Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur

Second Mid Term Examination, 2021

B.Tech./ Semester –IIIrd Year/ V Sem **Branch: Civil Engineering**

Subject: Repair and Rehabilitation of Structures **Subject Code: 5CE5-14**

Time: 1½ Hours **Maximum Mark: 20**

Part (A) All questions are compulsory (2X3= 6 Marks)

Q1. What is rebar locator?

Q2. Write about self-curing compound.

Q3. Enlist the characteristics of epoxy resin.

Part (B) Attempt any two question (4X2= 8 Marks)

Q1. Explain the preliminary investigation of damage assessment.

Q2. Discuss the properties and selection criteria of epoxy, polyester, and resins?

Q3. Explain Grouting Technique in detail?

Part (C) Attempt any one question (6X1= 6 Marks)

Q1. What do you mean by NDT? Write down the principle and working of Rebound hammer.

Q2. Write notes on: (1+1+4=6)

i. Under water repair
ii. Externally bonded plates
iii. A case study of rehabilitation of bridge.

Swami Keshvanand Institute of Technology, Management &Gramothan,
Ramnagaria, Jagatpura, Jaipur-302017

Question Paper Solution

Branch: Civil Engineering Semester: V Subject: Repair and Rehabilitation of Structures (5CE5-14) Term: II

Submitted By: Rakesh Choudhary

(PART-A)

Q.1 What is rebar locator? (2)

Sol.: Rebar locators are used to find the position of steel reinforcement bars in concrete structures and to measure their concrete cover. The test is used to determine effective concrete cover, detect reinforcement and bar diameter. It is also very useful for corrosion testing and to locate rebars before hacking of concrete or extracting concrete cores.

Q.2 Write about self-curing compound. (2)

Sol.: Curing is essential for the hydration of cement in concrete making. So, to maintain required moisture content, come precautions are applied. Concrete curing compound is a compound which helps to prevent the loss of moisture content from the concrete. So, concrete is properly cured which results the full development of strength of concrete.

Q.3 Enlist the characteristics of epoxy resin. (2)

SolThe basic characteristic of epoxy resin that makes them be widely used in the civil engineering application are:

The property of high adhesive strength to almost all the materials

- Low possibility for shrinkage during curing time
- Higher dimensional stability
- Naturally gained gap filling properties
- Thermosetting Property- Won't melt
- Higher resistance to chemicals and variety of environment condition
- Can cure even in wet conditions. For example Underwater construction
- Greater ease of application

(PART-B)

Q.4 Explain the preliminary investigation of damage assessment. (4)

Sol.: Preliminary investigation:

I. Visual Assessment
- Workmanship, structural serviceability, material, deterioration mechanism.
- General health (structural and nonstructural elements).
- Quantify extent of distress
- Photographic record.
- Obstructions for visual inspection to be noted.
- Understanding structural system / deviations
- Leakage , seepage due to inadequate drainage system
- Types of cracks and its pattern
- Color and texture of concrete surface (chemical attack or disintegration by way of leaching.

II. History Collection
- Information gathering
- Period of construction
- Construction details (drawings: architectural, structural)
- Exposure conditions
- Designed and present use of structure.
- Previous changes in use
- Record of structural changes if done.
- Record of 1st occurrence of defect.
- Details of repairs carried out previously.

Previous reports etc., and details from owner, photographs

Q.5 Discuss the properties and selection criteria of epoxy, polyester, and resins. (4)

Question Paper Solution

Branch: Civil Engineering Semester: V Subject: Repair and Rehabilitation of Structures (5CE5-14) Term: II

Submitted By: Rakesh Choudhary

Sol.:

Epoxies: The basic characteristic of epoxy resin that makes them be widely used in the civil engineering application are:

A. Typical applications.

- ✓ Bonding fresh concrete to old concrete
- ✓ Bonding old concrete to old concrete
- ✓ Bonding other materials to concrete
- ✓ Patches
- ✓ Protective coating
- ✓ Overlays
- ✓ Sealing water leakage(injection)
- ✓ Structural restoration of cracks (injection)
- ✓ Anchor grouting
- ✓ Grouting preplaced aggregate

B. Physical properties.

- ✓ Vary with formulation
- ✓ Vary with temperature
- ✓ Coefficient of thermal expansion greater than that of concrete

C. Advantages.

- ✓ Good adhesion
- ✓ High compressive/tensile/flexural strength
- ✓ Excellent resistance to cycles of freezing and thawing
- ✓ Good resistance to chemical attack
- ✓ Good wear resistance
- ✓ Impermeable
- ✓ Minimal shrinkage
- ✓ Excellent radiation resistance
- ✓ ome formulations are water compatible
- ✓ Viscosity can be varied
- ✓ Dimensionally stable

D. Disadvantages or limitations.

- ✓ Physical properties different from concrete
- ✓ Adversely affected by improper proportioning and lack of mixing
- ✓ Can cause allergic reaction in workers
- ✓ High exothermic reaction when used neat
- ✓ Limited thickness
- ✓ High coefficient of thermal expansion
- ✓ Physical characteristics are reduced at elevated temperature
- ✓ Higher creep than that of concrete
- ✓ Curing time dependent upon application temperature
- ✓ Some systems cannot be used in a moist environment

Polyesters.

A. Typical applications.

- ✓ Protective coatings
- ✓ Anchoring
- ✓ Adhesive bonder or sealer
- ✓ Floor coatings
- ✓ Sealer for epoxy injection
- ✓ Binder for polymer mortar
- ✓ Binder for fiberglass

- ✓ Thin overlays

B. Physical properties.

- ✓ Vary with formulation
- ✓ Vary with temperature
- ✓ Coefficient of thermal expansion greater than that of concrete

C. Advantages.

- ✓ Good chemical resistance
- ✓ Easy to use
- ✓ Good physical properties (some formulations)
- ✓ Good wear resistance
- ✓ Resistant to staining
- ✓ Impact resistance similar to concrete
- ✓ Impermeable

D. Disadvantages or limitations.

- ✓ Higher shrinkage and expansion than that of concrete
- ✓ Relatively poor adhesive properties (some formulations)
- ✓ Hydrolysis
- ✓ High exothermic reaction
- ✓ Strong odor

Resine

A. Typical applications.

- ✓ Adhesive for patches or overlays
- ✓ Concrete or mortar additive
- ✓ Adhesive bond coat
- ✓ Bonding agent for plaster

B. Physical properties.

- ✓ Vary according to concentration

C. Advantages.

- ✓ Easy to use
- ✓ Stable under sunlight
- ✓ Improved aging characteristics

D. Disadvantages or limitations.

- ✓ Must be protected before drying (some formulations)
- ✓ Poor resistance to cycles of freezing and thawing

Q6. Explain Grouting Technique in detail?

Sol.: Grouting in civil engineering refers to the injection of pumpable materials into a soil or rock formation to change its physical characteristics. It is one of the ways ground water can be controlled during civil engineering works. Grout is a fluid-consistency cement mortar used to fill voids and joints in masonry and to repair cracks. Grouting is the process of injecting liquids, mixed suspensions, or semi-solid mixtures under pressure to achieve one or more desired end results in terms of engineering properties.

Grout differs from mortar since it is poured rather than spread into place with a trowel. Cement, fine or coarse sand, water and a small amount (if any) of grouting admixture are the main ingredients of grout mixture.

Uses of Grouting

•Grout is used to fill the spaces between tunnel walls and the surrounding earth in order to distribute earth stresses evenly across the structures.

•Grout is widely used in dams to fill cracks that form after the concrete hardens and sets.

•Grout is also used to inject soil to increase its bearing capacity.

•Grouting can be used to improve the mechanical properties of soil or rock foundation materials used to support structures or excavations.
•Grout is also used to fill hollow concrete blocks in order to develop a bond between the steel reinforcement and the concrete.

Applications of Grouting

- The main application is the control of ground movement during tunneling operations.
- Used to regulate the control of groundwater flow.
- It is also applied for strengthening of soil to reduce the need for lateral support.
- Control of volume change in expansive soil via pressure injection of lime slurry.
- Soil strengthening for piles to increase their lateral and vertical resistance.
- To avoid excessive settlement, voids must be filled by grouting.
- For stabilizing loose sand to prevent liquefication.
- Underpinning of foundation.

Types of Grout Materials

Grouting is also categorized according to the material used in mix. Some of the grout materials are mentioned below.

- Asphalt Grouts
- Cementitious Grouts
- Chemical Grouts
- Epoxy Grouts

(PART-C)

Q1. What do you mean by NDT? Write down the principle and working of Rebound hammer. (6)

Sol.: Nondestructive test is generally defined as a method of test that does not impair the intended performance of the element or member under investigation. The process of nondestructive testing determines the existence of flaws, discontinuities, leaks, contamination, thermal anomalies, or imperfections in materials, components or assemblies without impairing the integrity or function of the inspected component.

Typical situations where non-destructive testing may be useful are, as follows:

- ✓ ***Quality control of pre-cast units or construction in situ***
- ✓ ***Removing uncertainties about the acceptability of the material supplied owing to apparent non compliance with specification***
- ✓ ***Confirming or negating doubt concerning the workmanship involved in batching, mixing, placing, compacting or curing of concrete.***
- ✓ ***Monitoring of strength development in relation to formwork removal, cessation of curing, prestressing, load application or similar purpose***
- ✓ ***Location and determination of the extent of cracks, voids, honeycombing and similar defects within a concrete structure.***
- ✓ ***Determining the concrete uniformity, possibly preliminary to core cutting, load testing or other more expensive or disruptive tests.***
- ✓ ***Determining the position, quantity or condition of reinforcement***
- ✓ ***Increasing the confidence level of a smaller number of destructive tests***
- ✓ ***determining the extent of concrete variability in order to help in the selection of sample***
- ✓ ***locations representative of the quality to be assessed***
- ✓ ***confirming or locating suspected deterioration of concrete resulting from such factors as overloading, fatigue, external or internal chemical attack or change, fire, explosion, environmental effects***
- ✓ ***assessing the potential durability of the concrete***
- ✓ ***monitoring long term changes in concrete properties***
- ✓ ***Providing information for any proposed change of use of a structure for insurance or for change of ownership.***

Question Paper Solution

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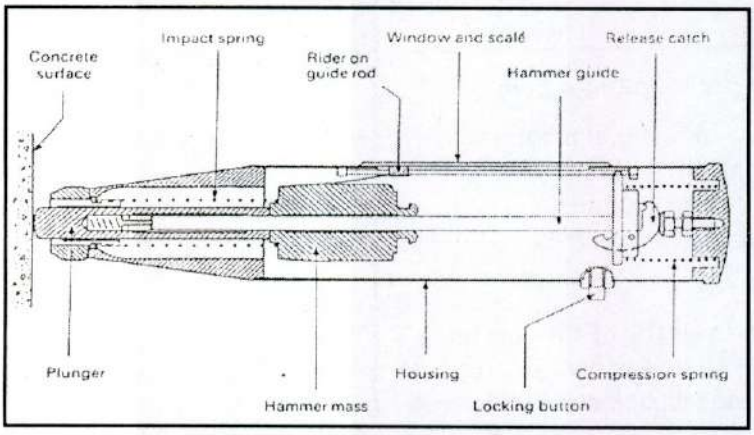
REBOUND HAMMER TEST

The rebound hammer method could be used for :

- Assessing the compressive strength of concrete with the help of suitable co-relations between rebound index and compressive strength
- Assessing the uniformity of the concrete
- Assessing the quality of concrete in relation to the standard requirements
- Assessing the quality of one element of concrete in relation to another.

Principle of test: The test is based on the principle that the rebound of an elastic mass depends on the hardness of the surface upon which it impinges. When the plunger of the rebound hammer pressed against the surface of the concrete, the spring controlled mass rebounds and the extent of such rebound depend upon the surface hardness of concrete. The surface hardness and therefore the rebound is taken to be related to the compressive strength of concrete. The rebound is read off along a graduated scale and is designated as the rebound number or rebound index.



Working of rebound hammer: A schematic cut way view of schmidt rebound hammer is shown in figure. The hammer weight about 1.8 kg., is suitable for use both in a laboratory and in the field. When the plunger of rebound hammer is pressed against the surface of concrete, a spring controlled mass rebounds and the extent of such rebound depends upon the surface hardness of concrete.

The rebound distance is measured on a graduated scale and is designated as rebound number. Basically, the rebound distance depends on the value of kinetic energy in the hammer, prior to impact with the shoulder of the plunger and how much of that energy is absorbed during impact. The energy absorbed by the concrete depends on the stress-strain relationship of concrete. Thus, a low strength low stiffness concrete will absorb more energy than high strength concrete and will give a lower rebound number.

Limitations: Although the rebound hammer provides a quick inexpensive means of checking the uniformity of concrete, it has serious limitations and these must be understood clearly for interpretation of test results.

Question Paper Solution

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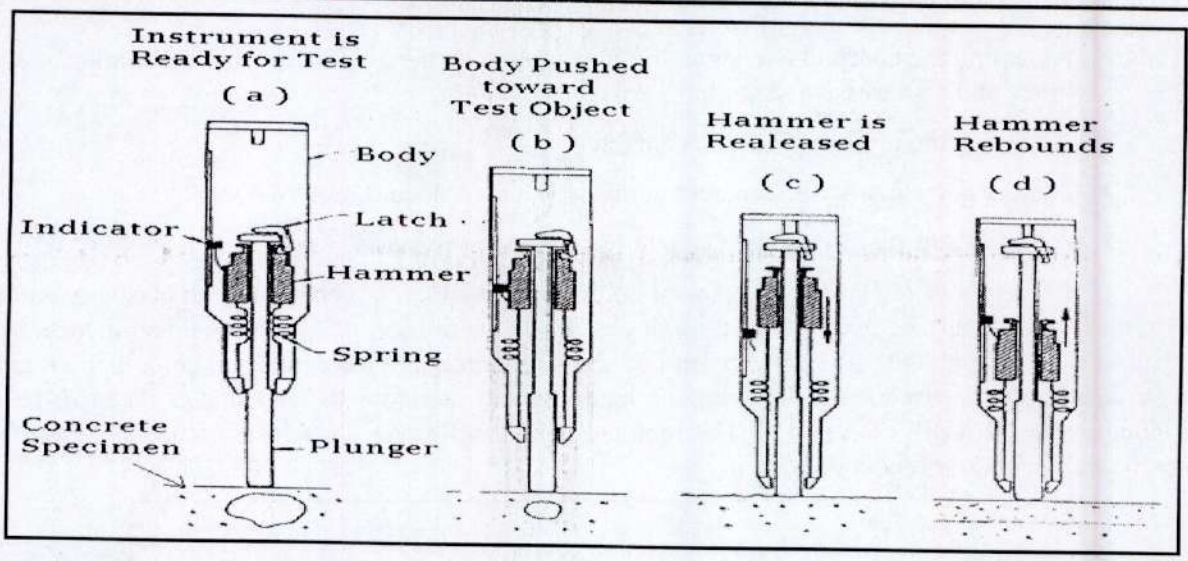
Submitted By: Rakesh Choudhary



Factors affecting rebound number

The results of Schmidt rebound hammer are significantly influenced by the following factors:

1. Smoothness of the test surface

Hammer has to be used against a smooth surface, preferably a formed one. Open textured concrete cannot therefore be tested. If the surface is rough, e.g. a trowelled surface, it should be rubbed smooth with a carborundum stone.

2. Size, shape and rigidity of the specimen

If the concrete does not form part of a large mass any movement caused by the impact of the hammer will result in a reduction in the rebound number. In such cases the member has to be rigidly held or backed up by a heavy mass.

3. Age of the specimen

For equal strengths, higher rebound numbers are obtained with a 7 day old concrete than with a 28 day old. Therefore, when old concrete is to be tested in a structure a direct correlation is necessary between the rebound numbers and compressive strengths of cores taken from the structure. Rebound testing should not be carried out on low strength concrete at early ages or when the concrete strength is less than 7 MPa since the concrete surface could be damaged by the hammer.

4. Surface and internal moisture conditions of concrete

The rebound numbers are lower for well-cured air dried specimens than for the same specimens tested after being soaked in water and tested in the saturated surface dried conditions. Therefore, whenever the actual moisture condition of the field concrete or specimen is unknown, the surface should be pre-saturated for several hours before testing. A correlation curve for tests performed on saturated surface dried specimens should then be used to estimate the compressive strength.

5. Type of coarse aggregate

Even though the same aggregate type is used in the concrete mix, the correlation curves can be different if the source of the aggregate is different.

6. Type of cement

High alumina cement can have a compressive strength 100% higher than the strength estimated using a correlation curve based on ordinary Portland cement. Also, super sulphated cement concrete can have strength 50% lower than ordinary Portland cement.

Question Paper Solution

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7. Carbonation of the concrete surface

In older concrete the carbonation depth can be several millimeters thick and, in extreme cases, up to 20 mm thick. In such cases the rebound numbers can be up to 50% higher than those obtained on an uncarbonated concrete surface.

Influence of these factors has different magnitudes. Hammer orientation will also influence the measured values, although correction factors can be used to allow for this effect.

Precautions to be taken while using rebound hammer: The following precautionary measures are taken while using the rebound hammer which may give rise to minimize error

- The surface on which the hammer strikes should be smooth and uniform. Moulded faces in such cases may be preferred over the Trowelled faces.
- The test hammer should not be used within about 20 mm from the edge of the specimen.
- Rebound hammer should not be used over the same points more than once.

The rebound test must be conducted closely placed to test points, on at least 10 to 12 locations while taking the average extremely high and low values of the index number should be neglected.

Q8. Write notes on: (1+1+4=6)

I. **Under water repair**
II. **Externally bonded plates**
III. **A case study of rehabilitation of bridge.**

Sol.: **I. Under water repair:** Several methods are used for the repair of underwater concrete structures. These methods with procedures for the repair of underwater concrete structures are discussed.

Following are the different methods to repair underwater concrete structures:

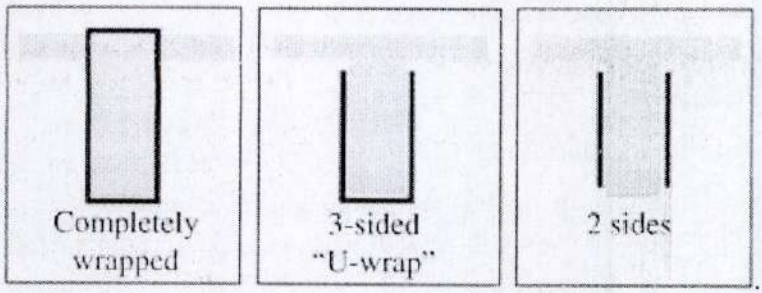
- Surface spalling repair
- Large scale repair of underwater structural concrete
- Preplaced aggregate concrete
- Injection technique for restoring the underwater concrete structure
- Guniting or shotcrete method to repair underwater concrete structure
- Steel sleeve repairing technique of underwater concrete

II. Externally bonded plates

Strengthening of reinforced concrete beams with Externally bonded plates systems (FRP plate or strips) have been utilize from around 1980s. FRP systems can be used for increasing shear strength of reinforced concrete beams by completely or partially wrapping FRP systems around reinforced concrete member. Since, most of reinforced concrete beams are constructed monolithically with other continuous members such as slabs or walls, therefore complete wrapping of FRP plates is not possible in most cases. Directing FRP fibers perpendicular to potential shear cracks is effective in providing extra shear strength.

There are three major wrapping schemes that applied in the shear strengthening of reinforced concrete beams:

- Complete wrapping
- U- Shaped wrapping scheme
- Two side wrapping scheme



III. A case study of rehabilitation of bridge

Girna Bridge is located near Chalisgaon town in Dhulia District of Maharashtra State on a State Highway. It has been constructed across river Girna by Public Works Department of Government of Maharashtra in the year 1965. The Bridge is founded on twin well foundation. The wells are of 4.27 metre diameter. The masonry piers of about 9 metre height are supported on wells. The superstructure of 247 metre length is of Balanced Cantilever type and consists of 3 beam System with reinforced concrete decking on top. The main spans are 27.4 metre length with 6.86 metre long cantilevers on either side. Suspended spans of 13.7 metre length have been provided between cantilever tips. The main beams are supported on steel rocker and roller bearings on piers and the suspended beams rest on plate bearings at articulation points.

The distress mainly was in the superstructure. In the year 1980, it was observed that the concrete in the zone of articulation is substantially damaged. The factors contributing to the damages are outlined below:

i) Plate bearings could not function due to jamming and absence of expansion gap.

ii) The main reinforcement in the cantilever portion was found having excessive cover.

iii) Concrete in the articulation zone was not of adequate quality.

In a particular span (No. 6), distress noticed in suspended span at articulation was of higher magnitude. Large chunks of concrete were found separated in the span from the cantilever tips and the suspended span had therefore settled by about 40 mm. In most of the articulation tips, wide cracks had developed. The distress mainly was in the superstructure. In the year 1980, it was observed that the concrete in the zone of articulation is substantially damaged. The factors contributing to the damages are outlined below:

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Remedial Measures:

Replacement of steel plate bearings by Neoprene Bearings and repairs to damaged concrete portion at the articulation were considered essential. For this purpose, it was necessary to lift the suspended spans and reconcrete the cantilever tips. Lifting of suspended spans was required to be done from the deck level since height of the superstructure was about 15 metres from river bed. Fabricated steel girders were placed in line with reinforced concrete beams over articulation portion. These steel girders were connected to reinforced concrete beams by means of Alloy steel suspenders at two locations. The hydraulic jacks were placed under the projecting portion of steel girders over the cantilever beams. All hydraulic jacks were connected to a common hydraulic circuit. Lifting of the suspended span could be achieved by pressunzing the hydraulic circuit. It was possible to obtain almost uniform lifting, by Controlling the valves on the circuitry. The span was raised by about 40 cms. Specially fabricated light weight platform was suspended from the deck for providing access to the articulation zone. Damaged concrete was removed by using pneumatic tools. Additional reinforcement was welded to the existing reinforcement and reconcreting was done by using epoxy bond layer at the interface of old and new concrete. At this face, subsequently, epoxy was injeeted through the inlets provided at the time of concreting. In one span, external prestressing rods were provided to prevent Separation of old concrete to new concrete besides other measures. Neoprene Bearings were placed in position and the span was lowered onto these bearings after the new concrete has attained minimum strength for dead load reaction. The prestressing rods were grouted after 3 months or so, to enable monitoring at articulation during this period. These rods were restressed to make up slight loss of prestress and then grouting was carried out. All the suspended spans were repaired in the same manner except that external prestressing rods were not considered necessary in remaining spans.

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Analysis of Question Paper Mid Term II Examination-2021

Branch : Civil Engineering **Semester/session: V/2021-22** **Max Marks:20**
Subject Code: 5CE5-14 **Subject:Repair and Rehabilitation of Structures** **Duration: 1.5 hours**

A. Distribution of Course Outcome and Bloom's Taxonomy in Question Paper

Part	Q. No	Questions	Marks	CO	BL
A	Q.1	What is rebar locator?	2	4	1
	Q.2	Write about self-curing compound.	2	5	2
	Q.3	Enlist the characteristics of epoxy resin.	2	5	1
B	Q.1	Explain the preliminary investigation of damage assessment.	4	4	2
	Q.2	Discuss the properties and selection criteria of epoxy, polyester, and resins?	4	5	2
	Q.3	Explain Grouting Technique in detail?	4	5	2
C	Q.1	Q7. What do you mean by NDT? Write down the principle and working of Rebound hammer.	6	4	2
	Q.2	Q8. Write notes on: i. Under water repair ii. Externally bonded plates iii. A case study of rehabilitation of bridge.	6	6	3

BL – Bloom's Taxonomy Levels
(1- Remembering, 2- Understanding, 3 – Applying, 4 – Analyzing, 5 – Evaluating, 6 - Creating)
CO – Course Outcomes

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Analysis of Question Paper Mid Term II Examination-2021

Branch : Civil Engineering Semester/session: V/2021-22 Max Marks:20
Subject Code: 5CE5-14 Subject:Repair and Rehabilitation of Structures Duration: 1.5 hours

B. Questions and Course Outcomes (COs) Mapping in terms of correlation

COs	Part A			Part B			Part C	
	Q1	Q2	Q3	Q1	Q2	Q3	Q1	Q2
CO1	0	0	0	0	0	0	1	0
CO2	0	0	0	0	0	0	0	0
CO3	0	0	0	0	0	0	0	0
CO4	3	0	0	3	0	0	3	2
CO5	0	3	3	0	3	3	0	2
CO6	0	0	0	0	0	0	0	3

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

C. Mapping of Bloom's Level and Course Outcomes with Question Paper

Bloom's Level Mapping		CO Mapping	
Bloom's Level	Percentage	CO	Percentage
BL1	13.33	CO1	00
BL2	66.67	CO2	00
BL3	20	CO3	00
		CO4	40
		CO5	40
		CO6	20

Swami Keshvanand Institute of Technology, M & G, Jaipur

Department of Civil Engineering

Mark List Cum Attainment Level of Subject

II Midterm Exam (2021)

Subject Code : 5CE5-14 **Subject : Repair and Rehabilitation of Structures (V-A)**

	Q. No.	1	2	3	4	5	6	7	8	TOTAL
	MM.	2	2	2	4	4	4	6	6	
	CO	5	4	2	2	5	4	3	3	
	Criterion: 50% of MM	1	1	1	2	2	2	3	3	
Roll No.	Name of Student	Part A			Part B			Part C		
19ESKCE001	Abhay Singh Dhaka	2	2	2	3	3		5		17
19ESKCE002	Abhijeet Singh Nathawat	2	2	2	4	3		6		19
19ESKCE003	Abhishek Lodwar	2	2	1	3		5			13
19ESKCE004	Abhishek Meena	2		0	0			4		6
19ESKCE005	Abhishek Moond	2	2	2	4		4	6		20
19ESKCE006	Aditya Choudhary	2	2	2				5		11
19ESKCE007	Aditya Raj	ABSENT								0
19ESKCE008	Aditya Saini	2	2	2	3		4	5		18
19ESKCE009	Ajay Kumar Meena	0	2				3		3	8
19ESKCE011	Akanksha Foujdar	2	2	2	4		4	6		20
19ESKCE012	Aman Suthar	2	0	2	3		4	5		16
19ESKCE013	Amit Kumar	2	2	2	4			6		16
19ESKCE014	Amit Kumar Sonwal	1	2		3	2		1		9
19ESKCE015	Anand Joshi	1	2	2	3	4	3			15
19ESKCE016	Anand Kumar	2	2	2	4		4	4		18
19ESKCE017	Ankit Mina	2	2		4	2		5		15
19ESKCE018	Anshaj Goyal				1					1
19ESKCE019	Anurag Meena	2	2	2	4		3	5		18
19ESKCE020	Arpit Meena	2	2	2	3	4		6		19
19ESKCE021	Arpit Mukesh Meena	2	2	2	4		4	6		20
19ESKCE022	Arvind Kumawat	1	2	2	4		4	3		16
19ESKCE023	Aryan Khatri	2	1	1	2	2		3		11
19ESKCE024	Ashish Singh Jadaun	2	1	0	2			3		8
19ESKCE025	Ashok Bairwa	2	1	1	2		2	6		14
19ESKCE026	Atiba Qureshi	1	2	2		4	4	5		18
19ESKCE027	Ayush Choudhary	2	2	2	4		4	0		14
19ESKCE028	Ayush Kumar	1	2	1	3		2	2		11
19ESKCE029	Banwari Lal Meena	2	2	2	4	2		4		16
19ESKCE030	Brijesh Jatoliya									0
19ESKCE031	Chitranshu Meena	ABSENT								
19ESKCE032	Deepak Meena	1	1	0	4			4		10
19ESKCE033	Dipak Kumar	ABSENT								
19ESKCE034	Divyanshu Jain	2	2	2	4			5		15
19ESKCE036	Harsh Kumawat			2	4			5		11
19ESKCE037	Harsh Meena	1	2		3		2	4		12
19ESKCE038	Harsh Singhal	2	1	2	2			3		10

19ESKCE039	Harshvardhan Rawat	2	2	2	4			6		16
19ESKCE040	Himanshu Agarwal	0	2	2	4		4	6		18
19ESKCE041	Himanshu Choudhary			2	4		4	4		14
19ESKCE042	Himanshu Vijayvargia	1	2	2	4		4	1		14
19ESKCE043	Hitesh Kumar Meena	2	2		4		4	6		18
19ESKCE044	Hitesh Sharma	2	2	2	4		3	5		18
19ESKCE045	Ishant Jogani	0	2	2	2		3		4	13
19ESKCE046	Jagender Baknad	2	2	2	3	4			5	18
19ESKCE047	Jatin Meena		2		1					3
19ESKCE048	Jatin Pratap Meena	1	2	2		4			4	13
19ESKCE049	Jatin Vedwal	2	2	2	4		2	5		17
19ESKCE050	Jay Kumar Bansiwal	2	2	1	4		2	4		15
19ESKCE051	Jayant Kumar	2	2	2	4		3	6		19
19ESKCE052	Jenisha Devnani	2	2	2	4		4	6		20
19ESKCE053	Kahkashan Khanam	ABSENT								
19ESKCE055	Kanishka	2	1	2	3	4		6		18
19ESKCE056	Karan Meena		2	2	4		3	6		17
19ESKCE057	Kartikay Singhal	2	2	2	4		4	6		20
19ESKCE058	Kavya Kulshrestha	2	2	2	4		4	6		20
19ESKCE059	Kuldeep Tiwari	2	2	2	3	1		3		13
19ESKCE060	Kumkum Maurya	2	2	2		4	4	5		19
19ESKCE061	Lalit Kumar Suwalka	2	1	2	3		2		4	14
19ESKCE062	Lokesh Mali	2	2	2	3		2	3		14
19ESKCE063	Luv Kumar Suhag	2	2	2	3		2	1		12
19ESKCE064	Mahendra Meena	ABSENT								0
19ESKCE065	Manish Choudhary	2	2	1				2		7
19ESKCE066	Manish Choudhary	2	2	2	2	2			3	13
19ESKCE067	Manish Kumar Meena	ABSENT								
19ESKCE068	Manish Rad	1	1	1	3		3		4	13
19ESKCE069	Mehul Agarwal		0			3	3	3		9
19ESKCE070	Mohammad Ramjan	ABSENT								
19ESKCE071	Mohd Arif Chowdhary	ABSENT								
19ESKCE072	Mohit Meena	2	1		1		2	2		8
19ESKCE073	Mukul Mangal	1	0	2	4		3		4	14
19ESKCE074	Muskan Meena	1	2	2	4		3	4		16
No. of Students attempt question		57	58	53	55	16	38	50	8	
No. of student get marks greater than 50		53	55	50	51	15	38	43	8	
%		92.98	94.83	94.34	92.73	93.75	100.00	86.00	100.00	
Attainment level gain		3	3	3	3	3	3	3	3	

*** If >75% students get 50% marks or more, than attainment level is**	**3**
*** If 66-75% students get 50% marks or more, than attainment level is**	**2**
*** If 56-65% students get 50% marks or more, than attainment level is**	**1**
*** If 45-55% students get 50% marks or more, than attainment level is**	**0**

RAKESH CHOUDHARY

Rakesh

Swami Keshvanand Institute of Technology, M & G, Jaipur

Department of Civil Engineering

Mark List Cum Attainment Level of Subject

II Midterm Exam (2021)

Subject Code : 5CE5-14 **Subject : RRS (V-B)**

	Q. No.	1	2	3	4	5	6	7	8	TOTAL
	MM.	2	2	2	4	4	4	6	6	
	CO	5	4	2	2	5	4	3	3	
	Criterion: 50% of MM	1	1	1	2	2	2	3	3	
Roll No.	**Name of Student**	**Part A**			**Part B**			**Part C**		**20**
19ESKCE075	Naman Singhal	1	2	2		3	3	5		**16**
19ESKCE076	Naveen Kumar	1	0		2		3	4		**10**
19ESKCE077	Nitesh Kumar	ABSENT								
19ESKCE078	Nitin Goyal	2	2	2	3		4	6		**19**
19ESKCE079	Piyush Jain	0			4		4	6		**14**
19ESKCE080	Pooja Kumari Meena	2	1	2	4	4		6		**19**
19ESKCE081	Pradeep Kumar Meena	2	2	2		4	4	5		**19**
19ESKCE082	Pravesh Sehra	2	2	2	3		4		4	**17**
19ESKCE083	Raghvendra Singh Rathor	ABSENT								
19ESKCE084	Rahul Ghorela	ABSENT								
19ESKCE085	Rahul Meena		2	2		3	3	4		**14**
19ESKCE086	Rahul Sharma	1	2	2		4	3	2		**14**
19ESKCE087	Rahul Singh Shekhawat	ABSENT								
19ESKCE088	Rajat Singh		2	2	2		2		4	**12**
19ESKCE089	Rakesh Jakhar	1	2	2	3		2		5	**15**
19ESKCE090	Rakesh Mina	2	2	2	2		2		3	**13**
19ESKCE091	Rakesh Singh	0	0	0	2		2		4	**8**
19ESKCE092	Ramesh Choudhary	1	2	2	3		4		6	**18**
19ESKCE093	Randheer	2	2						3	**7**
19ESKCE094	Reddy Sai Praveen Reddy	2	2	2	4		4	5		**19**
19ESKCE095	Ritesh Kumar Maurya	1	2	2	3		3	6		**17**
19ESKCE096	Rohit Mehta	1	2	2	4		3	5		**17**
19ESKCE097	Sachin Rewadia	1	1	1	4		4	5		**16**
19ESKCE099	Sagar Meena	ABSENT								
19ESKCE100	Sahi Ram Godara	1	2	2		4	3	4		**16**
19ESKCE102	Samyak Jain	2	1	2	4		4	6		**19**
19ESKCE103	Sanuj Mohan							1		**1**
19ESKCE104	Satish Saini	0	1	1		1			4	**7**
19ESKCE105	Saurabh Kumar Meena	1	1	1	4		3		1	**11**
19ESKCE107	Shailesh Kumar				3		3		4	**10**
19ESKCE108	Shiv Singh Naruka	2		2	3		3	5		**15**
19ESKCE109	Shivani Meena			1	4		3	5		**13**
19ESKCE110	Shubham Saxena	1	1	2	3		3	5		**15**
19ESKCE111	Sonal Meena				4		4	5		**13**
19ESKCE112	Sourabh Meena	2	1		1			2		**6**
19ESKCE113	Subhash Sihag	2	2	2	3			5		**14**

19ESKCE114	Sumit Dangda	2	2	2	4		4	6		20
19ESKCE115	Tanmay Jaiswal	ABSENT								
19ESKCE116	Ujjwal Tripathi	0	0	1	0		1		1	3
19ESKCE117	Umang Panchal	1	1	1	4		3	5		15
19ESKCE118	Utkarsh Daukiya	1	1	0	3				5	10
19ESKCE119	Ved Pratap Singh	2	0	0	1		3	2		8
19ESKCE120	Vikas Aechara	1	2	1	4		4	5		17
19ESKCE121	Vikash Mahawar			2	4		4	5		15
19ESKCE122	Vimal Kumawat	2	2	2	4		4	6		20
19ESKCE123	Vinod Kumar Meena	2	2	2		4	4	5		19
19ESKCE124	Vishal Kumar	ABSENT								
19ESKCE125	Vishnu Goyal	2		2					2	6
19ESKCE126	Vishnu Meena	ABSENT								
19ESKCE127	Vivek Verma	1	2	1	3		4	5		16
19ESKCE128	Yash Chaudhary	1	2	1				4		8
19ESKCE129	Youvan Jain	2	2	2	4		4	6		20
19ESKCE300	Nitesh	2	0	2	4		4	2		14
19ESKCE301	Rishabh	2	1	2	4		4	6		19
19ESKCE302	Shouryaraj Singh	2	2	2		3	4	5		18
19ESKCE303	Anush Sharma	2	2	2	4		4	6		20
20ESKCE200	Aditya Singh Parihar	1	1		3		1	4		10
20ESKCE202	Ashish Verma	1	2	2		4	4	6		19
20ESKCE203	Chitransh Srivastava	2	2	2	4		4	6		20
20ESKCE204	Mukul Saini	2	2	2	3		4	6		19
20ESKCE205	Pankaj Sharma		1	1				3		5
20ESKCE206	Priyanka Sharma	2	2	2	4	4		6		20
20ESKCE207	Rahul Saini	1	2	2	3	4		4		16
20ESKCE208	Rakesh Kumar Meena	2	2	1		3	4	4		16
20ESKCE209	Shiv Datt Borana		2	1	3		3	4		13
20ESKCE210	Shubham Jain	1	2	2	4		3	6		18
20ESKCE211	Simran Singh		2	2	4		4	5		17
20ESKCE212	Udit Narayan Avasthi	2	2	2	4		4	6		20
20ESKCE213	Yash Sarswat	2	2	2		3	4	6		19
20ESKCE215	Yash Sharma	1	2	2	4	4		5		18
No. of Students attempt question		**52**	**54**	**54**	**46**	**15**	**49**	**49**	**13**	
No. of student get marks greater than 50		**48**	**49**	**51**	**43**	**14**	**47**	**44**	**10**	
%		92.31	90.74	94.44	93.48	93.33	95.92	89.80	76.92	
Attainment level gain		**3**	**3**	**3**	**2**	**2**	**3**	**3**	**3**	

*** If >75% students get 50% marks or more, than attainment level is**	**3**
*** If 66-75% students get 50% marks or more, than attainment level is**	**2**
*** If 56-65% students get 50% marks or more, than attainment level is**	**1**
*** If 45-55% students get 50% marks or more, than attainment level is**	**0**

RAKESH CHOUDHARY
(Name of Faculty)

29.12.2021

Date: 29/12/21 II Session

Swami Keshvanand Institute of Technology, M & G, Jaipur

II- Mid Term Examination, 2021

B.Tech./ Semester -V | **Branch: CE**

Subject: TP | **Subject Code: 5CE5-13**

Time: 1½ Hours | **Maximum Mark: 20**

Note:- 1. Attempt all questions from Part – (A) **(Q. No. 1, 2 &3)**
2. Attempt any two questions from Part – (B) **(Q. No. 4, 5 & 6)**
3. Attempt any one question from Part – (C) **(Q. No. 7 & 8)**

PART (A)

Q.1. Write a short note on concentration of Industry? **(2)**

Q.2. Write the factors influencing the demand of Housing. **(2)**

Q.3. State any four objectives of replanning of a town. **(2)**

PART (B)

Q.4. What do you understand by decentralization of Towns? **(4)**

Q.5. What are the principles of Neighborhood Unit Planning? Explain in detail. **(4)**

Q.6. Explain the Improvement method for slum clearance in detail. **(4)**

PART (C)

Q.7. What are the preventive measures to adopt to stop slum formation? **(6)**

Q.8. What are the factors to be considered while deciding the location of public buildings? **(6)**

Question Paper Solution for Mid Term: II Examination-2021

Branch: Civil Engg. **Semester/session: V** **Submitted by: Er. J.B. Jangid & Vikas Vyas**
Subject Code: 5CE5-13 **Subject: Town Planning**

PART A

Q.1 Write a short note on concentration of Industry.

Ans:

Industrial concentration" refers to a structural characteristic of the business sector. It is the degree to which production in an industry—or in the economy as a whole—is dominated by a few large firms. Once assumed to be a symptom of "market failure," concentration is, for the most part, seen nowadays as an indicator of superior economic performance.

Q.2 Write the factors influencing the demand of Housing.

Ans:

1. Higher incomes.
2. Demographics.
3. High rents.
4. Lower interest rates.
5. Greater credit availability.
6. Speculative demand.
7. Taxation influences.
8. Discount on capital gains on investor housing.
9. Capital gains tax exemption for owner-occupied housing.
10. Land tax exemption for owner-occupied housing.
11. Negative gearing.

Q.3 State any four objectives of replanning of a town?

Ans:

1. To add further to the civic aesthetics of the town.
2. To attempt for an orderly, appropriate & balanced arrangements of land use.
3. To contribute to the economics & social welfare of the community.
4. To correct the past errors as far as possible.

PART-B

Q.4 What do you understand by decentralization of Towns?

Ans: Decentralization is the process of distributing or dispersing functions, powers, people or things away from a central location or authority. The basic idea in decentralization as well as recentralization is to make town healthier by introducing the advantages of country or village. The well-planned centres & sub-centres with large open spaces around them from an ideal arrangement. The place for these centres can be deliberately chosen & developed as such.

The arrangements to be accepted for decentralization & recentralization include the following:

1) Diffusion of residential units into compact residential neighbourhoods throughout the whole urban region.
2) Recentralization of industry with the objects of lessening the density of congested centres& of creation of new centres.

Sub- centralization of business centres so arranged as to provide the maximum convenience t the residential areas.

Q.5 What are the principles of Neighborhood Unit Planning? Explain in detail.

Ans:

The neighbourhood unit theory provides a planning guideline of space and facilities that can support a routine life within a spatial boundary. A neighborhood unit is a block surrounded by a convenient internal transportation network and trunk roads. A block is developed to have a size optimal to maintain an elementary school.

Principles:

- Major arterials and through traffic routes should not pass through residential neighborhoods. Instead these streets should provide boundaries of the neighborhood;
- Interior street patterns should be designed and constructed through use of cui-de-sacs, curved layout

and light duty surfacing so as to encourage a quiet, safe and low volume traffic movement and preservation of the residential atmosphere;

- The population of the neighborhood should be that which is required to support its elementary school;
- The neighborhood focal point should be the elementary school centrally located on a common or green, along with other institutions that have service areas coincident with the neighborhood boundaries;
- The radius of the neighborhood should be a maximum of one quarter mile thus precluding a walk of more than that distance for any elementary school child; and
- Shopping districts should be sited at the edge of neighborhoods preferably at major street intersections.

Q.6 Explain the Improvement method for slum clearance in detail?

Ans:

Slum clearance in India is used as an urban renewal approach to redevelop and transform poor and low income settlements into new developments or housing. Millions of people live in slum dwellings across India and many migrate to live in the slums from rural villages, often in search of work opportunities.

1. **Complete removal method-** In this method, the slum area is completely cleaned out of the existing locality. All the dilapidated structures are demolished. Only such buildings which are really in good condition are retained. The area thus cleaned up may be used as open spaces and site for new buildings.

2. **Improvement method-** It is observed that certain areas where slums are due to poor drainage arrangement & insanitariy environments need necessarily be demolished. If the houses are fairly good, certain steps such as improvements of the street system, filling up of low ground, modifications of drainage arrangements, removal of obstructing structures, etc. The important points to be carefully attended to in any slum clearance or improvement projects are as follows:

    a) Amenities.
    b) Legal aspects.
    c) Transit camps.
    d) Unauthorized persons.

PART-C

Q.7. What are the preventive measures to adopt to stop slum formation?

Ans:

- The government should consider providing a legitimate solution to the poor. Most of the times, it is seen that the rehabilitation takes place at a location which is far away from the core areas and employability is zero.
- Instead of forced evictions, authorities should plan an in-situ upgrading approach.
- Not everyone wants to live in homes which are insufficient for family needs and just have a concrete roof over their head.
- To rehabilitate the downtrodden, the government should offer them areas where they can stay within the community and not in isolated projects and societies.
- Offering safe and secure land title should also be on the consideration list of the government to ensure that the settlement isn't disturbed in the future.
- If the existing homes are being upgraded, municipal authorities should upgrade the provisions from time to time.
- Easy financing and loaning options at affordable interest rates for upgrading, building and extension of the existing shelter should be made available. New methods of creating land supply should be tried.. Freeing up the unused land lying with government institutions can be used to create affordable homes.
- It is important to change the thought process of the people first. The urban population avoids staying in the same compound with the under-privileged, it has been seen. Also, slum-rehabilitation projects which have reservations for the economic weaker section has minimal amenities and facilities for them as compared to those offered to regular buyers.

Q.8. What are the factors to be considered while deciding the location of public buildings?

Ans:

1. PURPOSE OF BUILDING- This is the most important factor to consider before purchasing or selecting a site for residential purpose. The site should be selected keeping in view the general scope or the purpose of building and on the basis of extent or privacy required.

2. FRIENDLY NEIGHBORHOOD-The site should be situated in locality which is already fully developed or

which is fast developing. To secure happy living conditions, generally such neighborhood is preferred where the neighbors belong to an equal status in society and who should be social and friendly.

3. AVAILABLE FACILITIES

The plot should be in a locality where the various facilities as mentioned below are available.

- Community services such as police and fire protection, clearing of waste and street cleaning
- Utility services such as water supply, gas, electricity, and drainage
- Amenities such as schools, hospitals, libraries, recreation, telephone, etc
- Shopping facilities
- Means of transportation

4. GOVERNMENT LAWS- A site which comes within the limits of an area where the by-laws of the local authority enforce restrictions regarding proportions of plots to be built up, vacant spaces to be left in front and sides, heights of buildings, etc., should be preferred.

5. SHAPE & SIZE-Area of the plot of land should be such that the house constructed, keeping in view the restrictions of the local authority, would meet the requirements of the owner, preferably with possibilities of future extensions. The site should not be irregular in shape or having any sharp corners.

6. TERRAIN CONDITION- The site should be situated on an elevated place and also leveled with uniform slopes from one end to the other so as to provide good and quick drainage of rain water.

7. TYPE OF GROUND SOIL- The ground soil of the site should be good enough to provide economical foundations for the intended building without causing and problems. Generally, for most satisfactory constructions, the site should have rock, sand or dense soil below 60 to 120 cm layer of light soil or even black cotton soil.

8. NATURAL LIGHT & AIR- The location of the site should be such as to ensure unobstructed natural light and air.

9. ENVIRONMENTAL CONDITION- The site should be available in a locality where natural beauty and man-made environment create healthy living and working conditions. Environment also affected by nearest factories, kiln etc: so these thing also need to be considered.

10. LEGAL & FINANCIAL ASPECTS- The legal and financial aspects, which dictate upon ownership rights and the costs, should be given due consideration before the purchase of a plot.

Swami Keshvanand Institute of Technology, Management & Gramothan, Ramnagaria, Jagatpura, Jaipur-302017

Analysis of Question Paper Mid Term : II Examination-2021

Branch : CE **Semester/session: V/2021-22** **Max Marks:20**
Subject Code: 5CE5-13 **Subject: Town Planning** **Duration:1.5 hrs**

A. Distribution of Course Outcome and Bloom's Taxonomy in Question Paper

Q.No	Questions	Marks	CO	BL
1	Write a short note on concentration of Industry?	2	6	1
2	Write the factors influencing the demand of Housing.	2	3	1
3	State any four objectives of replanning of a town	2	6	1
4	What do you understand by decentralization of Towns?	4	5	1,2
5	What are the principles of Neighborhood Unit Planning? Explain in detail.	4	3	1,2
6	Explain the Improvement method for slum clearance in detail.	4	4	1,2
7	What are the preventive measures to adopt to stop slum formation?	6	4	1
8	What are the factors to be considered while deciding the location of public buildings?	6	5	1,2

BL – Bloom's Taxonomy Levels
(1- Remembering, 2- Understanding, 3 – Applying, 4 – Analyzing, 5 – Evaluating, 6 - Creating)
CO – Course Outcomes

Swami Keshvanand Institute of Technology, Management & Gramothan, Ramnagaria, Jagatpura, Jaipur-302017

Analysis of Question Paper Mid Term : II Examination-2021

Branch : CE **Semester/session: V/2021-22** **Max Marks:20**
Subject Code: 5CE5-13 **Subject: Town Planning** **Duration:1.5 hrs**

B. Questions and Course Outcomes (COs) Mapping in terms of correlation

COs	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
CO1								
CO2								
CO3		3			3			
CO4						3	3	
CO5				3				3
CO5								
CO6	3		3					

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

C. Mapping of Bloom's Level and Course Outcomes with Question Paper

Bloom's Level Mapping		CO Mapping	
Bloom's Level	Percentage	CO	Percentage
BL1	70	CO1	
BL2	30	CO2	
BL3		CO3	20
BL4		CO4	33
BL5		CO5	33
BL6		CO6	14

Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur

B.Tech III Year V Semester (Session 2021-2022)

CO's Attainment (Theory Mid Term : II) | **Department: Civil Engineering**

Faculty Name: VIKAS VYAS | **Course Name with CODE: TP, 5CE5-13**

Upon successful completion of this course, students will be able to:

CO1: Understand the objects and necessity of town planning.

CO2: Understand the civic survey and zoning.

CO3: Understand the importance and demand of housing.

CO4: Discuss causes, characteristics and effects of slums.

CO5: Discuss about public buildings: location, classification and principle of design.

CO6: Discuss the Re-planning of existing towns.

MID TERM EVALUATION

Sr. N0.	ROLL NO	PART →	A			B			C		Total (20)	Assignment (10)	Total (20)
		Note→	Attempt All			Attempt Any Two			Attempt Any One				
		QUESTION NO. →	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8			
		COURSE OUTCOME(S) SATISFIED →	6	3	6	5	3	4	4	5			
		MAXIMUM MARKS →	2	2	2	4	4	4	6	6			
		MINIMUM QUALIFYING MARKS (50%) →	1	1	1	2	2	2	3	3			
		NAME OF STUDENT ↓											
1	19ESKCE001	ABHAY SINGH DHAKA	2	2	2	3		4		6	19		19
2	19ESKCE002	ABHIJEET SINGH NATHAWAT	0.5	2	2	4		4		6	18.5		19
3	19ESKCE003	ABHISHEK LODWAR	1.5		1.5	2		3		5	13		13
4	19ESKCE004	ABHISHEK MEENA	2	2	2		2			2	10		10
5	19ESKCE005	ABHISHEK MOOND	2	1.5	1.5	3		4		6	18		18
6	19ESKCE006	ADITYA CHOUDHARY	2	2		2.5				6	12.5		13
7	19ESKCE007	ADITYA RAJ	2	2	2		4		4		14		14
8	19ESKCE008	ADITYA SAINI	2	2	2	4		2		6	18		18
9	19ESKCE009	AJAY KUMAR MEENA	2	1.5	1			3		2	9.5		10
10	19ESKCE011	AKANKSHA FOUJDAR	1.5	1.5	1.5	3.5		4		6	18		18
11	19ESKCE012	AMAN SUTHAR		2	2		2	4		5	15		15
12	19ESKCE013	AMIT KUMAR	1.5	2	0.5	1		2		6	13		13
13	19ESKCE014	AMIT KUMAR SONWAL	2	2	2	3		2		4	15		15
14	19ESKCE015	ANAND JOSHI	2	2	2	4		4	6		20		20
15	19ESKCE016	ANAND KUMAR	2	2	0.5	3		3	5		15.5		16
16	19ESKCE017	ANKIT MINA	2	1.5	1.5	3		2.5	5		15.5		16
17	19ESKCE018	ANSHAJ GOYAL	2	1	1	0		2.5		0	6.5		7
18	19ESKCE019	ANURAG MEENA	2	2	2	2		4		5	17		17
19	19ESKCE020	ARPIT MEENA	2	2	2	3		2.5		6	17.5		18
20	19ESKCE021	ARPIT MUKESH MEENA	2	2	1.5	4	4			2	15.5		16
21	19ESKCE022	ARVIND KUMAWAT	2	1	1.5	1		0.5		4	10		10
22	19ESKCE023	ARYAN KHATRI	2	2	2		4	4		3	17		17
23	19ESKCE024	ASHISH SINGH JADAUN	2	2	2			4	3		13		13
24	19ESKCE025	ASHOK BAIRWA	2	2	2	2		3		3	14		14
25	19ESKCE026	ATIBA QURESHI	2	2	2		3.5	4	6		19.5		20
26	19ESKCE027	AYUSH CHOUDHARY	2	2	2		4	4	5		19		19
27	19ESKCE028	AYUSH KUMAR	2	2	2		3.5	3.5		6	19		19
28	19ESKCE029	BANWARI LAL MEENA	1.5	1.5	1.5	3.5		3.5		3.5	15		15
29	19ESKCE030	BRIJESH JATOLIYA	0		0					0	0		0
30	19ESKCE031	CHITRANSHU MEENA	ABSENT										AB
31	19ESKCE032	DEEPAK MEENA						2		4	6		6
32	19ESKCE033	DIPAK KUMAR	ABSENT										AB
33	19ESKCE034	DIVYANSHU JAIN		1.5	1.5	2		4		5	14		14
34	19ESKCE036	HARSH KUMAWAT	1.5	2	2	4		4		5	18.5		19
35	19ESKCE037	HARSH MEENA	1	2	1.5	2.5		2.5	3		12.5		13
36	19ESKCE038	HARSH SINGHAL	1.5	1	1.5			2		3	9	NA	9

37	19ESKCE039	HARSHVARDHAN RAWAT	2	2	1.5			4		4	13.5	14
38	19ESKCE040	HIMANSHU AGARWAL	2	1.5	1.5	3		1.5	5		14.5	15
39	19ESKCE041	HIMANSHU CHOUDHARY	2	2	2	2		2	6		16	16
40	19ESKCE042	HIMANSHU VIJAYVARGIA	2	2	2	4		4		6	20	20
41	19ESKCE043	HITESH KUMAR MEENA	2	0.5	2	3.5		4		4	16	16
42	19ESKCE044	HITESH SHARMA	1	1.5	1.5	3		3	3		13	13
43	19ESKCE045	ISHANT JOGANI	2	2	1.5	1.5		2		6	15	15
44	19ESKCE046	JAGENDER BAKNAD	1.5	1.5	2	3.5		2.5		6	17	17
45	19ESKCE047	JATIN MEENA	1					1			2	2
46	19ESKCE048	JATIN PRATAP MEENA	2	2	2	4		4	5		19	19
47	19ESKCE049	JATIN VEDWAL	2	2	2	1.5		4		6	17.5	18
48	19ESKCE050	JAY KUMAR BANSIWAL	2	1.5	2	2		4		5.5	17	17
49	19ESKCE051	JAYANT KUMAR	2	2	2	4		4		5	19	19
50	19ESKCE052	JENISHA DEVNANI	2	2	2		4	4		6	20	20
51	19ESKCE053	KAHKASHAN KHANAM	ABSENT									AB
52	19ESKCE055	KANISHKA	2	2	2	3.5		4		6	19.5	20
53	19ESKCE056	KARAN MEENA	1.5	1.5	2	3		3		5	16	16
54	19ESKCE057	KARTIKAY SINGHAL	2	2	2		4	4		6	20	20
55	19ESKCE058	KAVYA KULSHRESTHA	2	2	2		4	4		6	20	20
56	19ESKCE059	KULDEEP TIWARI	2		2	4		4		6	18	18
57	19ESKCE060	KUMKUM MAURYA	2	2	2	4		4		6	20	20
58	19ESKCE061	LALIT KUMAR SUWALKA	2	2	2	4		2	3		15	15
59	19ESKCE062	LOKESH MALI	2	2	2	4		4	4		18	18
60	19ESKCE063	LUV KUMAR SUHAG	1.5	2	2	2.5		2		0.5	10.5	11
61	19ESKCE064	MAHENDRA MEENA	2	2	2	3.5		2.5			12	12
62	19ESKCE065	MANISH CHOUDHARY	1	1	1	2		2	2.5		9.5	10
63	19ESKCE066	MANISH CHOUDHARY	2	2	2	4		4		6	20	20
64	19ESKCE067	MANISH KUMAR MEENA	ABSENT									AB
65	19ESKCE068	MANISH RAD	2	1.5	1.5		4	4	6		19	19
66	19ESKCE069	MEHUL AGARWAL		1	1.5		4	0.5	6		13	13
67	19ESKCE070	MOHAMMAD RAMJAN	ABSENT									AB
68	19ESKCE071	MOHD ARIF CHOWDHARY	ABSENT									AB
69	19ESKCE072	MOHIT MEENA	2	2	1.5	2.5		2.5		2	12.5	13
70	19ESKCE073	MUKUL MANGAL	1	1.5	2		4	2.5		6	17	17
71	19ESKCE074	MUSKAN MEENA	2	0.5	2	2		3		6	15.5	16

Total No. of DEBARRED (DB)	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	
Total No. of ABSENT (AB)	4	4	4	4	4	4	4	4	
Total Students Appreaed for Exam (A)	66	66	66	66	66	66	66	66	
Total Students Attempted the Question (A)	60	59	61	44	14	59	17	45	
No. of Students scored >=50% marks (B)	**58**	**58**	**58**	**39**	**14**	**55**	**16**	**38**	
Percentage Attainment of Criterion (B/A)	96.67	98.31	95.08	88.64	100.00	93.22	94.12	84.44	
CO Attainment Level	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
Attainment of CO-1	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
Attainment of CO-2	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
Attainment of CO-3		**98**			**82.6**				**3**
Attainment of CO-4						**94.91**	**96**		**3**
Attainment of CO-5				**70.00**				**90**	**3**
Attainment of CO-6	**83%**		**100.00**						**3**

Criterion of Percentage for CO Attainment Level	**Attainment Level**
If below 60% students get 50% marks or less, than attainment level is	0
If below 60-69% students get 50% marks or less, than attainment level is	1
If below 70-79% students get 50% marks or less, than attainment level is	2
If below 80-100% students get 50% marks or less, than attainment level is	3

VIKAS VYAS

Faculty name with signature

Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur

B.Tech III Year V Semester (Session 2021-2022)

CO's Attainment (Theory Mid Term : II) | **Department: Civil Engineering**

Faculty Name: Er. Jetender Babulal Jangid | **Course Name with CODE: TP, 5CE5-13**

Upon successful completion of this course, students will be able to:

CO1: Understand the objects and necessity of town planning.

CO2: Understand the civic survey and zoning.

CO3: Understand the importance and demand of housing.

CO4: Discuss causes, characteristics and effects of slums.

CO5: Discuss about public buildings: location, classification and principle of design.

CO6: Discuss the Re-planning of existing towns.

MID TERM EVALUATION

Sr. N0.	ROLL NO	PART →	A			B			C		Total (20)	Assignment (10)	Total (20)
		Note→	Attempt All			Attempt Any Two			Attempt Any One				
		QUESTION NO. →	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8			
		COURSE OUTCOME(S) SATISFIED →	6	3	6	5	3	4	4	5			
		MAXIMUM MARKS →	2	2	2	4	4	4	6	6			
		MINIMUM QUALIFYING MARKS (50%) →	1	1	1	2	2	2	3	3			
		NAME OF STUDENT ↓											
1	19ESKCE075	NAMAN SINGHAL	1	1	1		3	4	5		15		15
2	19ESKCE076	NAVEEN KUMAR	1	1	2		4	4	4		16		16
3	19ESKCE077	NITESH KUMAR	ABSENT										AB
4	19ESKCE078	NITIN GOYAL	2	2	2		3	4	5		18		18
5	19ESKCE079	PIYUSH JAIN	1	2	2	2		3	5		15		15
6	19ESKCE080	POOJA KUMARI MEENA	2	2	2	4		4		6	20		20
7	19ESKCE081	PRADEEP KUMAR MEENA	2	2	2		3	3		5	17		17
8	19ESKCE082	PRAVESH SEHRA	2	2	2		4	4		5	19		19
9	19ESKCE083	RAGHVENDRA SINGH RATHOR	1	1	1	1		2	4		10		10
10	19ESKCE084	RAHUL GHORELA	1	2	2		3	3	5		16		16
11	19ESKCE085	RAHUL MEENA	1	2	2	2		4		5	16		16
12	19ESKCE086	RAHUL SHARMA	2	1	2	3		3	4		15		15
13	19ESKCE087	RAHUL SINGH SHEKHAWAT	2	2	1		2	4	4		15		15
14	19ESKCE088	RAJAT SINGH	2	1	1	3		3		3	13		13
15	19ESKCE089	RAKESH JAKHAR	1	2	1	3		2		4	13		13
16	19ESKCE090	RAKESH MINA	1	1	1	2		2		4	11		11
17	19ESKCE091	RAKESH SINGH	0	1	2	2		2		2	9		9
18	19ESKCE092	RAMESH CHOUDHARY	2	2	2	2		4	5		17		17
19	19ESKCE093	RANDHEER	1	2	2	1.5	1.5		4		12		12
20	19ESKCE094	REDDY SAI PRAVEEN REDDY	2	2	2	4		4		6	20		20
21	19ESKCE095	RITESH KUMAR MAURYA	2	2	2		1.5	4		6	18		18
22	19ESKCE096	ROHIT MEHTA	1	2	2	1.5		3	6		16		16
23	19ESKCE097	SACHIN REWADIA	0.5	2	2	1.5		2.5		6	15		15
24	19ESKCE099	SAGAR MEENA	ABSENT										AB
25	19ESKCE100	SAHI RAM GODARA	0.5	1	2	2		2.5		4.5	13		13
26	19ESKCE102	SAMYAK JAIN	1.5	0.5	2	2.5		4		6	17		17
27	19ESKCE103	SANUJ MOHAN		2	2	2		1	4		11		11
28	19ESKCE104	SATISH SAINI	0	1	2	2	2		2		9		9
29	19ESKCE105	SAURABH KUMAR MEENA	0.5	1.5	2	1		2.5	3		11		11
30	19ESKCE107	SHAILESH KUMAR	0.5	1	2	1.5		3		4.5	13		13

31	19ESKCE108	SHIV SINGH NARUKA	2	2	2	3		3	4		16	16
32	19ESKCE109	SHIVANI MEENA	ABSENT									AB
33	19ESKCE110	SHUBHAM SAXENA	0.5	2	2	2.5		3	4.5		15	15
34	19ESKCE111	SONAL MEENA	0		2	3		4	4		13	13
35	19ESKCE112	SOURABH MEENA	0.5	1.5	1	1		1.5		2.5	8	8
36	19ESKCE113	SUBHASH SIHAG	1	1.5	2	3		3		5	16	16
37	19ESKCE114	SUMIT DANGDA	2	2	2	3.5		3.5		6	19	19
38	19ESKCE115	TANMAY JAISWAL	ABSENT									AB
39	19ESKCE116	UJJWAL TRIPATHI	1	1	2	2.5		3		4	14	14
40	19ESKCE117	UMANG PANCHAL	1	2	2		1.5	4	5		16	16
41	19ESKCE118	UTKARSH DAUKIYA	1	1	2		2	2		4	12	12
42	19ESKCE119	VED PRATAP SINGH	1	2	2	2		3	4		14	14
43	19ESKCE120	VIKAS AECHARA	2	2	2	2		3		4	15	15
44	19ESKCE121	VIKASH MAHAWAR			2	0	0	2		5	9	9
45	19ESKCE122	VIMAL KUMAWAT	1	1.5	2		4	4	6		19	19
46	19ESKCE123	VINOD KUMAR MEENA	1	2	2	2	4			5	16	16
47	19ESKCE124	VISHAL KUMAR	1	1	2	0		3		4	11	11
48	19ESKCE125	VISHNU GOYAL	1	1.5	2		3	3	3		14	14
49	19ESKCE126	VISHNU MEENA	1	2	2			2		2	9	9
50	19ESKCE127	VIVEK VERMA	1	2	2	2		4		6	17	17
51	19ESKCE128	YASH CHAUDHARY	0	2	2	1		2	4		11	11
52	19ESKCE129	YOUVAN JAIN	2	2	1	4		4		5	18	18
53	19ESKCE300	NITESH	1	1	1	2		2		4	11	11
54	19ESKCE301	RISHABH	2	2	2	3	3			5	17	17
55	19ESKCE302	SHOURYARAJ SINGH	2	1	2	0.5		0.5		6	12	12
56	19ESKCE303	ANUSH SHARMA	1	2	2	2	4			6	17	17
57	20ESKCE200	ADITYA SINGH PARIHAR	1	2	2	1	3				9	9
58	20ESKCE202	ASHISH VERMA	2	1	2	3		4		4	16	16
59	20ESKCE203	CHITRANSH SRIVASTAVA	1	1.5	1.5	1.5		2.5	5		13	13
60	20ESKCE204	MUKUL SAINI	1	1	2	3		2.5		4	14	14
61	20ESKCE205	PANKAJ SHARMA	1	1.5	1.5	1.5		2		4	12	12
62	20ESKCE206	PRIYANKA SHARMA	2	2	2	3		4	6		19	19
63	20ESKCE207	RAHUL SAINI	1	1	2	2.5	2.5			2.5	12	12
64	20ESKCE208	RAKESH KUMAR MEENA	0.5	1	2		2	3		4	13	13
65	20ESKCE209	SHIV DATT BORANA	1	2	2		3	4		4	16	16
66	20ESKCE210	SHUBHAM JAIN	1.5	1.5	2		4	4	5		18	18
67	20ESKCE211	SIMRAN SINGH	1.5	1	2	2		2.5		3	12	12
68	20ESKCE212	UDIT NARAYAN AVASTHI	1.5	2	2	2.5		4		6	18	18
69	20ESKCE213	YASH SARSWAT	2	1.5	1.5	2		3		4	14	14
70	20ESKCE215	YASH SHARMA	1	2	2	0		3		5	13	13
Total No. of DEBARRED (DB)			NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL		
Total No. of ABSENT (AB)			4	4	4	4	4	4	4	4		
Total Students Appreaed for Exam (A)			66	66	66	66	66	66	66	66		
Total Students Attempted the Question (A)			64	64	66	50	23	59	25	40		
No. of Students scored >=50% marks (B)			**53**	**63**	**66**	**35**	**19**	**56**	**24**	**36**		
Percentage Attainment of Criterion (B/A)			82.81	98.44	100.00	70.00	82.61	94.92	96.00	90.00		
CO Attainment Level			**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	
Attainment of CO-1			NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	
Attainment of CO-2			NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	
Attainment of CO-3				**98**			**82.6**				3	
Attainment of CO-4								**94.91**	**96**		3	
Attainment of CO-5						**70.00**				**90**	3	
Attainment of CO-6			**83%**		**100.00**						3	
Criterion of Percentage for CO Attainment Level			Attainment Level									

NA

If below 60% students get 50% marks or less, than attainment level is	0							
If below 60-69% students get 50% marks or less, than attainment level is	1							
If below 70-79% students get 50% marks or less, than attainment level is	2							
If below 80-100% students get 50% marks or less, than attainment level is	3							

25/12/21

Er. Jetender Babulal Jangid

Faculty name with signature

Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur

II - Mid Term Examination, 2021

B.Tech. III/ Semester: V | **Branch: Civil Engineering**
Subject: Water Resource Engineering | **Subject Code: 5CE4-05**
Time: 1½ Hours | **Maximum Marks: 20**

Part (A) Attempt all Questions **(3X2= 6 Marks)**

Q1. Write short notes on Bligh,s theory.

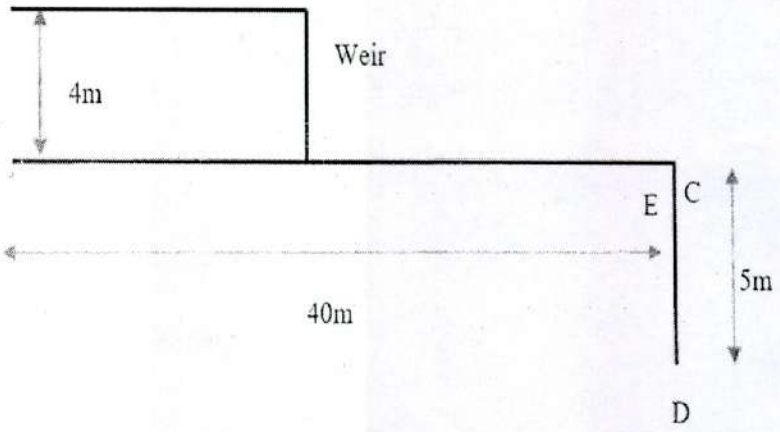
Q2. What do you understand by rain gauge? Briefly describe the types of rain gauge.

Q3. Enlist the different types of cross-drainage work when canal crosses over the river.

Part (B) Attempt any two questions **(2X4= 8 Marks)**

Q1. Design an irrigation channel by Lacey`s theory to carry a discharge of 20 cumec and silt factor f = 1.0.

Q2. Determine the residual head and uplift pressure at salient points E, D & C of the downstream pile as shown in figure. Also determine exit gradient.



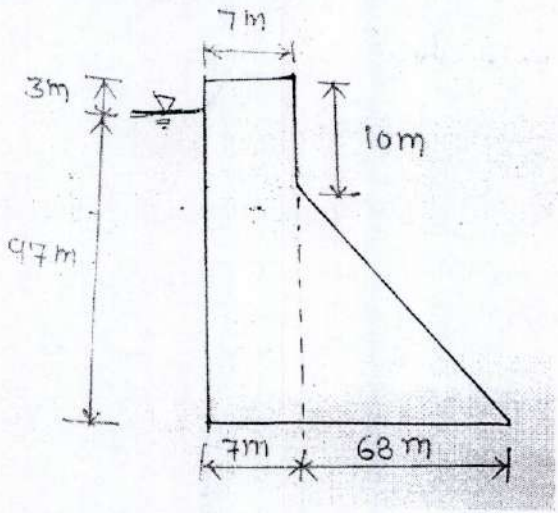
Q3. The following are ordinates for a flood hydrograph resulting from an isolated strom of 6 hours duration.

Time (hr)	0	12	24	36	48	60	72	84	96
Ordinate of flood hydrograph (cumec)	5	15	40	80	60	50	25	16	5

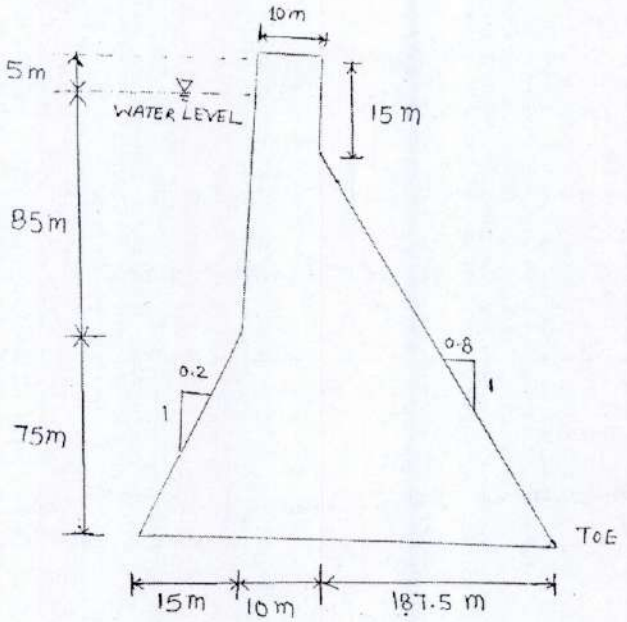
Determine the ordinates of 1 cm -6 hr unit hydrograph if the catchment area is 450 km^2.

Part (C) Attempt one question (1X6= 6 Marks)

Q1. A masonry dam 100 m high as shown in the figure. If $\mu = 0.75$ and weight density of concrete is 23.544 kN/m^3. Is the dam safe against sliding or not?



Q.2 Calculate the maximum and minimum normal stresses intensities at the base of the dam section shown in figure when the reservoir is full condition. Neglect the earthquake effect. Also calculate sliding factor and shear friction factor of safety. Assume shear strength 35 kg/cm^2, coefficient of friction (μ) is 0.75, and material density 2400 kg/m^3.



Swami Keshvanand Institute of Technology, Management &Gramothan,
Ramnagaria, Jagatpura, Jaipur-302017

Question Paper Solution

Branch: Civil Engineering Semester: V semester Subject: Water Resource Engineering Mid Term: II Mid-term Exam

Submitted By: Gaurav Gupta & Dr. Rakesh Choudhary

PART A

Q.1Write short notes on Bligh,s theory.

- **Ans:** This theory is based on the assumption that seeping water through the soil below the weir Follows the path along with the contact of the base, with the underlying sub-soil.
- The length of the path of seeping water from the point of entry into the sub-soil from the U/S of the impervious.
- Apron to the point at the D/S end of the impervious apron is know creep length.
- Bligh also assumed that loss of head of the seeping water is proportional to the length of its travel irrespective of whether.
- The length of travel is in the horizontal or vertical direction.
- He also assumes that unless cut-off sheet piles extent to the impervious subsoil strata, no amount of sheet piling could stop the flow of percolating water.
- AB is the length of impervious apron l and H is the head of water-fill up to the top of the weir CD and there is no water on the D/S side.
- According to Bligh's theory L = l where L is the total creep length.
- If vertical cut-offs are provided below the impervious apron.

$$L=l+2d1+2d2$$

- The Length of vertical cut-off taken double because vertical cut-off provides the creep length equivalent.
- To twice the length of the cut-off, as seeping water once goes down and then comes up along the cut-off.
- If H is the total head causing seepage or total loss of head, and L the total creep length, the loss of head per unit length of creep (C) is given by

$$C=HL=H1+2d1+2d2$$

Q.2 What do you understand by rain gauge? Briefly describe the types of rain gauge.

Ans: Rain gauge- A rain gauge is a meteorological instrument to measure the precipitating rain in a given amount of time per unit area.

Types of rain gauge-

I. Non recording type of rain gauge
   a) Symon's rain gauge
   b) I.M.D rain gauge

II. Recording type of rain gauge
   a) Tipping bucket rain gauge
   b) Weighing bucket rain gauge
   c) Float type rain gauge

Question Paper Solution

Branch: Civil Engineering Semester: V semester Subject: Water Resource Engineering Mid Term: II Mid-term Exam
Submitted By: Gaurav Gupta & Dr. Rakesh Choudhary

Q3. Enlist the different types of cross-drainage work when canal crosses over the river.

Ans: Cross-drainage work when canal crosses over the river two types of CD work is provided

a) Aqueduct

b) Sphon Aqueduct

a) Aqueduct: - Provided when canal crosses over the river and HFL of drainage in below than the canal bed level.

b) Sphon Aqueduct: - Provided when canal crosses over the river and HFL of drainage in higher than the canal bed level.

PART B

Q1. Design an irrigation channel by Lacey`s theory to carry a discharge of 20 cumec and silt factor f = 1.0.

Ans: ANS.

Step:1. Silt factor(f):

f =1.0

Step:2. Velocity of flow (v):

$V = (Q f^2/140)$ 1/6

V = (20*1 /140) 1/6

V = 0.72 m/s

Step:3. Flow Area (A):

A = (Q/V) = 20/.72 = 27.78 m 2

Step:4. Wetted perimeter (p):

P = 4.75(20) 1/2 = 21.24 m

Step:5. Determine depth & width (D and; B):

A = BD+0.5D 2 = 27.78

P = B+D (5) 1/2 = 21.24

NOW

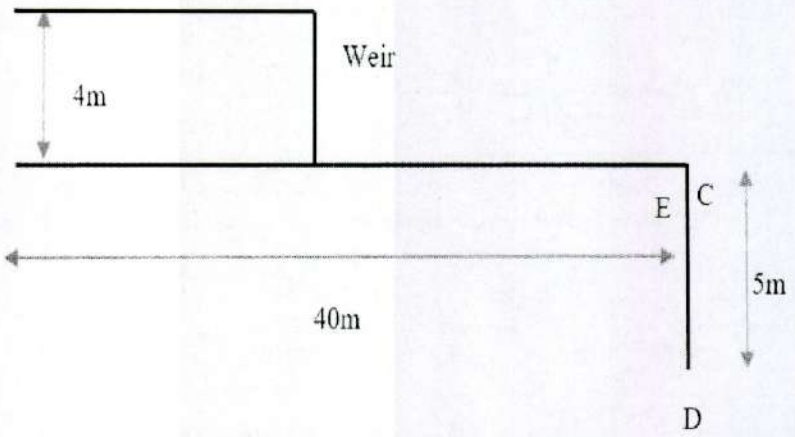
D= 01.49m

B= 17.91m

Step:4. Bed slope (s):

S= 1/5503

Q.2 Determine the residual head and uplift pressure at salient points E, D & C of the downstream pile as shown in figure. Also determine exit gradient.



Ans:

Question Paper Solution

Branch: Civil Engineering Semester: V semester Subject: Water Resource Engineering Mid Term: II Mid-term Exam

Submitted By: Gaurav Gupta & Dr. Rakesh Choudhary

Solution. In this case, $b_1 = b = 40\text{ m}, H = 4\text{ m}, d = 5\text{ m}.\ \alpha = b/d = 40/5 = 8$

From Eq. 18.49, $\lambda = \dfrac{1+\sqrt{1+\alpha^2}}{2} = \dfrac{1+\sqrt{1+(8)^2}}{2} = 4.53$

From Eq. 18.46, $P_E = \dfrac{H}{\pi}\cos^{-1}\left(\dfrac{\lambda-2}{\lambda}\right)$ or $P_E = \dfrac{4}{\pi}\cos^{-1}\left(\dfrac{4.53-2}{4.53}\right) = \dfrac{4}{\pi}\left(\dfrac{56.048}{180}\times\pi\right) = 1.25\text{ m}$

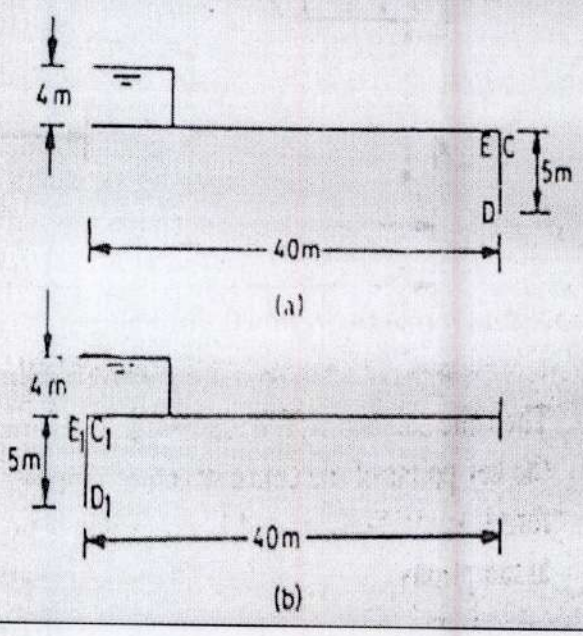
From Eq. 18.47, $P_D = \dfrac{H}{\pi}\cos^{-1}\left(\dfrac{\lambda-1}{\lambda}\right) = \dfrac{4}{\pi}\cos^{-1}\left(\dfrac{4.53-1}{4.53}\right)$

or $P_D = \dfrac{4}{\pi}\left(\dfrac{38.808}{180}\times\pi\right) = 0.86\text{ m}$

Of course, $P_C = 0$

From Eq. 18.50, $G_E = \dfrac{H}{d}\cdot\dfrac{1}{\pi\sqrt{\lambda}}$

or $G_E = \dfrac{4}{5}\times\dfrac{1}{\pi\sqrt{4.53}} = \dfrac{1}{8.36}$



Q3. The following are ordinates for a flood hydrograph resulting from an isolated storm of 6 hour duration.

Time (hr)	0	12	24	36	48	60	72	84	96
Ordinate of flood hydrograph (cumec)	5	15	40	80	60	50	25	16	5

Determine the ordinates of 1 cm -6 hr unit hydrograph if the catchment area is 450 km^2.

Ans:

Question Paper Solution

Branch: Civil Engineering Semester: V semester Subject: Water Resource Engineering Mid Term: II Mid-term Exam
Submitted By: Gaurav Gupta & Dr. Rakesh Choudhary

Time (hr)	FH (m^3/s)	Base Flow (m^3/s)	DRH (m^3/s)	1 cm UH = Col. 4 / DRD
(1)	(2)	(3)	(4)	(5)
0	5	5	0	0
12	15	5	10	4.17
24	40	5	35	14.58
36	80	5	75	31.25
48	60	5	55	22.92
60	50	5	45	18.75
72	25	5	20	8.33
84	15	5	10	4.17
96	5	5	0	0
			ΣO = 250	ΣU = 104.17

Assuming base flow = 5 m^3/sec

Now, Direct Runoff Depth, $DRD = \frac{0.36 \times \Sigma O \times t}{A}$

where $\Sigma O = 250\ m^3/s$; $t = 12$ hr; $A = 450\ km^2$

$\therefore \quad DRD = \frac{0.36 \times 250 \times 12}{450} = 2.4$ cm

Check: DRD of unit hydrograph $= \frac{0.36\,\Sigma U \times t}{A} = \frac{0.36 \times 104.17 \times 12}{450} = 1.00$ cm

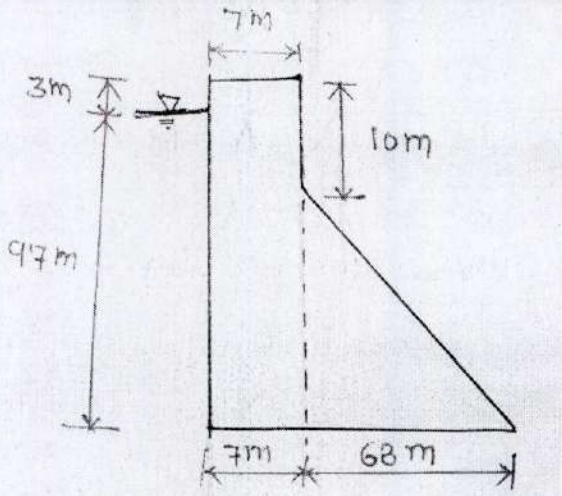
PART C

Q1. A masonry dam 100 m high as shown in the figure. If μ = 0.75 and weight density of concrete is 23.544 kN/m^3. Is the dam safe against sliding or not?

Question Paper Solution

Branch: Civil Engineering Semester: V semester Subject: Water Resource Engineering Mid Term: II Mid-term Exam

Submitted By: Gaurav Gupta & Dr. Rakesh Choudhary



Ans:

Consider unit width of the dam

$$W_1 = (7 \times 100 \times 1) \times \gamma_c = 700 \times 23.544 = 16480.80 \text{ kN}$$

$$W_2 = \left(\frac{1}{2} \times (68 \times 90) \times 1\right) \times \gamma_c = 72044.64 \text{ kN}$$

Uplift pressure, $$U = \left[\frac{1}{2} \times (97\gamma_w + 0)\right] \times 75 \times 1 = 0.5 \times 97 \times 9.81 \times 75 \times 1 = 35683.875 \text{ kN}$$

$$\therefore \quad \Sigma F_v = W_1 + W_2 - U$$

$$= 16480.80 + 72044.6 - 35683.875 = 52841.525 \text{ kN}$$

Now, $$\mu \Sigma F_v = 0.75 \times 52841.525 \text{ kN}$$

$$\mu \Sigma F_v = 39631.144 \text{ kN}$$

Horizontal force due to water pressure on the vertical face

$$\Sigma F_H = \frac{1}{2}\gamma_w H_1^2 = \frac{1}{2} \times 9.81 \times 97^2 = 46151.145 \text{ kN}$$

Now, FOS against sliding

$$= \frac{\mu \Sigma F_V}{\Sigma F_H} = \frac{39631.144}{46151.145} = 0.859 < 1$$

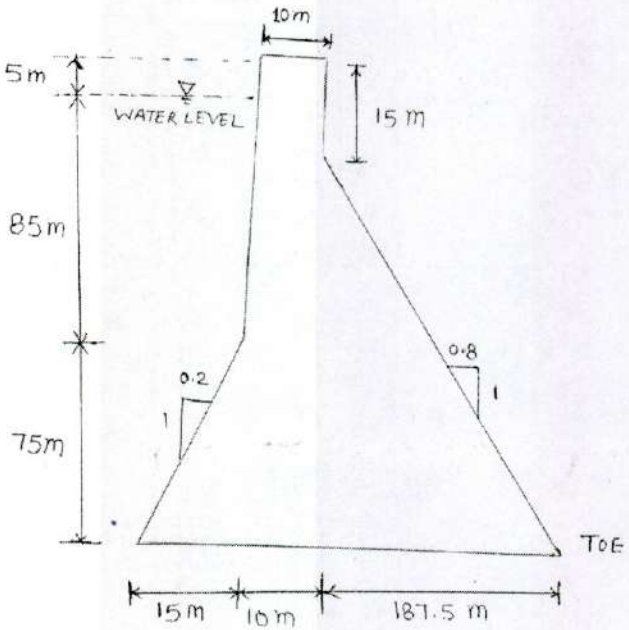
Hence, not safe in sliding.

So, reduce the uplift by providing drainage galleries.

Question Paper Solution

Branch: Civil Engineering Semester: V semester Subject: Water Resource Engineering Mid Term: II Mid-term Exam
Submitted By: Gaurav Gupta & Dr. Rakesh Choudhary

Q.2Calculate the maximum and minimum normal stresses intensities at the base of the dam section shown in figure when the reservoir is full condition. Neglect the earthquake effect. Also calculate sliding factor and shear friction factor of safety. Assume shear strength 35 kg/cm^2, coefficient of friction (μ) is 0.75, and material density 2400 kg/m^3.



Ans:

Question Paper Solution

Branch: Civil Engineering Semester: V semester Subject: Water Resource Engineering Mid Term: II Mid-term Exam

Submitted By: Gaurav Gupta & Dr. Rakesh Choudhary

S.No.	Discription and Dimension	Forces (Kg) Horizontal	Forces (Kg) Vertical	$\bar{x}$ (m) Lever Arm	Moments Kg.m
1.	Weight of Dam				
	$\Delta 1 - \frac{156 \times 424.8}{2} \times 2400$	–	23.35×10^6	61.70	1440×10^6
	Rec. 2 - $9 \times 168 \times 2400$		3.63×10^6	15.60	56.60×10^6
	$\Delta 3 - \frac{11.10 \times 74}{2} \times 2400$		0.99×10^8	7.40	7.32×10^6
2.	Water Pressure at U/s face				
	$83 \times 11.1 \times 1000$		0.98×10^6	5.55	5.43×10^6
	$\frac{74 \times 11.1}{2} \times 1000$		0.41×10^6	3.7	1.52×10^6
	$\frac{162 \times 162}{2} \times 1000$	13.12×10^6		54 $h_1/(h_2/3)$ ✓	708×10^6
3.	Uplift on the Base				
	$\frac{162 \times 144.9}{2} \times 1000$		11.74×10^6 (-ve)	48.3 $\left(\frac{144.9}{3}\right)$ ✓	567×10^6 (-ve)
	Σ	13.12×10^6	17.62×10^6		1651.87×10^6

Question Paper Solution

Branch: Civil Engineering Semester: V semester Subject: Water Resource Engineering Mid Term: II Mid-term Exam

Submitted By: Gaurav Gupta & Dr. Rakesh Choudhary

(1) $\bar{x} = \frac{\Sigma M}{\Sigma W} = \frac{16.51.87 \times 10^6}{17.62 \times 10^6} = 93.75$ m (From Heel)

(2) $e = \frac{144.9}{2} - 93.75 = 21.30$ m

(3) Stresses: As reservoir is in full condition,

$$\sigma_{min} \text{ (on U/s end)} = \frac{\Sigma W}{b}\left(1 + \frac{6 \times [-21.30]}{B}\right)$$

$$= \frac{17.62 \times 10^6}{144.9}\left(1 + \frac{6 \times (-21.30)}{144.9}\right)$$

$$= \frac{17.62 \times 10^6}{144.9}(1 - 0.882)$$

$$= 1.434 \text{ kg/cm}^2$$

$$\sigma_{max} \text{ (on D/s end)} = \frac{\Sigma W}{b}\left(1 - \frac{6e}{B}\right)$$

$$= \frac{17.62 \times 10^6}{144.9}(1 + 0.882) = 22.86 \text{ kg/cm}^2$$

(4) Sliding factor $= \frac{\Sigma H}{\Sigma W} = \frac{13.12 \times 10^6}{17.62 \times 10^6} = 0.744$

$\therefore$ Factor of safety $= \frac{1}{0.744} = 1.34$

(5) Shear friction FOS $= \frac{\text{Shear Resistance} + \text{Frictional Resitance}}{\Sigma H}$

$= \frac{(B \times \text{Shear Resistance}) + \Sigma V \times \mu}{\Sigma H} = \frac{35 \times 144.9 \times 10^4 + 17.62 \times 10^6 \times 0.75}{13.12 \times 10^6}$

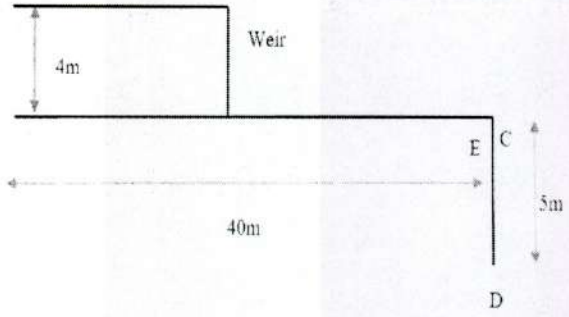
$= \frac{63.92 \times 10^6}{13.12 \times 10^6} = 1.870$

Swami Keshvanand Institute of Technology, Management & Gramothan, Ramnagaria, Jagatpura, Jaipur-302017

Analysis of Question Paper Mid Term II Examination-2021

Branch : Civil Engineering Semester/session: V/2021-22 Max Marks:20
Subject Code: 5CE4-05 Subject:Water Resource Engineering Duration: 1.5 hours

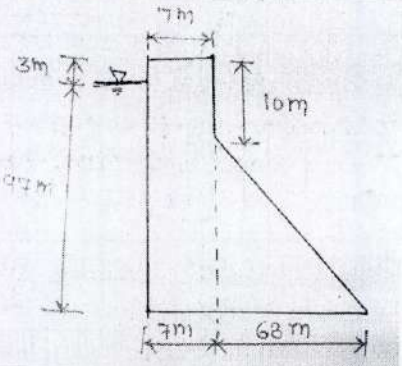
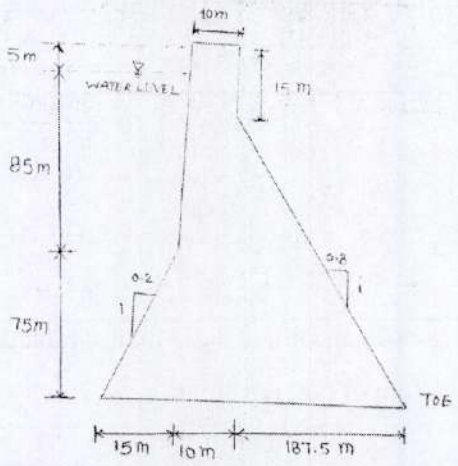
A. Distribution of Course Outcome and Bloom's Taxonomy in Question Paper

Part	Q. No	Questions	Marks	CO	BL
A	Q.1	Write short notes on Bligh,s theory.	2	5	2
	Q.2	What do you understand by rain gauge? Briefly describe the types of rain gauge.	2	4	2
	Q.3	Enlist the different types of cross-drainage work when canal crosses over the river.	2	2	1
B	Q.1	Design an irrigation channel by Lacey`s theory to carry a discharge of 20 cumec and silt factor f = 1.0.	4	2	6
	Q.2	Determine the residual head and uplift pressure at salient points E, D & C of the downstream pile as shown in figure. Also determine exit gradient. 	4	5	4
	Q.3	The following are ordinates for a flood hydrograph resulting from an isolated strom of 6 hours duration. <table><tr><td>Time (hr)</td><td>0</td><td>12</td><td>24</td><td>36</td><td>48</td><td>60</td><td>72</td><td>84</td><td>96</td></tr><tr><td>Ordinate of flood hydrograph (cumec)</td><td>5</td><td>15</td><td>40</td><td>80</td><td>60</td><td>50</td><td>25</td><td>16</td><td>5</td></tr></table> Determine the ordinates of 1 cm -6 hr unit hydrograph if the catchment area is 450 km^2.	4	4	5
C	Q.1	A masonry dam 100 m high as shown in the figure. If $\mu = 0.75$ and weight density of concrete is 23.544 kN/m^3. Is the dam safe against sliding or not?	6	3	5

Swami Keshvanand Institute of Technology, Management & Gramothan, Ramnagaria, Jagatpura, Jaipur-302017

Analysis of Question Paper Mid Term II Examination-2021

Branch : Civil Engineering **Semester/session: V/2021-22** **Max Marks:20**
Subject Code: 5CE4-05 **Subject:Water Resource Engineering** **Duration: 1.5 hours**

					
	Q.2	Calculate the maximum and minimum normal stresses intensities at the base of the dam section shown in figure when the reservoir is full condition. Neglect the earthquake effect. Also calculate sliding factor and shear friction factor of safety. Assume shear strength 35 kg/cm^2, coefficient of friction (μ) is 0.75, and material density 2400 kg/m^3. 	6	3	5

BL – Bloom's Taxonomy Levels
(1- Remembering, 2- Understanding, 3 – Applying, 4 – Analyzing, 5 – Evaluating, 6 - Creating)
CO – Course Outcomes

Swami Keshvanand Institute of Technology, Management & Gramothan, Ramnagaria, Jagatpura, Jaipur-302017

Analysis of Question Paper Mid Term II Examination-2021

Branch : Civil Engineering **Semester/session: V/2021-22** **Max Marks:20**
Subject Code: 5CE4-05 **Subject:Water Resource Engineering** **Duration: 1.5 hours**

B. Questions and Course Outcomes (COs) Mapping in terms of correlation

COs	Part A			Part B			Part C	
	Q1	Q2	Q3	Q1	Q2	Q3	Q1	Q2
CO1	0	0	0	0	0	0	1	0
CO2	0	0	3	3	0	0	0	0
CO3	0	0	0	0	0	0	3	3
CO4	0	3	0	0	0	3	0	0
CO5	2	0	0	0	3	0	0	0

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

C. Mapping of Bloom's Level and Course Outcomes with Question Paper

Bloom's Level Mapping		CO Mapping	
Bloom's Level	Percentage	CO	Percentage
BL1	6.67	CO1	00
BL2	13.33	CO2	20
BL3	00	CO3	40
BL4	13.33	CO4	20
BL5	53.33	CO5	20
BL6	13.33	CO6	00

Swami Keshvanand Institute of Technology, M & G, Jaipur

Department of Civil Engineering

Mark List Cum Attainment Level of Subject

II Midterm Exam (2021)

Subject Code : 5CE4-05 **Subject : Water Resource Engineering (V-A)**

	Q. No.	1	2	3	4	5	6	7	8	TOTAL
	MM.	2	2	2	4	4	4	6	6	
	CO	5	4	2	2	5	4	3	3	
	Criterion: 50% of MM	1	1	1	2	2	2	3	3	
Roll No.	Name of Student	Part A			Part B			Part C		
19ESKCE001	Abhay Singh Dhaka	0	2	1	2		1	1		7
19ESKCE002	Abhijeet Singh Nathawat	2	2		4	4		4		16
19ESKCE003	Abhishek Lodwar	1	1.5		3	4		1		11
19ESKCE004	Abhishek Meena	0	0	0	3	3		1		7
19ESKCE005	Abhishek Moond	1.5	1	1	3	2				9
19ESKCE006	Aditya Choudhary	1.5	1.5	0	3	2				8
19ESKCE007	Aditya Raj	1	1.5	2		2				7
19ESKCE008	Aditya Saini	1.5	1.5	0		1	1			5
19ESKCE009	Ajay Kumar Meena		0	0	0	0		0		0
19ESKCE011	Akanksha Foujdar	2	2	1	4	3		2.5		15
19ESKCE012	Aman Suthar	ABSENT								
19ESKCE013	Amit Kumar	2	1	2	4	4		4		17
19ESKCE014	Amit Kumar Sonwal	2	1.5	1	3		1			9
19ESKCE015	Anand Joshi	1.5	1	1	3	2		1		10
19ESKCE016	Anand Kumar	0	0	0		1	1	0		2
19ESKCE017	Ankit Mina	2	1.5	2	4	3		2		15
19ESKCE018	Anshaj Goyal	ABSENT								
19ESKCE019	Anurag Meena	2	2	2	4	4		0		14
19ESKCE020	Arpit Meena	2	2	2	3	3		1		13
19ESKCE021	Arpit Mukesh Meena	2	2	2	4	4		0		14
19ESKCE022	Arvind Kumawat	1.5	2	0	3	1				8
19ESKCE023	Aryan Khatri	1	1	1	2	2		0		7
19ESKCE024	Ashish Singh Jadaun	0	1	1	1					3
19ESKCE025	Ashok Bairwa	1.5	1.5	1	2					6
19ESKCE026	Atiba Qureshi	1.5	2	2	4		4		5	19
19ESKCE027	Ayush Choudhary	1	2	1		1		1		6
19ESKCE028	Ayush Kumar	1.5	2	1	2	4				11
19ESKCE029	Banwari Lal Meena	ABSENT								
19ESKCE030	Brijesh Jatoliya				0	3				3
19ESKCE031	Chitranshu Meena	ABSENT								
19ESKCE032	Deepak Meena	1.5		0		4	1	3		10
19ESKCE033	Dipak Kumar	ABSENT								
19ESKCE034	Divyanshu Jain	2	1.5	0	1					5
19ESKCE036	Harsh Kumawat	0	1		1					2
19ESKCE037	Harsh Meena	0	2	0	2	1				5
19ESKCE038	Harsh Singhal				1					1

19ESKCE039	Harshvardhan Rawat	2	1		3.5	3.5				10
19ESKCE040	Himanshu Agarwal	2	2		4	4			6	18
19ESKCE041	Himanshu Choudhary	1	1	1	2	0		0		5
19ESKCE042	Himanshu Vijayvargia	1	1	1	2	1				6
19ESKCE043	Hitesh Kumar Meena	1		1	2	2				6
19ESKCE044	Hitesh Sharma	1	1	1	2	2		1		8
19ESKCE045	Ishant Jogani	0	1	0	2			1		4
19ESKCE046	Jagender Baknad	1.5	1.5	0	4	2		2		11
19ESKCE047	Jatin Meena							0		0
19ESKCE048	Jatin Pratap Meena		0	0	0		0	1		1
19ESKCE049	Jatin Vedwal	0	1	0	0	0			1	2
19ESKCE050	Jay Kumar Bansiwal	1.5	1	1	2	2		3		11
19ESKCE051	Jayant Kumar	1	1.5	2	2	2			3	12
19ESKCE052	Jenisha Devnani	2	2	2	4	4		4		18
19ESKCE053	Kahkashan Khanam	ABSENT								
19ESKCE055	Kanishka	2	1.5	0	4	2		1		11
19ESKCE056	Karan Meena	1.5	1.5		3.5	3.5		0		10
19ESKCE057	Kartikay Singhal	2	2	2		4	4	6		20
19ESKCE058	Kavya Kulshrestha	2	2	1.5	4	3		1		14
19ESKCE059	Kuldeep Tiwari	1	1.5	1.5	2			0		6
19ESKCE060	Kumkum Maurya	2	2	1	3.5	2		0		11
19ESKCE061	Lalit Kumar Suwalka	2	1.5	1	1					6
19ESKCE062	Lokesh Mali	1.5	1.5	0	4					7
19ESKCE063	Luv Kumar Suhag	1	1.5	0	1					4
19ESKCE064	Mahendra Meena	1.5	1.5	0						3
19ESKCE065	Manish Choudhary	1			3.5					5
19ESKCE066	Manish Choudhary	0	1	0	1	0		0		2
19ESKCE067	Manish Kumar Meena	ABSENT								
19ESKCE068	Manish Rad	0	0	0	3	2		2		7
19ESKCE069	Mehul Agarwal				4	1		0		5
19ESKCE070	Mohammad Ramjan	ABSENT								
19ESKCE071	Mohd Arif Chowdhary	ABSENT								
19ESKCE072	Mohit Meena	1.5	1.5	0		0				3
19ESKCE073	Mukul Mangal	2	2	0	4	3			1	12
19ESKCE074	Muskan Meena	1.5	2	2	4	3			5	18
No. of Students attempt question		**56**	**55**	**51**	**53**	**45**	**8**	**33**	**6**	
No. of student get marks greater than 50		**46**	**50**	**30**	**42**	**33**	**2**	**6**	**4**	
%		**82.14**	**90.91**	**58.82**	**79.25**	**73.33**	**25.00**	**18.18**	**66.67**	
Attainment level gain		**3**	**3**	**1**	**3**	**2**	**0**	**0**	**2**	

*** If >75% students get 50% marks or more, than attainment level is 3**

*** If 66-75% students get 50% marks or more, than attainment level is 2**

*** If 56-65% students get 50% marks or more, than attainment level is 1**

*** If 45-55% students get 50% marks or more, than attainment level is 0**

Gaurav Gupta

23/12/21

Swami Keshvanand Institute of Technology, M & G, Jaipur

Department of Civil Engineering

Mark List Cum Attainment Level of Subject

II Midterm Exam (2021)

Subject Code : 5CE4-05 **Subject : Water Resource Engineering (V-B)**

	Q. No.	1	2	3	4	5	6	7	8	TOTAL
	MM.	2	2	2	4	4	4	6	6	
	CO	5	4	2	2	5	4	3	3	
	Criterion: 50% of MM	1	1	1	2	2	2	3	3	
Roll No.	Name of Student	Part A			Part B			Part C		
19ESKCE075	Naman Singhal	1.5	1	1.5	3	2		4		13
19ESKCE076	Naveen Kumar	1.5	1	1.5	1		0		2	7
19ESKCE077	Nitesh Kumar	ABSENT								0
19ESKCE078	Nitin Goyal	2	2	2	4	3.5			2.5	16
19ESKCE079	Piyush Jain	1	2	2	1					6
19ESKCE080	Pooja Kumari Meena	2	2	2	3	3			5	17
19ESKCE081	Pradeep Kumar Meena	2			3.5	3.5			6	15
19ESKCE082	Pravesh Sehra	2	2	2	4	3			2	15
19ESKCE083	Raghvendra Singh Rathor	ABSENT								0
19ESKCE084	Rahul Ghorela	1	1	1	0	0			1	4
19ESKCE085	Rahul Meena	1			1					2
19ESKCE086	Rahul Sharma	2	2	2	1	0		0		7
19ESKCE087	Rahul Singh Shekhawat	1	1	1	1	1			1	6
19ESKCE088	Rajat Singh	1		1	2				2	6
19ESKCE089	Rakesh Jakhar	2	1	0		1		1	0	5
19ESKCE090	Rakesh Mina	1	2	1	1					5
19ESKCE091	Rakesh Singh	1	1	0	1	1			0	4
19ESKCE092	Ramesh Choudhary	2	2	2	4	4			4	18
19ESKCE093	Randheer	2	2	1	2	1		1		9
19ESKCE094	Reddy Sai Praveen Reddy	2	2		4	4				12
19ESKCE095	Ritesh Kumar Maurya	1	2	2	2	0			2	9
19ESKCE096	Rohit Mehta	2	2	2	0	2			5	13
19ESKCE097	Sachin Rewadia	2	1		3	4				10
19ESKCE099	Sagar Meena	ABSENT								0
19ESKCE100	Sahi Ram Godara	2	2	1	3	2		2		12
19ESKCE102	Samyak Jain	2	1		1	4			2	10
19ESKCE103	Sanuj Mohan	1	1	1	4	4				11
19ESKCE104	Satish Saini	1	1	1	2				0	5
19ESKCE105	Saurabh Kumar Meena		0		0					0
19ESKCE107	Shailesh Kumar	1	1	2	1			0		5
19ESKCE108	Shiv Singh Naruka	2	1	1		2	4		5	15
19ESKCE109	Shivani Meena	ABSENT								0
19ESKCE110	Shubham Saxena	1	1		3	4		1		10
19ESKCE111	Sonal Meena	2	2	2	3	2			2	13
19ESKCE112	Sourabh Meena	2	2					1		5
19ESKCE113	Subhash Sihag	2	2	2	2	0			0	8

19ESKCE114	Sumit Dangda	2			4	4			5	15
19ESKCE115	Tanmay Jaiswal	ABSENT								0
19ESKCE116	Ujjwal Tripathi	0	2	2	1	0		1		6
19ESKCE117	Umang Panchal	1	1.5	1	1.5	2			1	8
19ESKCE118	Utkarsh Daukiya		2			1	0			3
19ESKCE119	Ved Pratap Singh		2	2	4	4				12
19ESKCE120	Vikas Aechara	0	0	0	2		2		3	7
19ESKCE121	Vikash Mahawar		1	1	3				2	7
19ESKCE122	Vimal Kumawat	2	2	2	4	4			5	19
19ESKCE123	Vinod Kumar Meena	2	2	2	4	4			3	17
19ESKCE124	Vishal Kumar	ABSENT								0
19ESKCE125	Vishnu Goyal	2	2	2	1	4			6	17
19ESKCE126	Vishnu Meena	ABSENT								0
19ESKCE127	Vivek Verma	2	2		2	3.5		3.5		13
19ESKCE128	Yash Chaudhary	2	1	1	1	4				9
19ESKCE129	Youvan Jain	2	2	2	4	3		2		15
19ESKCE300	Nitesh		2	2	0					4
19ESKCE301	Rishabh	2	2	2		3	1		2	12
19ESKCE302	Shouryaraj Singh	2	2	1	4	4			4	17
19ESKCE303	Anush Sharma	2	2	1	3		4		6	18
20ESKCE200	Aditya Singh Parihar		2	2	0				2	6
20ESKCE202	Ashish Verma	2	2	2		3			4	13
20ESKCE203	Chitransh Srivastava	1	2	2	4	2		5		16
20ESKCE204	Mukul Saini	2	2	1	4	2			5	16
20ESKCE205	Pankaj Sharma				2				2	4
20ESKCE206	Priyanka Sharma	2	2	2	4	2		6		18
20ESKCE207	Rahul Saini	2	1	2	4	1				10
20ESKCE208	Rakesh Kumar Meena	1	1	1	3	3			5	14
20ESKCE209	Shiv Datt Borana		2	2	1					5
20ESKCE210	Shubham Jain	2	2	2		2	2	4		14
20ESKCE211	Simran Singh	2	2	2	3	1			3	13
20ESKCE212	Udit Narayan Avasthi	2	2	2	3	3				12
20ESKCE213	Yash Sarswat	2	2	2	3	2		4		15
20ESKCE215	Yash Sharma	ABSENT								0
No. of Students attempt question		**54**	**57**	**50**	**55**	**46**	**7**	**15**	**34**	
No. of student get marks greater than 50		**52**	**55**	**47**	**36**	**34**	**4**	**6**	**16**	
%		**96.30**	**96.49**	**94.00**	**65.45**	**73.91**	**57.14**	**40.00**	**47.06**	
Attainment level gain		**3**	**3**	**3**	**2**	**2**	**1**	**0**	**0**	

*** If >75% students get 50% marks or more, than attainment level is 3**

*** If 66-75% students get 50% marks or more, than attainment level is 2**

*** If 56-65% students get 50% marks or more, than attainment level is 1**

*** If 45-55% students get 50% marks or more, than attainment level is 0**

RAKESH CHOUDHARY

Rakesh

23.12.2021

Swami Keshvanand Institute of Technology, M & G, Jaipur

Department of Civil Engineering

Mark List Cum Attainment Level of Subject

II Midterm Exam (2021)

Subject Code : 5CE4-03 **Subject : Design of concrete structure (V-B)**

	Q. No.	1	2	3	4	5	6	7	8	9	Total (24)	Assignment (6)	Total (30)
	MM.	2	2	2	2	4	4	4	8	8			
	CO	4	5	5	3	2	5	5	4	6			
	Criterion: 50% of MM	1	1	1	1	2	2	2	4	4			
Roll No.	Name of Student	Part A				Part B			Part C				
19ESKCE075	Naman Singhal	1	1	1	1		4	4		7	19	6	25
19ESKCE076	Naveen Kumar	1	1	1			3	3	3		12	6	18
19ESKCE077	Nitesh Kumar	ABSENT									0	~~AB~~	AB
19ESKCE078	Nitin Goyal	2	1	1	2		4	4	6		20	6	26
19ESKCE079	Piyush Jain	2	1	2	1		4	3			13	6	19
19ESKCE080	Pooja Kumari Meena	2	1	2	2	4		4	5		20	6	26
19ESKCE081	Pradeep Kumar Meena	1	1	1	1	4	4		6		18	6	24
19ESKCE082	Pravesh Sehra		1				4	1			6	6	12
19ESKCE083	Raghvendra Singh Rathor	ABSENT									0	~~6~~	AB
19ESKCE084	Rahul Ghorela	2		2			1	1			6	6	12
19ESKCE085	Rahul Meena	2							1		3	6	9
19ESKCE086	Rahul Sharma	2	1	2	1		3	4	2		15	6	21
19ESKCE087	Rahul Singh Shekhawat		1				1	2	4		8	6	14
19ESKCE088	Rajat Singh	1	1	1	0		3	1	6		13	6	19
19ESKCE089	Rakesh Jakhar	2	2	1			1				6	6	12
19ESKCE090	Rakesh Mina	1	1	0	1	0		1		2	6	6	12
19ESKCE091	Rakesh Singh	1	1				2				4	6	10
19ESKCE092	Ramesh Choudhary		1	1	1		4	4		6	17	6	23
19ESKCE093	Randheer	2	1	1			1	1			6	6	12
19ESKCE094	Reddy Sai Praveen Reddy	1	1	2		1		4	3		12	6	18
19ESKCE095	Ritesh Kumar Maurya	2	1	2	1	1		2			9	6	15
19ESKCE096	Rohit Mehta	1		1				2	3		7	6	13
19ESKCE097	Sachin Rewadia	1						1	6		8	6	14
19ESKCE099	Sagar Meena	ABSENT									0	~~6~~	AB
19ESKCE100	Sahi Ram Godara	1	1	1			4	2			9	6	15
19ESKCE102	Samyak Jain	2	2	1			2	1	6		14	6	20
19ESKCE103	Sanuj Mohan	2	1		1				3		7	6	13
19ESKCE104	Satish Saini	1	1	2			1	1			6	6	12
19ESKCE105	Saurabh Kumar Meena	1					1	1			3	6	9
19ESKCE107	Shailesh Kumar	1	0	0							1	6	7
19ESKCE108	Shiv Singh Naruka	2						1	5		8	6	14
19ESKCE109	Shivani Meena	0	1	0	1					2	4	6	10
19ESKCE110	Shubham Saxena	1	1	1		2		2	1		8	6	14
19ESKCE111	Sonal Meena	2	2	2	1		3	4	5		19	6	25
19ESKCE112	Sourabh Meena	1	1	0			1				3	6	9
19ESKCE113	Subhash Sihag	2	2	2	1		2	3		2	14	6	20

19ESKCE114	Sumit Dangda	2	1	2		2	3		6		16	6	22
19ESKCE115	Tanmay Jaiswal	ABSENT									0	~~6~~	AB
19ESKCE116	Ujjwal Tripathi	1	1	2	0				2		6	6	12
19ESKCE117	Umang Panchal	2	1	2	1	1		1	1		9	6	15
19ESKCE118	Utkarsh Daukiya	2	2	2			2	2			10	NS	10
19ESKCE119	Ved Pratap Singh	2	2		1		3	4		5	17	6	23
19ESKCE120	Vikas Aechara	0	1	0	0		0	1		4	6	6	12
19ESKCE121	Vikash Mahawar	1	1	1	0		2	3	3		11	6	17
19ESKCE122	Vimal Kumawat	2	2	2	1		4	3	7		21	6	27
19ESKCE123	Vinod Kumar Meena	1	2	2	1		3	3	2		14	6	20
19ESKCE124	Vishal Kumar	ABSENT									0	~~6~~	AB
19ESKCE125	Vishnu Goyal	2	2	2	1			4			11	6	17
19ESKCE126	Vishnu Meena	ABSENT									0	~~6~~	AB
19ESKCE127	Vivek Verma	2	2	2	1		3	3		4	17	6	23
19ESKCE128	Yash Chaudhary	2	2	2	0		3	1		4	14	6	20
19ESKCE129	Youvan Jain	2	1	2	2	2	3			5	17	6	23
19ESKCE300	Nitesh	2	2	1	1		3	3	5		17	6	23
19ESKCE301	Rishabh	2	2	2	1		3	3	3		16	6	22
19ESKCE302	Shouryaraj Singh	2	2	1	1		4	3	7		20	6	26
19ESKCE303	Anush Sharma	2	2	2			4	4	7		21	6	27
20ESKCE200	Aditya Singh Parihar	1	2		1		0	2	0		6	6	12
20ESKCE202	Ashish Verma	2	2	2	2		4	0			12	6	18
20ESKCE203	Chitransh Srivastava	1	2	2	1		3	3	6		18	6	24
20ESKCE204	Mukul Saini	2	1	2	1		3	3	5		17	6	23
20ESKCE205	Pankaj Sharma	1	2	1		0	2			1	7	6	13
20ESKCE206	Priyanka Sharma	2	1	1	0		4	4	7		19	6	25
20ESKCE207	Rahul Saini	1	2	0	0		2	1			6	6	12
20ESKCE208	Rakesh Kumar Meena	1	2	0	0		3	3	4		13	6	19
20ESKCE209	Shiv Datt Borana	2	2	2	0		3	2	2		13	6	19
20ESKCE210	Shubham Jain	1	1	1			2	1	0		6	6	12
20ESKCE211	Simran Singh	2	2	1	1		3		4		13	6	19
20ESKCE212	Udit Narayan Avasthi	1	2	1	1		4		8		17	6	23
20ESKCE213	Yash Sarswat	2	2	1			4	3	6		18	6	24
20ESKCE215	Yash Sharma	1	2	2	1						6	6	12
No. of Students attempt question		**61**	**58**	**54**	**39**	**10**	**48**	**49**	**36**	**11**			
No. of student get marks greater than 50%		**59**	**57**	**47**	**30**	**5**	**39**	**33**	**21**	**7**			
%		**96.72**	**98.28**	**87.04**	**76.92**	**50.00**	**81.25**	**67.35**	**58.33**	**63.64**			
Attainment level gain		**3**	**3**	**3**	**2**	**0**	**3**	**1**	**0**	**0**			

* If 80-100% students get 50% marks or more, than attainment level is	3
* If 70-79% students get 50% marks or more, than attainment level is	2
* If 60-69% students get 50% marks or more, than attainment level is	1
* If 50-59% students get 50% marks or more, than attainment level is	0

Faculty Name : Dr. Abhishek Jain

Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur

B. Tech 2nd Mid Term Examination –2021

Semester/Session: V/ 2021-2022 **Branch: Civil Engineering**

Subject: Design of Concrete Structures **Subject Code: 5CE4-03**

Day, Date & Time: Monday, 20.12.2021 & 9:00 – 10:30 AM

Maximum Marks: 24 **Time Duration: 1.5 Hrs**

Important instructions:

1. Any data you feel missing suitably be assumed as per IS:456 (2000) and stated clearly.

Part A (Attempt all four questions and each question carry two marks).

Q.1. Explain difference between one-way slab and two-way slab with neat sketch? (2)

Q.2. Explain difference between short column and long column? (2)

Q.3. Explain difference between isolated and combined footing? (2)

Q.4. Define anchorage length and development length? (2)

Part B (Attempt two questions and each question carry four marks).

Q.1. Evaluate the ultimate moment capacity of a rectangular beam has width of 250 mm and effective depth of 500 mm. The beam is provided with tension steel of 5 bars of 28 mm diameter and compression steel of 2 bars of 25 mm diameter. The effective cover to the compression reinforcement being 50 mm. Use M20 and Fe-415 grades of concrete and reinforcement, respectively. (4)

Q.2. Discuss the design steps for column? (4)

Q.3. Discuss the design steps for footing? (4)

Part C (Attempt one questions and each question carry eight marks).

Q.1 Design a simply supported slab of a hospital building has a clear span 2.5 m which is supported on beams of 230 mm width. The slab is carrying an imposed load of 5 kN/m^2. Use M20 and Fe-415 grades of concrete and reinforcement, respectively. Take effective cover 20 mm. Apply check for shear and deflection. (8)

Q.2 Determine the reinforcement required for a beam of size 300 x 600 mm subjected to an ultimate bending moment of 150 kN-m, ultimate shear force of 100 kN and ultimate torsional moment of 50 kN-m. Use M20 concrete and Fe 415 steel. Draw the neat sketch also.
(Note: Percentage of steel will be calculated from the $A_{st, provided}$ for shear check). (8)

----------BEST OF LUCK----------

Question Paper Solution for Mid Term II Examination – 2021

Branch: Civil Engineering Sem/session: V/I Submitted by: Dr. Sunita Tolani & Dr. Abhishek Jain
Subject Code: 5CE4 - 03 Subject: Design of Concrete structures

Part A (Attempt all four questions and each question carry two marks)

Q.1. Explain difference between one-way slab and two-way slab with neat sketch?

Sol:

One-Way Slab	Two-Way Slab
$\frac{l}{b} > 2$	$\frac{l}{b} \leq 2$
The bending takes place in one direction i.e. along shorter direction	The bending takes place in both the directions
Depth required is more	Depth required is less
Main steel reinforcement is provided along shorter direction	Main steel reinforcement is provided along both the spans
Less economical as thickness is more and the amount of steel required is also more	More economical as the thickness of slab and amount of steel required is less

Q.2. Explain difference between short column and long column?

Sol:

$\frac{\text{Effective Length}}{\text{Least Lateral Dimension}} \leq 12$, Short Column

$\frac{\text{Effective Length}}{\text{Least Lateral Dimension}} > 12$, Long Column

Q.3. Explain difference between isolated and combined footing?

Sol:

Isolated footing: Isolated footings are provided under each column. These may be square, rectangular or circular in plan.

Combined footing: Combined footing supports two or more column loads. These may be continuous with rectangular or trapezoidal in plan.

Q.4. Define anchorage length and development length?

Sol. Development length (L_d) is the minimum length of bar which must be embedded in concrete beyond any section to develop its full strength. This is also called as anchorage length in case of axial tension and axial compression and development length in case of flexural tension and flexural compression.

Part B (Attempt two questions and each question carry four marks).

Q.1. Evaluate the ultimate moment capacity of a rectangular beam has width of 250 mm and effective depth of 500 mm. The beam is provided with tension steel of 5 bars of 28 mm diameter and compression steel of 2 bars of 25 mm diameter. The effective cover to the compression reinforcement being 50 mm. Use M20 and Fe-415 grades of concrete and reinforcement, respectively.

Sol.

Given Data:

$b = 250$ mm, $d = 500$ mm, $d` = 50$ mm

$f_{ck} = 20$ N/mm^2, $f_y = 415$ N/mm^2

$A_{st} = 5 \text{ X } \frac{\pi}{4} \text{ X } 28 \text{ X } 28 = 3078$ mm^2 $A_{sc} = 2 \text{ X } \frac{\pi}{4} \text{ X } 25 \text{ X } 25 = 981.7$ mm^2

$\frac{d'}{d} = \frac{50}{500} = 0.1$

$f_{sc} = 353$ N/mm^2

Step 1: Calculate the depth of neutral axis (x_u)

$$x_u = \frac{0.87 f_y A_{st} - f_{sc} A_{sc}}{0.36 f_{ck} b}$$

$$x_u = \frac{0.87 \text{ X } 415 \text{ X } 3078.7 - 353 \text{ X } 981.7}{0.36 \text{ X } 20 \text{ X } 250}$$

$x_u = 425$ mm

Step 2: Calculate the limiting value for depth of neutral axis ($x_{u,max}$)

For Fe-415

$$\frac{x_{u,max}}{d} = 0.48$$

$x_{u,max} = 0.48 \text{ X } 500$

$x_{u,max} = 240$ mm

$\because x_{u,max} < x_u$, the section is over reinforced.

Moment of resistance $M_u = 0.36 f_{ck} x_{u,max} (d - 0.42 x_{u,max}) b + f_{sc} A_{sc} (d - d')$

$M_u = 0.36 \text{ X } 20 \text{ X } 240 \text{ X } (500 - 0.42 \text{ X } 240) \text{ X } 250 + 353 \text{ X } 981.7 \text{ X } (500 - 50)$ (N-mm)

$M_u = 328.39$ kN-m

Q.2. Discuss the design steps for column?

Sol. Step 1: Assume percentage of longitudinal reinforcement (A_{sc})

$A_{sc} = 0.8\%$ to 4% of A_g

Step 2: Area of concrete (A_c)

$A_c = A_g - A_{sc}$

Step 3: Calculate area of gross section (A_g)

$P_u = 0.4\ f_{ck}\ A_c + 0.67\ f_y\ A_{sc}$

Step 4: Calculate dimension of column.

Step 5: Calculate area of longitudinal reinforcement

Step 6: Check for load carrying capacity

$P_u = 0.4\ f_{ck}\ A_c + 0.67\ f_y\ A_{sc}$

Step 7: Transverse reinforcement

Step 8: Check for slenderness ratio

$$\frac{Le}{\text{Least Lateral Dimension}} \leq 12$$

Step 9: Check for minimum eccentricity

Q.3. Discuss the design steps for footing?

Sol. Step 1: Calculate area of Footing (A)

$$A = \frac{1.1\ W_s}{q_s}$$

$$A = \frac{W_s + \text{Self weight of footing}}{q_s}$$

Self weight of footing = 10% of load on column

Step 2: Calculate size of footing

Assume one dimension (say X) and calculate the other dimension (say Y)

$$Y = \frac{A}{X}$$

Note: Ratio of width to length of column and footing are assumed to be similar.

Step 3: Factored soil pressure

$$P_u = \frac{1.5\ W_s}{X\ Y}$$

Step 4: Calculate depth of footing (d)

(i) By one way shear criteria

The critical section for one way shear is taken at a distance `d` from the column face.

- Shear force at critical section

$= P_u\ X\ (\frac{Y - b}{2} - d)$ .....(A)

- Shear force resisted by concrete = τ_c X d .....(B)

Note: If percentage of reinforcement is not given, take 0.2%.

- Calculate effective depth of footing (d) by equating equation (A) & (B)

(ii) By two way shear criteria

The critical section for two way shear or punching shear is taken at a distance `d/2` from the column face.

- Punching shear on critical section

  $= P_u\{X.Y - (a+d).(b+d)\}$ .....(C)

- Punching shear resisted by the section

  $= 0.5d(a+b+2d)\sqrt{f_{ck}}$ .....(D)

- Calculate effective depth of footing (d) by equating equation (C) & (D)

(iii) By bending moment criteria

The critical section for bending moment is taken at face of the column.

- Moment at section in x-direction

  $M_{ux} = \frac{P_u}{8} Y(X - a)^2$ .....(E)

- Moment at section in y-direction

  $M_{uy} = \frac{P_u}{8} X(Y - b)^2$ .....(F)

Note: Take maximum value (i.e. G) between above two.

- Moment of resistance of section

  $M_u = 0.36\, f_{ck} \frac{x_{u,max}}{d} (1 - 0.42 \frac{x_{u,max}}{d})\, Y.d^2$ .....(H)

- Calculate effective depth of footing (d) by equating equation (G) & (H)
- The highest value of effective depth as obtained in (i), (ii) & (iii) shall be adopted as effective depth of footing (d).

Step 5: Calculate area of reinforcement

(i) In x-direction

- Area of reinforcement $A_{st,x} = \frac{0.5\, f_{ck}}{f_y} \left(1 - \sqrt{1 - \frac{4.6\, M_{ux}}{f_{ck}\, X\, d^2}}\right) X\, d$

- Minimum reinforcement $A_{st,min} = \frac{0.12 X D}{100}$
- Spacing between bars $S = \frac{A_s X}{A_{st}}$

Step 5: Calculate area of reinforcement

(ii) In y-direction

- Area of reinforcement $A_{st,y} = \frac{0.5 f_{ck}}{f_y} (1 - \sqrt{1 - \frac{4.6 M_{uy}}{f_{ck} Y d^2}}) Y d$
- Minimum reinforcement $A_{st,min} = \frac{0.12 Y D}{100}$
- Spacing between bars $S = \frac{A_s Y}{A_{st}}$

Note: For design of Isolated square footing Take X=Y & a=b

Part C (Attempt one questions and each question carry eight marks).

Q.1 Design a simply supported slab of a hospital building has a clear span 2.5 m which is supported on beams of 230 mm width. The slab is carrying an imposed load of 5 kN/m^2. Use M20 and Fe-415 grades of concrete and reinforcement, respectively. Apply all check for shear, deflection.

Sol. Given Data:

b_w = 230 mm w_{live} = 5 kN/m^2 l_c = 2.5 m

M20 Concrete f_{ck} = 20 N/mm^2

Fe-415 Steel f_y = 415 N/mm^2 $\frac{x_{u\,max}}{d} = 0.48$

Step 1: Assume overall depth of slab (D)

D = 120 mm

Effective cover d` = 20 mm

Effective depth d = 120 – 20 = 100 mm

Step 2: Calculate Effective Span (l_e) (Page No. 34)

For simply supported slab

l_e = Minimum between ($l_c + b_w$) or ($l_c + d$)

l_e = Minimum between (2500 + 230) or (2500 + 100)

l_e = Minimum between 2730 mm or 2600 mm

l_e = 2600 mm

Step 3: Calculate Load on Slab (for 1 meter width)

(a) Calculate Self Weight

$w_{self} = 25\ b\ D$

$w_{self} = 25X1X0.12 = 3$ kN/m

(b) Calculate Total Weight

$w_{total} = w_{self} + w_{live}$

$w_{live} = 5X1 = 5$ kN/m

$w_{total} = 3+5 = 8$ kN/m

Step 4: Calculate Design/Factor/Ultimate Moment (M_u) and Shear (V_u)

For simply supported slab

- Maximum Bending Moment (M_{max}) and Shear Force (V)

$$M_{max} = \frac{w_{total}\, l_e^2}{8}$$

$$M_{max} = \frac{8X2.6X2.6}{8} = 6.76 \text{ kN-m}$$

- Maximum Shear Force (V_{max})

$$V_{max} = \frac{w_{total}\, l_e}{2}$$

$$V_{max} = \frac{8X2.6}{2} = 10.4 \text{ kN}$$

- Design/Factor/Ultimate Moment (M_u)

$M_u = 1.5\, M_{max}$

$M_u = 1.5X6.76 = 10.14$ kN-m

- Design/Factor/Ultimate Shear (V_u)

$V_u = 1.5\, V_{max}$

$V_u = 1.5X10.4 = 15.6$ kN

Step 5: Calculate the Limiting Moment of Resistance Factor (R_u)

$$R_u = 0.36\, f_{ck} \frac{x_{u,max}}{d} \left(1 - 0.42 \frac{x_{u,max}}{d}\right)$$

$R_u = 0.36X20X0.48X(1 - 0.42X0.48) = 2.76$ N/mm^2

Step 6: Determine Minimum Depth required (d_{req})

$$d_{req} = \sqrt{M_u/(R_u.b)}$$

$$d_{req} = \sqrt{10.14 \text{ X } 106/2.76 \text{ X } 1000}$$

$d_{req} = 60.61$ mm

Step 7: Compare the value of d_{req} (Obtained in Step 6) and d (Assumed)

$\because$ $d_{assumed} > d_{req}$, then our assumption is right. Provide assumed d and proceed for calculation of reinforcement.

Now d = 100 mm d`= 20 mm D = 120 mm

Step 8: Calculate Area of main reinforcement (A_{st})

$$A_{st} = \frac{0.5\, f_{ck}}{f_y} \left(1 - \sqrt{1 - \frac{4.6\, M_u}{f_{ck}\, b\, d^2}}\right) b\, d$$

$$A_{st} = \frac{0.5 \text{ X } 20}{415} \left(1 - \sqrt{1 - \frac{4.6 \text{ X } 10.14 \text{ X } 106}{20 \text{ X } 1000 \text{ X } 1002}}\right) \text{X } 1000 \text{ X } 100$$

$A_{st} = 299.62$ mm^2 = 300 mm^2

Step 9: Calculate Minimum Area of Reinforcement ($A_{st,min}$)

For Fe-415 Steel $A_{st,min} = \frac{0.12\,b\,D}{100}$ (Page No. 48)

$A_{st,min} = \frac{0.12 \times 1000 \times 120}{100} = 144\ mm^2$

Step 10: Compare A_{st} & $A_{st,min}$

$A_{st} = 300\ mm^2$ (Maximum between A_{st} & $A_{st,min}$)

Step 11: Spacing between bars (Main reinforcement)

$S = \frac{1000 \times A_\phi}{A_{st}}$

if 8 mm diameter bar is used

$A_\phi = \frac{\pi}{4} \times 8^2 = 50.3\ mm^2$

$S = \frac{1000 \times 50.3}{300} = 167.66\ mm$

Take S = 160 mm

Step 12: Check for Spacing between bars (Page No. 46)

$S \leq 3d$ or 300 mm

$S \leq 3 \times 100$ or 300 mm

$S \leq 300$ mm or 300 mm

Provide 8 mm diameter bar @ 160 mm.

Step 13: Calculate Area of distribution reinforcement ($A_{st,\ dist}$)

For Fe-415 Steel $A_{st,\ dist} = \frac{0.12\,b\,D}{100}$ (Page No. 48)

$A_{st,\ dist} = \frac{0.12 \times 1000 \times 120}{100} = 144\ mm^2$

Step 14: Spacing between bars (distribution reinforcement)

$S = \frac{1000 \times A_\phi}{A_{st,dist}}$

if 6 mm diameter bar is used

$A_\phi = \frac{\pi}{4} \times 6^2 = 28.3\ mm^2$

$S = \frac{1000 \times 28.3}{144} = 196.5\ mm$

Take S = 190 mm

Step 15: Check for Spacing between bars (Page No. 46)

$S \leq 5d$ or 450 mm

$S \leq 5 \times 100$ or 450 mm

$S \leq 500$ mm or 450 mm

Provide 6 mm diameter bar @ 190 mm.

Step 16: Check for Shear (Page No. 72 & 73)

(a) Calculate nominal shear stress (τ_v)

$\tau_v = \frac{V_u}{b\,d}$

$\tau_v = \frac{15.6 \times 103}{1000 \times 100}$

$\tau_v = 0.156$ N/mm^2

(b) Calculate percentage of steel (p_t)

$$p_t = \frac{100\, A_{st}}{b\, d}$$

$$p_t = \frac{100 \times 150}{1000 \times 100} = 0.15\%$$

(c) Calculate the design shear strength of concrete (τ_c)

$$\tau_c = k\, \tau_c$$

$$\tau_c = 1.3 \times 0.28$$

$$\tau_c = 0.364 \text{ N/mm}^2$$

(d) Compare τ_v and τ_c

$\because \tau_c > \tau_v$

"OK"

Step 17: Check for Deflection (Page No. 37 & 38)

(a) Calculate area of reinforcement provided ($A_{st,provided}$)

$$A_{st,provided} = \frac{A_g}{S} \times 1000$$ (A_g & S belongs to the main r/f)

$$A_{st,provided} = \frac{50.3}{160} \times 1000 = 314.38 \text{ mm}^2$$

(b) Calculate design strength (f_s)

$$f_s = 0.58\, f_y \frac{A_{st,req}}{A_{st,provided}}$$

$$f_s = 0.58 \times 415 \times \frac{300}{314.38}$$

$$f_s = 229.69 \text{ N/mm}^2$$

(c) Calculate the percentage of tensile reinforcement (p_t)

$$p_t = \frac{100\, A_{st,provided}}{b\, d}$$

$$p_t = \frac{100 \times 314.38}{1000 \times 100}$$

$$p_t = 0.314\%$$

(d) Calculate modification factor for tension reinforcement (k_t)

For $f_s = 190$ N/mm^2 & $p_t = 0.31\% \Rightarrow k_t = 1.89$

For $f_s = 240$ N/mm^2 & $p_t = 0.31\% \Rightarrow k_t = 1.47$

For $f_s = 229.67$ N/mm^2 & $p_t = 0.31\%$

$$\Rightarrow k_t = 1.89 + \frac{1.47 - 1.89}{240 - 190} \times (229.67 - 190) = 1.56$$

(e) Maximum deflection (δ_{max})

$$\delta_{max} = \alpha\, k_t$$

Here, $\alpha = 20$ (For simply supported slab)

$$\delta_{max} = 20 \times 1.56$$

$$\delta_{max} = 31.2$$

(f) Actual deflection (δ)

$$\delta = \frac{l_e}{d}$$

$$\delta = \frac{2600}{100} = 26 < \delta_{max} \quad \text{"OK"}$$

Q.2 Determine the reinforcement required for a beam of size 300 x 600 mm subjected to an ultimate bending moment of 150 kNm, ultimate shear force of 100 kN and ultimate torsional moment of 50 kN-m. Use M20 concrete and Fe 415 steel. Draw the neat sketch also.
(Note: Percentage of steel will be calculated from the $A_{st.provided}$ for shear check)

Sol.

Step 1: Longitudinal tension reinforcement

$M_e = M_u + M_t = M_u + (T_u/1.7)\{1 + (D/b)\} = 150 + (50/1.7)\{1 + (600/300)\} = 150 + 88.23 = 238.23$ kN-m

Calculate Area of main reinforcement (A_{st})

$$A_{st} = \frac{0.5\, f_{ck}}{f_y}\left(1 - \sqrt{1 - \frac{4.6\, M_e}{f_{ck}\, b\, d^2}}\right) b\, d$$

$$A_{st} = \frac{0.5 \times 20}{415}\left(1 - \sqrt{1 - \frac{4.6 \times 238.23 \times 10^6}{20 \times 300 \times 550^2}}\right) \times 300 \times 550$$

$$A_{st} = 1473 \text{ mm}^2$$

Provide 5-20mm bars , Ast.provided= 1570 mm2

percentage of tensile reinforcement = 0.95%,

Here, in this problem, the numerical value of Mt (= 88.23 kNm) is less than that of Mu (150 kNm). So, longitudinal compression reinforcement shall not be required.

Step 2: Check for shear

the equivalent shear Ve = Vu + 1.6(Tu/b) = 100 + 1.6(50/0.3) = 366.67 kN,

the equivalent shear stress τve = 366.67/(0.3)(0.55) = 2.22 N/mm2,

τc.max = 2.8 N/mm2 . Hence, the section does not need any revision.

Check if shear reinforcement shall be required.

percentage of tensile steel as 0.9, τc = 0.62 N/mm2 < τve < τc.max transverse reinforcement shall be required

Transverse reinforcement Providing two legged, 10 mm diameter stirrups (area = 157 mm2)

d1 = 600 - 50 - 50 = 500 mm, b1 = 300 - 2(25 + 10 + 10) = 210 mm

From equation

$$0.87 f_y A_{sv}/s_v = (T_u/b_1 d_1) + (V_u/2.5 d_1)$$

We get s_v = 124mm

Total transeverse reinforcement should not be less than

$$A_{sv} = \frac{(\tau_{ve} - \tau_c)\, b\, sv}{0.87\, fy}$$

We get s_v = 113mm

Step 3: Check for sv

x1 = 240 mm and y1 = 528.5 mm.

The maximum spacing sv should be the least of x1, (x1 + y1)/4 and 300 mm

Here, x1 = 240 mm, (x1 + y1)/4 = 192 mm. So, provide 2 legged 10 mm stirrups @ 110 mm c/c.

Step 4: side face reinforcement

Providing 4-8 mm diameter bars (area = 201 mm2) at the mid-depth of the beam and two on each face , the total area required 0.1(300)(550)/100 = 165 mm2 < 201 mm2 . Hence o.k.

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Analysis of Question Paper Mid Term II Examination-2021

Branch : Civil **Semester/session: V/2021-22** **Max Marks:24**
Subject Code: 5CE4-03 **Subject: DCS** **Duration: 1.5 hours**

A. Distribution of Course Outcome and Bloom's Taxonomy in Question Paper

Part	Q. No	Questions	Marks	CO	BL
A	Q.1	Explain difference between one-way slab and two-way slab with neat sketch?	2	4	2
	Q.2	Explain difference between short column and long column	2	5	2
	Q.3	Explain difference between isolated and combined footing?	2	5	2
	Q.4	Define anchorage length and development length?	2	3	1
B	Q.1	Evaluate the ultimate moment capacity of a rectangular beam has width of 250 mm and effective depth of 500 mm. The beam is provided with tension steel of 5 bars of 28 mm diameter and compression steel of 2 bars of 25 mm diameter. The effective cover to the compression reinforcement being 50 mm. Use M20 and Fe-415 grades of concrete and reinforcement, respectively.	4	2	5
	Q.2	Discuss the design steps for column?	4	5	2
	Q.3	Discuss the design steps for footing?	4	5	2
C	Q.1	Design a simply supported slab of a hospital building has a clear span 2.5 m which is supported on beams of 230 mm width. The slab is carrying an imposed load of 5 kN/m^2. Use M20 and Fe-415 grades of concrete and reinforcement, respectively. Take effective cover 20 mm. Apply check for shear and deflection.	8	4	6
	Q.2	Determine the reinforcement required for a beam of size 300 x 600 mm subjected to an ultimate bending moment of 150 kN-m, ultimate shear force of 100 kN and ultimate torsional moment of 50 kN-m. Use M20 concrete and Fe 415 steel. Draw the neat sketch also. (Note: Percentage of steel will be calculated from the Ast, provided for shear check).	8	6	3

BL – Bloom's Taxonomy Levels
(1- Remembering, 2- Understanding, 3 – Applying, 4 – Analyzing, 5 – Evaluating, 6 - Creating)
CO – Course Outcomes

Swami Keshvanand Institute of Technology, Management & Gramothan, Ramnagaria, Jagatpura, Jaipur-302017

Analysis of Question Paper Mid Term II Examination-2021

Branch : Civil Semester/session: V/2021-22 Max Marks:24
Subject Code: 5CE4-03 Subject: DCS Duration: 1.5 hours

B. Questions and Course Outcomes (COs) Mapping in terms of correlation

COs	Part A				Part B			Part C	
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q1	Q2
CO1	0	0	0	0	0	0	0	0	0
CO2	0	0	0	0	3	0	0	0	0
CO3	0	0	0	2	0	0	0	0	0
CO4	2	0	0	0	0	0	0	3	0
CO5	0	2	2	0	0	3	3	0	0
CO6	0	0	0	0	0	0	0	0	3

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

C. Mapping of Bloom's Level and Course Outcomes with Question Paper

Bloom's Level Mapping		CO Mapping	
Bloom's Level	Percentage	CO	Percentage
BL1	5.55	CO1	00
BL2	38.88	CO2	11.11
BL3	22.22	CO3	5.55
BL4	00	CO4	27.77
BL5	11.11	CO5	33.33
BL6	22.22	CO6	22.22

Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur

B.Tech III Year V Semester (Session 2021-2022)

CO's Attainment (Theory Mid Term : II) | Department: Civil Engineering

Faculty Name: SUNITA TOLANI | Course Name with CODE: DCS, 5CE4-03

Upon successful completion of this course, students will be able to:

CO1: Understand design philosophies of beam by limit state and working state methods

CO2: Analyze and design of beams for flexure using working stress & limit state design methods.

CO3: Check beams for shear and bond and serviceability for deflection using limit state method.

CO4: Analyze and design of one way and two way slabs using limit state method

CO5: Analyze and design of column and footing by limit state method

CO6: Analyze and design of beams for torsion as per codal method

MID TERM EVALUATION

Sr. No.	ROLL NO	PART →	A				B		C			Total (24)	Assignment (6)	Total (30)
		Note→	Attempt All				Attempt Any Two			Attempt Any One				
		QUESTION NO. →	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9			
		COURSE OUTCOME(S) SATISFIED →	4	5	5	3	2	5	5	4	6			
		MAXIMUM MARKS →	2	2	2	2	4	4	4	8	8			
		MINIMUM QUALIFYING MARKS (50%) →	1	1	1	1	2	2	2	4	4			
		NAME OF STUDENT ↓												
1	19ESKCE001	ABHAY SINGH DHAKA	2	0		0	4	4		5		15	3	18
2	19ESKCE002	ABHIJEET SINGH NATHAWAT	2	2		1	4	4			7	20	3	23
3	19ESKCE003	ABHISHEK LODWAR	2				3	3		4		12	4	16
4	19ESKCE004	ABHISHEK MEENA	2	1		0	1	2			3	9	3	12
5	19ESKCE005	ABHISHEK MOOND	2	2	2	2	4					12	6	18
6	19ESKCE006	ADITYA CHOUDHARY	2	2	2	0	3					9	3	12
7	19ESKCE007	ADITYA RAJ	2	2		2	3	3				12	5	17
8	19ESKCE008	ADITYA SAINI	2	2	2	2		3				11	6	17
9	19ESKCE009	AJAY KUMAR MEENA	0	0		0						0	3	3
10	19ESKCE011	AKANKSHA FOUJDAR	2	2	2	1		2	4			13	6	19
11	19ESKCE012	AMAN SUTHAR	2	2	2		4	3			4	17	3	20
12	19ESKCE013	AMIT KUMAR	2	2	2	2	4	4		4		20	6	26
13	19ESKCE014	AMIT KUMAR SONWAL	2	2	2	2		2	2		3	15	4	19
14	19ESKCE015	ANAND JOSHI	2	2	2	1	4	2				13	4	17
15	19ESKCE016	ANAND KUMAR	2	1	1	2						6	4	10
16	19ESKCE017	ANKIT MINA	2	2	2	2	2	4			4	18	6	24
17	19ESKCE018	ANSHAJ GOYAL	Absent											
18	19ESKCE019	ANURAG MEENA	2	0	2	2	4	3		5		18	6	24
19	19ESKCE020	ARPIT MEENA	2	0		2	4	1		4		13	4	17
20	19ESKCE021	ARPIT MUKESH MEENA	2	1		2	4	2		1		12	5	17
21	19ESKCE022	ARVIND KUMAWAT	2	2	2	2	4	1				13	6	19
22	19ESKCE023	ARYAN KHATRI	2		2	1		1				6	6	12
23	19ESKCE024	ASHISH SINGH JADAUN	0		0	2						2	3	5
24	19ESKCE025	ASHOK BAIRWA	2	2		2				1		7	4	11
25	19ESKCE026	ATIBA QURESHI	2	1	1	2	4		2	8		20	6	26
26	19ESKCE027	AYUSH CHOUDHARY	2		2	2					0.5	6.5	3	10
27	19ESKCE028	AYUSH KUMAR	2		1	2	2					7	6	13
28	19ESKCE029	BANWARI LAL MEENA	Absent											
29	19ESKCE030	BRIJESH JATOLIYA					1	2				3	4	7
30	19ESKCE031	CHITRANSHU MEENA										0	4	4
31	19ESKCE032	DEEPAK MEENA	2	2				2	3	6		15	6	21
32	19ESKCE033	DIPAK KUMAR	Absent											
33	19ESKCE034	DIVYANSHU JAIN	2	2	2		3	3				12	6	18
34	19ESKCE036	HARSH KUMAWAT	2	2		2	2	1				9	4	13
35	19ESKCE037	HARSH MEENA	2	2		2		2				8	4	12
36	19ESKCE038	HARSH SINGHAL	2	1				2				5	5	10
37	19ESKCE039	HARSHVARDHAN RAWAT	2		2	2	3	1				10	6	16
38	19ESKCE040	HIMANSHU AGARWAL	2	2		1		4	4		8	21	5	26
39	19ESKCE041	HIMANSHU CHOUDHARY	2	1	2	2	2			2		11	5	16
40	19ESKCE042	HIMANSHU VIJAYVARGIA	2	1	2		2			2		9	5	14

41	19ESKCE043	HITESH KUMAR MEENA	2	1				4	1	4		12	4	16
42	19ESKCE044	HITESH SHARMA	2	2	2	2	4	1		1		14	6	20
43	19ESKCE045	ISHANT JOGANI	2	2			1		1	6		12	6	18
44	19ESKCE046	JAGENDER BAKNAD	2	1		1		4		6		14	6	20
45	19ESKCE047	JATIN MEENA	2	2			3	2		1		10	4	14
46	19ESKCE048	JATIN PRATAP MEENA	2	1		1	1	1				6	4	10
47	19ESKCE049	JATIN VEDWAL	2	2			3	1		0		8	4	12
48	19ESKCE050	JAY KUMAR BANSIWAL	2	1		2	4			7		16	6	22
49	19ESKCE051	JAYANT KUMAR	2	2	2	2	3	2		7		20	6	26
50	19ESKCE052	JENISHA DEVNANI	2	2	2	2	4	4		8		24	6	30
51	19ESKCE053	KAHKASHAN KHANAM	2	2	2	2		4	4		8	24	6	30
52	19ESKCE055	KANISHKA	2	2	1	1	4	2		6		18	6	24
53	19ESKCE056	KARAN MEENA	2	2	1	2			3		6	16	6	22
54	19ESKCE057	KARTIKAY SINGHAL	2	2	2	2		4	4	8		24	6	30
55	19ESKCE058	KAVYA KULSHRESTHA	2	2	2	2	4	4		7		23	6	29
56	19ESKCE059	KULDEEP TIWARI	2	1	2	1	2	1				9	4	13
57	19ESKCE060	KUMKUM MAURYA	2	1	2	2	4	3		4		18	6	24
58	19ESKCE061	LALIT KUMAR SUWALKA	2	1	1		1		3	3		11	5	16
59	19ESKCE062	LOKESH MALI	2	1	2	1	3	1		3		13	5	18
60	19ESKCE063	LUV KUMAR SUHAG	1	2	2			2		2		9	5	14
61	19ESKCE064	MAHENDRA MEENA	1	1				2	1	1		6	3	9
62	19ESKCE065	MANISH CHOUDHARY	2	2			1			2		7	4	11
63	19ESKCE066	MANISH CHOUDHARY	1		1			1	2			5	3	8
64	19ESKCE067	MANISH KUMAR MEENA	Absent											
65	19ESKCE068	MANISH RAD	1	1	1	1	2	3		3		12	5	17
66	19ESKCE069	MEHUL AGARWAL	1	1			4	2		3		11	4	15
67	19ESKCE070	MOHAMMAD RAMJAN	2				4					6	4	10
68	19ESKCE071	MOHD ARIF CHOWDHARY	Absent											
69	19ESKCE072	MOHIT MEENA	2	1	1		1					5	3	8
70	19ESKCE073	MUKUL MANGAL	2	2	1	2		2	4	5		18	5	23
71	19ESKCE074	MUSKAN MEENA	2	2	2	2	3	4			6	21	6	27

Total No. of DEBARRED (DB)	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
Total No. of ABSENT (AB)	5	5	5	5	5	5	5	5	5
Total Students Appreaed for Exam (A)	66	66	66	66	66	66	66	66	66
Total Students Attempted the Question (A)	64	56	39	46	43	47	14	32	10
No. of Students scored >=50% marks (B)	**61**	**51**	**37**	**41**	**35**	**35**	**11**	**18**	6
Percentage Attainment of Criterion (B/A)	95.31	91.07	94.87	89.13	81.40	74.47	78.57	56.25	60.00
CO Attainment Level	**3**	**3**	**3**	**3**	**3**	**2**	**2**	**0**	**1**
Attainment of CO-1									
Attainment of CO-2					**81.40**				
Attainment of CO-3				**89.13**					
Attainment of CO-4	**95.31**							**56.25**	
Attainment of CO-5		**91.07**	**94.87**			**74.47**	**78.57**		
Attainment of CO-6									**60**

Criterion of Percentage for CO Attainment Level	Attainment Level
If below 60% students get 50% marks or less, then attainment level is	0
If below 60-69% students get 50% marks or more, then attainment level is	1
If below 70-79% students get 50% marks or more, then attainment level is	2
If below 80-100% students get 50% marks or more, then attainment level is	3

SUNITA TOLANI

Faculty name with signature

Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur

B.Tech Mid Term II Examination- 2021

Semester/Session: V / 21-22 **Branch: CE**

Subject: Structural Analysis-I **Subject Code: 5CE4-02**

Time: 1½ Hours **Maximum Marks: 20**

Part A (Attempt all questions max. limit 25 words)

Ques 1: Define D Almbert's principle? [2]

Ques 2: Give the vector and graphical representation of simple harmonic motion? [2]

Ques 3: Give equivalent spring stiffness formula of springs are in series or in parallel? [2]

Part B (Attempt any two questions from 4 to 6)

Ques 4: Derive an equation which gives the relationship between natural frequency and the static deflection of the system? [4]

Ques 5: Analyse the continuous beam ABCD as shown in fig.1 by slope deflection method. The support B sinks by 15 mm downwards. Take E $=200\times10^5$ KN/m^2 and I $=120\times10^{-6}$m^4. [4]

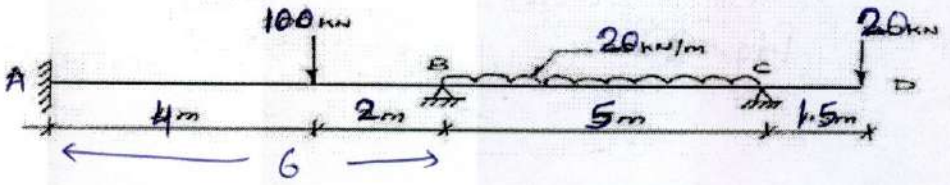


Fig 1

Ques 6: Calculate the distribution factor for the given fig. 2. [4]

Part C (Attempt any one question from 7 & 8)

Q. 7: Analyse the portal frame ABCD. Support A and D both are fixed. Only span BC is loaded as per fig.3. Draw the BM diagram by using **slope**

deflection method. Also sketch the deflected shape of the frame. [6]

Ques 8: Analyse the portal frame ABCD. Support A and D both are fixed. Only span BC is loaded as per fig.3. Draw the BM diagram by using **moment distribution method**. Also sketch the deflected shape of the frame. [6]

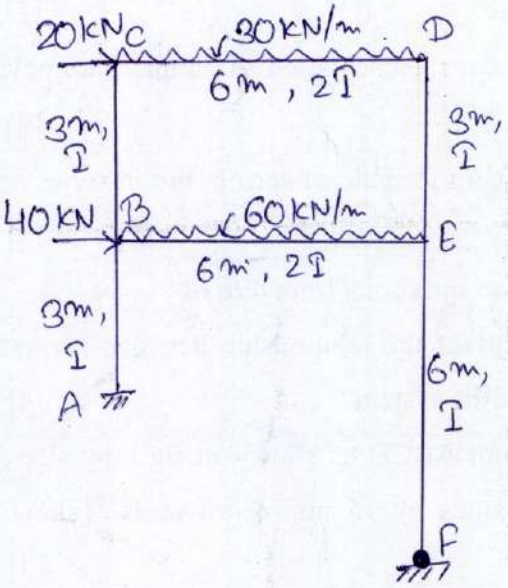


Fig. 2.

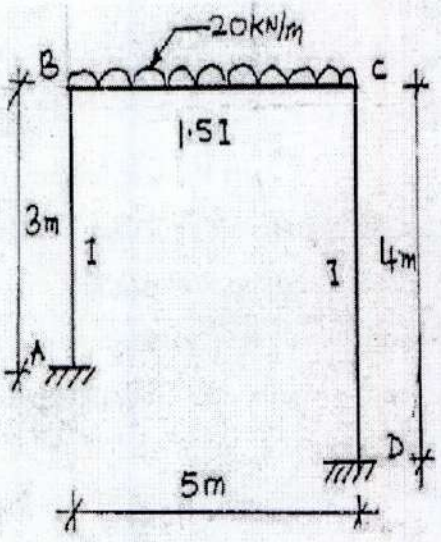


Fig. 3

Question Paper Solution for Mid Term: II Examination-2021

Branch: CE. Semester/session: V /21-22 Submitted by: POOJA JAIN
Subject Code: 5CE4:02 Subject: SA-I

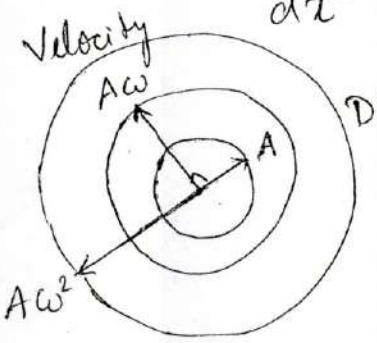
Answer 1) It states that a body which is not in a static equilibrium moves with some acceleration apply some inertia forces. It is alternative form of Newton's second law of motion. This principle reduces a problem from dynamic to static. The body is in equilibrium under the action of real force F and the fictious force $-ma$ This fictitious force is also called an inertial force.

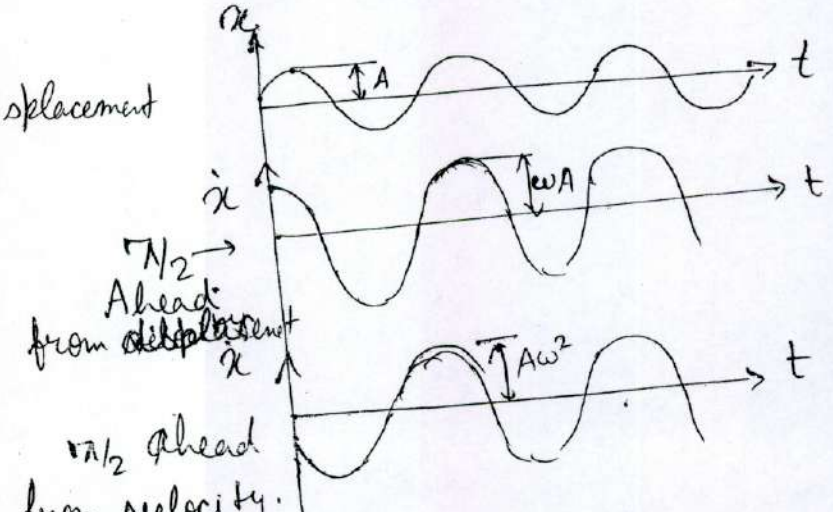
$$F - ma = 0.$$

Ques (2) → $x = A \sin \omega t$ — Displacement equation

Velocity → $\dot{x} = \frac{dx}{dt} = A\omega \cos \omega t = A\omega \cos(\omega t + \pi/2)$

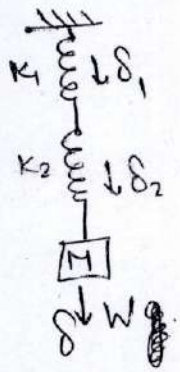
Acceleration → $\ddot{x} = \frac{d^2x}{dt^2} = -A\omega^2 \sin \omega t = A\omega^2 \sin(\omega t + \pi)$





π/2 ahead from velocity.
& π ahead from displacement.

Ques(3) → When springs are in series →

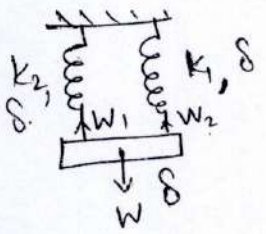


$$\delta = \delta_1 + \delta_2$$

$$\frac{W}{K_{eq}} = \frac{W}{K_1} + \frac{W}{K_2}$$

$$\Rightarrow \frac{1}{K_{eq}} = \frac{1}{K_1} + \frac{1}{K_2}$$

When springs are in parallel



$$W = W_1 + W_2$$

$$K_{eq}\delta = K_1\delta + K_2\delta$$

$$K_{eq} = K_1 + K_2$$

Ques(4) → The time period of oscillatory motion is that time during which rotating vector having a circular frequency ω_n complete one cycle of 2π radians.

$$\text{time} = T = 2\pi/\omega_n$$

& f_n natural frequency is inverse to Time period

$$f_n = 1/T = \omega_n/2\pi$$

& We know that $\omega_n = \sqrt{K/m}$

$$\text{So } f_n = \frac{1}{2\pi}\sqrt{\frac{K}{m}} = \frac{1}{2\pi}\sqrt{\frac{Kg}{mg}}$$

& For equilibrium of spring $mg = K \cdot \Delta_{st}$

Where Δ_{st} is static deflection.

$$\text{So. } f_n = \frac{1}{2\pi}\sqrt{g/\Delta_{st}} = \frac{0.4984}{\sqrt{\Delta_{st}}} \text{ Hz.}$$

Ques(5). For this $\theta_A = 0$; $\Delta = 15\,mm$

For u diagram Span AB Max^m B.M $= \frac{Wab}{l} = 133.33\,KN.m$

Span BC Max^m B.M. $= \frac{Wl^2}{8} = 62.5\,KN.m$

Fixed end moment for each span :—

1.) $M^F_{AB} = -\frac{Pab^2}{l^2} = -44.44\,KN.m$

2.) $M^f_{BA} = \frac{Pa^2b}{l^2} = 88.89\,KN.m$

3.) $M^f_{BC} = -\frac{Wl^2}{12} = -41.67\,KN.m$

4.) $M^f_{CB} = \frac{Wl^2}{12} = 41.67\,KN.m$

5) $M^f_{CD} = -20 \times 1.5 = -30\,KN.m.$

Applying slope deflection equation :—

$$M_{AB} = M^f_{AB} + \frac{2EI}{L}\left(2\theta_A + \theta_B - \frac{3\Delta}{L}\right)$$

$$= -44.44 + \frac{2400}{3}\left(\theta_B - \frac{3 \times 0.015}{6}\right)$$

$$= -50.44 + 800\,\theta_B \quad —(1)$$

$$M_{BA} = 82.89 + 1600 \times \theta_B \quad —(2)$$

$$M_{BC} = -33.03 + 960\,(2\theta_B + \theta_C) \quad —(3)$$

$$M_{CB} = 50.31 + 960\,(\theta_B + 2\theta_C) \quad —(4)$$

$$M_{CD} = -30\,KN.m.$$

Joint equilibrium equation.

$M_{BA} + M_{BC} = 0 \Rightarrow 49.86 + 3520 \cdot \theta_B + 960 \cdot \theta_C = 0$ — (A)

$M_{CB} + M_{CD} = 0 \Rightarrow 20.31 + 960 \cdot \theta_B + 1920 \cdot \theta_C = 0$ — (B)

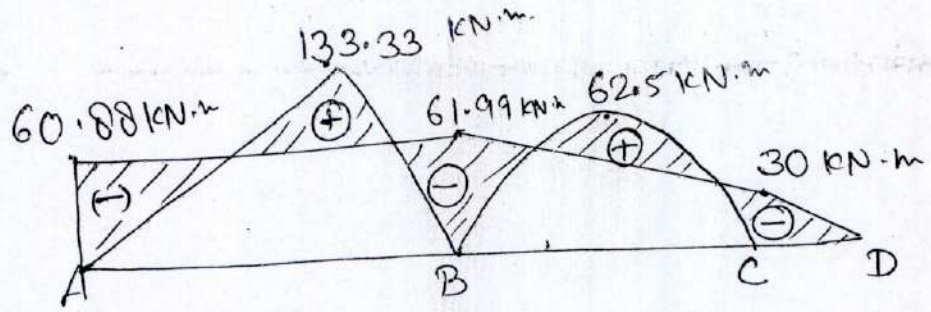
By solving (A) & (B)

$\theta_B = -0.0130608$; $\theta_C = -0.0040479$

Final end moments

$M_{AB} = -60.88$ KN.m $M_{BA} = 61.99$ KN.m

$M_{BC} = -61.99$ KN.m $M_{CB} = 30$ KN.m



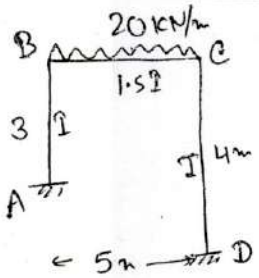
Bending Moment Diagram.

Ques (6). Distribution factor Table :—

Joint	Members	Stiffness (Ki)	Sum of Stiffness ΣK	D.F.
B	BA	I/3	I	1/3
	BE	2I/6		1/3
	BC	I/3		1/3
C	CB	I/3	2I/3	1/2
	CD	2I/6		1/2

D	DC	$2I/6$	$2I/3$	$1/2$
	DE	$I/3$		$1/2$
E	ED	$I/3$	$0.79167I$	0.42
	EB	$2I/6$		0.42
	EF	$\frac{3}{4} \times \frac{I}{6}$		0.16

Ques (7)



By SDM

$\theta_A = 0$; $\theta_D = 0$; θ_B, θ_C & Δ is there.

For Span BC Max^m B.M $= \frac{wl^2}{8} = 62.5$ KN.m

Fixed End Moment :-

$M^F_{AB} = M^F_{BA} = M^F_{CD} = M^F_{DC} = 0$

$M^F_{BC} = -\frac{wl^2}{12} = -41.67$ KN.m ; $M^F_{CB} = \frac{wl^2}{12} = 41.67$ KN.m

Applying SDE →

1.) $M_{AB} = \frac{2EI}{3}(\theta_B - \Delta)$

2) $M_{BA} = \frac{2EI}{3}(2\theta_B - \Delta)$

3) $M_{BC} = -41.67 + \frac{3EI}{5}(2\theta_B + \theta_C)$

4) $M_{CB} = 41.67 + \frac{3EI}{5}(\theta_B + 2\theta_C)$

5.) $M_{CD} = \frac{2EI}{4}(2\theta_C - \frac{3\Delta}{4})$

6.) $M_{DC} = \frac{2EI}{4}(\theta_C - \frac{3\Delta}{4})$

Joint equilibrium equation

$M_{BA} + M_{BC} = 0 \Rightarrow -41.67 + 2.533EI\theta_B + 0.6EI\theta_C + 0.67EI\Delta = 0$ — (A)

$M_{CB} + M_{CD} = 0 \Rightarrow 41.67 + 0.6EI\theta_B + 2.2EI\theta_C - 0.375EI\Delta = 0$ — (B)

Shear equilibrium equation $H_A + H_D = 0$

$8EI\theta_B + 4.5EI\theta_C - 7.53EI\Delta = 0$ — (C)

By solving A, B & C :-

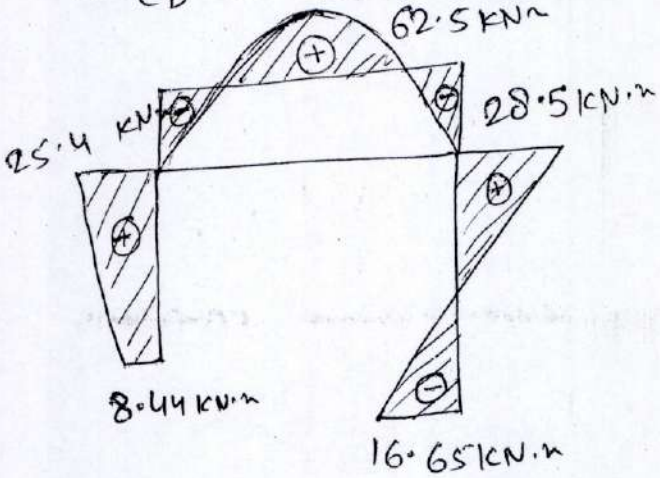
$$\theta_B = \frac{25.46}{EI} \quad ; \quad \theta_C = -\frac{23.17}{EI} \quad ; \quad \Delta = \frac{12.8}{EI}$$

Final End Moments :-

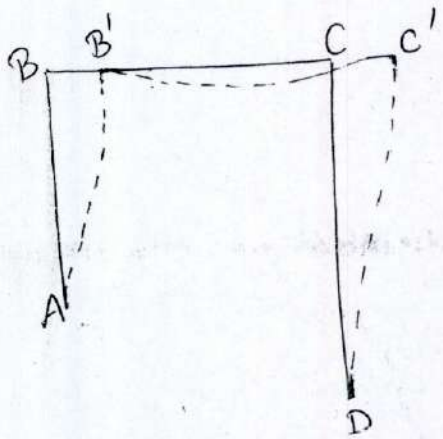
$M_{AB} = -8.44$ KN.m. $\quad M_{BA} = 25.4$ KN.m

$M_{BC} = -25.4$ KN.m $\quad M_{CB} = 28.5$ KN.m

$M_{CD} = -28.5$ KN.m $\quad M_{DC} = -16.65$ KN.m



BM D



Deflected Shape

Ques (8) → By MDM →

Distribution Table :-

Joint	Member	Stiffness (K)	Sum of Stiffness ΣK	D.F.
B	BA	I/3	0.6333 I	0.53
	BC	1.5I/5		0.47
C	CB	1.5I/5	0.55 I	0.55
	CD	I/4		0.45

Question Paper Solution for Mid Term: II Examination-2021

Branch: CE Semester/session: V /21-22 Submitted by: POOJA JAIN
Subject Code: 5CE4b2 Subject: SA-I

Non-Sway Moment Distribution table:-

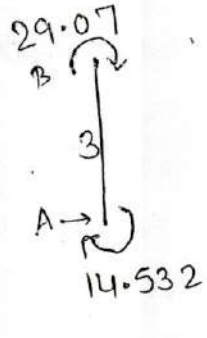
Joint	A	B		C		D
Member	AB	BA	BC	CB	CD	DC
D.F.		0.53	0.47	0.55	0.45	0
F.E.M.	0	0	-41.67	41.67	0	
Balance	0	20.0851	19.5849	-22.9185	-18.7515	
CO	10.04		-11.4592	9.7924		-9.37575
Balance		6.0733	5.3858	-5.3858	-4.4065	
CO	3.0366		-2.6929	2.6929		-2.2033
Balance		1.4272	1.2656	-1.4811	-1.2118	
CO	0.7136		-0.7405	0.6328		-0.6059
Balance		0.3924	0.348	-0.348	-0.2847	
CO	0.1962		-0.174	0.174		-0.1423
Balance	0.046	0.092	0.08598	-0.095	-0.0783	-0.03915
CO.						
FEM	14.532	29.07	-29.07	~~26.9303~~ 24.73	-24.73	-12.365

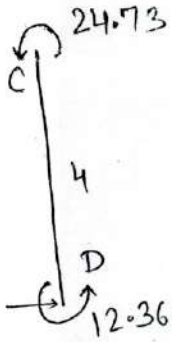
Ratio. $M^f_{AB} : M^f_{BA} : M^f_{CD} : M^f_{DC}$

$\frac{6EI\Delta}{9} : \frac{6EI\Delta}{16}$

16 : 9

For Non Sway





$-H_A \times 3 + 14.532 + 29.07 = 0$

$H_A = 14.534 \ (\rightarrow)$

$-H_D \times 4 - 12.365 - 24.73 = 0$

$H_D = -9.2737 \ (\leftarrow)$

Extra Horizontal equation for equilibrium: $H = 5.2603 \ (\leftarrow)$

Question Paper Solution for Mid Term: II Examination-2021

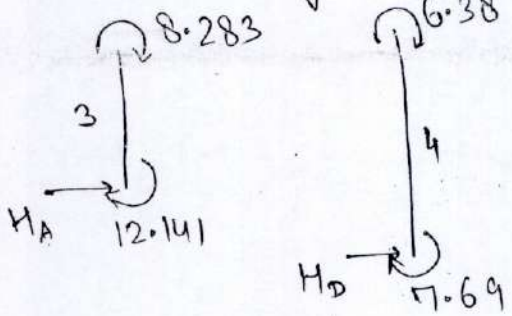
Branch: CE Semester/session: V -21-22 Submitted by: POOJA JAIN.
Subject Code: 5CE4'02 Subject: SA-I

For Sway

Joint	A	B		C		D
Member	AB	BA	BC	CB	CD	DC
D.F.		0.53	0.47	0.55	0.45	
FEM	16	16	0	0	9	9
Balance		-8.48	-7.52	-4.95	-4.05	
CO	-4.24		-2.475	-3.76		-2.025
Balance		1.311	1.164	2.068	1.692	
CO	0.655		1.034	0.582		0.846
Balance	-0.274	-0.548	-0.486	-0.32	-0.262	-0.131
FEM	12.141	8.283	-8.283	-6.38	6.38	7.69

H = 5.2603 (←)

Due to Sway.



$-H_A \times 3 + 12.141 + 8.283 = 0$

$H_A = 6.808$ (→) C = 0.50944

$-H_D \times 4 + 7.69 + 6.38 = 0$

$H_D = 3.5175$ (→)

Horizontal equilibrium 10.3255 (←)

	A		B		C		D
Non Sway	14.532	29.07	-29.07	24.73	-24.73	-12.365	
Sway	12.141	8.283	-8.283	-6.38	6.38	7.69	
Factor Moment	-6.185	-4.2196	+4.2196	+3.25	-3.25	-3.917	
FEM	8.947	24.85	21.85	27.98	-27.98	16.28	

Now plot a B.M.D as per the question (7).
The values are just same to the value of (7).

Swami Keshvanand Institute of Technology, Management & Gramothan, Ramnagaria, Jagatpura, Jaipur-302017

Analysis of Question Paper Mid Term: II Examination-2021

Branch : CE **Semester/session: V / 2021-2022** **Max Marks: 20**
Subject Code: 5CE4:02 **Subject: STRUCTURAL ANALYSIS-I** **Duration: 1.5 Hrs.**

A. Distribution of Course Outcome and Bloom's Taxonomy in Question Paper

Q.No	Questions	Marks	CO	BL
1	Define D Almbert's principle?	2	5	2
2	Give the vector and graphical representation of simple harmonic motion?	2	4	1
3	Give equivalent spring stiffness formula of springs are in series or in parallel?	2	4	1
4	Derive an equation which gives the relationship between natural frequency and the static deflection of the system?	4	4	2
5	Analyse the continuous beam ABCD as shown in fig.1 by slope deflection method. The support B sinks by 15 mm downwards. Take E =200x10^5 KN/m^2 and I =120x$10^{-6}$$m^4$.	4	3	4
6	Calculate the distribution factor for the given fig. 2.	4	3	3
7	Analyse the portal frame ABCD. Support A and D both are fixed. Only span BC is loaded as per fig.3. Draw the BM diagram by using **slope deflection method**. Also sketch the deflected shape of the frame.	6	3	4
8	Analyse the portal frame ABCD. Support A and D both are fixed. Only span BC is loaded as per fig.3. Draw the BM diagram by using **moment distribution method**. Also sketch the deflected shape of the frame.	6	3	4

BL – Bloom's Taxonomy Levels
(1- Remembering, 2- Understanding, 3 – Applying, 4 – Analyzing, 5 – Evaluating, 6 - Creating)

CO – Course Outcomes

CO1: To calculate the static and kinematic indeterminacy of structure

CO2: To analyze of indeterminate structure using area moment method, conjugate beam method and three moment's theorem

CO3: To analyze of statically indeterminate structures using slope□deflection and moment□distribution method

CO4: To understand the basic concept of structural vibration and its mathematical models

CO5: To understand the undamped free, damped, force vibration theories for single degree of freedom system.

Swami Keshvanand Institute of Technology, Management & Gramothan, Ramnagaria, Jagatpura, Jaipur-302017

Analysis of Question Paper Mid Term: II Examination-2021

Branch : CE | Semester/session: V / 2021-2022 | Max Marks: 20
Subject Code: 5CE4:02 | Subject: STRUCTURAL ANALYSIS-I | Duration: 1.5 Hrs.

B. **Questions and Course Outcomes (COs) Mapping in terms of correlation**

COs	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
CO1	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-
CO3	-	-	-	-	3	3	3	3
CO4	-	1	2	2	-	-	-	-
CO5	2	-	-	-	-	-	-	-

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

C. **Mapping of Bloom's Level and Course Outcomes with Question Paper**

Bloom's Level Mapping		CO Mapping	
Bloom's Level	Percentage	CO	Percentage
BL1	13.33	CO1	-
BL2	20	CO2	-
BL3	13.33	CO3	66.67
BL4	53.34	CO4	26.67
BL5	-	CO5	6.66
BL6	-	CO6	-

Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur													
B.Tech III Year V Semester (Session 2021-2022)													
CO's Attainment (Theory Mid Term : II)							Department: CIVIL ENGINEERING						
Faculty Name: POOJA JAIN							Course Name with CODE: Structure Analysis-I, 5CE4-02						
Upon successful completion of this course, students will be able to:													
CO1: To calculate the static and kinematic indeterminacy of structure													
CO2: To analyze of indeterminate structure using area moment method, conjugate beam method and three moment's theorem													
CO3: To analyze of statically indeterminate structures using slope-deflection and moment-distribution method													
CO4: To understand the basic concept of structural vibration and its mathematical models													
CO5: To understand the undamped free, damped, force vibration theories for single degree of freedom system													
MID TERM EVALUATION												(Section-A)	

S.NO.	ROLL NO	PART →	A			B			C		Total (20)	Assignment	Total (20)
		Note→	Attempt All			Attempt Any Two			Attempt Any One				
		QUESTION NO. →	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8			
		COURSE OUTCOME(S) SATISFIED →	CO5	CO4	CO4	CO4	CO3	CO3	CO3	CO3			
		MAXIMUM MARKS →	2	2	2	4	4	4	6	6			
		MINIMUM QUALIFYING MARKS (50%) →	1	1	1	2	2	2	3	3			
		NAME OF STUDENT ↓											
1	19ESKCE001	ABHAY SINGH DHAKA	1	0	0	N/A	1	N/A	N/A	N/A	2		2
2	19ESKCE002	ABHIJEET SINGH NATHAWAT	2	N/A	2	N/A	4	2	N/A	4	14		14
3	19ESKCE003	ABHISHEK LODWAR	N/A	N/A	N/A	N/A	3	1	0	N/A	4		4
4	19ESKCE004	ABHISHEK MEENA	0	0	0	N/A	N/A	N/A	N/A	0	0		0
5	19ESKCE005	ABHISHEK MOOND	N/A	N/A	N/A	N/A	0	N/A	N/A	0	0		0
6	19ESKCE006	ADITYA CHOUDHARY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0		0
7	19ESKCE007	ADITYA RAJ	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0		0
8	19ESKCE008	ADITYA SAINI	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0		0
9	19ESKCE009	AJAY KUMAR MEENA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0		0
10	19ESKCE011	AKANKSHA FOUJDAR	1	1	2	N/A	N/A	N/A	N/A	1	5		5
11	19ESKCE012	AMAN SUTHAR	2	1	0	1	1	N/A	N/A	1	6		6
12	19ESKCE013	AMIT KUMAR	2	1	2	N/A	4	N/A	N/A	N/A	9		9
13	19ESKCE014	AMIT KUMAR SONWAL	1	1	2	N/A	N/A	N/A	N/A	N/A	4		4
14	19ESKCE015	ANAND JOSHI	1.5	2	2	N/A	3	N/A	N/A	N/A	8.5		9
15	19ESKCE016	ANAND KUMAR	N/A	1	N/A	N/A	0	N/A	0	N/A	1		1
16	19ESKCE017	ANKIT MINA	N/A	N/A	N/A	3	N/A	N/A	N/A	N/A	3		3
17	19ESKCE018	ANSHAJ GOYAL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0		0
18	19ESKCE019	ANURAG MEENA	2	2	2	N/A	4	N/A	5	N/A	15		15
19	19ESKCE020	ARPIT MEENA	N/A	1	2	N/A	4	0	6	N/A	13		13
20	19ESKCE021	ARPIT MUKESH MEENA	1	1	2	N/A	4	3	N/A	1	12		12
21	19ESKCE022	ARVIND KUMAWAT	1	N/A	2	N/A	N/A	N/A	N/A	N/A	3		3
22	19ESKCE023	ARYAN KHATRI	1	1	N/A	N/A	N/A	N/A	N/A	N/A	2		2
23	19ESKCE024	ASHISH SINGH JADAUN	N/A	N/A	N/A	1	N/A	N/A	N/A	N/A	1		1
24	19ESKCE025	ASHOK BAIRWA	1	N/A	N/A	2	N/A	N/A	N/A	N/A	3		3
25	19ESKCE026	ATIBA QURESHI	2	N/A	2	N/A	4	N/A	4	N/A	12		12
26	19ESKCE027	AYUSH CHOUDHARY	N/A	1	2	N/A	N/A	N/A	N/A	N/A	3		3
27	19ESKCE028	AYUSH KUMAR	2	N/A	N/A	N/A	2	N/A	N/A	N/A	4		4
28	19ESKCE029	BANWARI LAL MEENA	ABSENT								AB		AB
29	19ESKCE030	BRIJESH JATOLIYA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0		0
30	19ESKCE031	CHITRANSHU MEENA	ABSENT								AB		AB
31	19ESKCE032	DEEPAK MEENA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	1		1
32	19ESKCE033	DIPAK KUMAR	ABSENT								AB		AB
33	19ESKCE034	DIVYANSHU JAIN	1	1	2	N/A	1	N/A	N/A	N/A	5		5
34	19ESKCE036	HARSH KUMAWAT	2	2	2	1	1	N/A	N/A	1	9		9
35	19ESKCE037	HARSH MEENA	2	1.5	2	4	1	N/A	N/A	N/A	10.5		11
36	19ESKCE038	HARSH SINGHAL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0		0
37	19ESKCE039	HARSHVARDHAN RAWAT	1	2	2	N/A	1	N/A	N/A	N/A	6		6
38	19ESKCE040	HIMANSHU AGARWAL	1	2	2	N/A	4	3	6	N/A	18		18
39	19ESKCE041	HIMANSHU CHOUDHARY	2	1	2	N/A	1	0	N/A	2	8		8
40	19ESKCE042	HIMANSHU VIJAYVARGIA	1	1.5	2	N/A	1	N/A	1.5	N/A	7		7
41	19ESKCE043	HITESH KUMAR MEENA	1	1	2	N/A	1	N/A	N/A	N/A	5		5
42	19ESKCE044	HITESH SHARMA	1	1	2	1	1	N/A	N/A	N/A	6		6
43	19ESKCE045	ISHANT JOGANI	N/A	1	N/A	N/A	N/A	N/A	N/A	N/A	1		1
44	19ESKCE046	JAGENDER BAKNAD	1	1	N/A	N/A	1	N/A	N/A	N/A	3		3
45	19ESKCE047	JATIN MEENA	2	N/A	2	4	N/A	N/A	N/A	N/A	8		8
46	19ESKCE048	JATIN PRATAP MEENA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0		0
47	19ESKCE049	JATIN VEDWAL	0	1	2	N/A	0	N/A	N/A	N/A	3		3

48	19ESKCE050	JAY KUMAR BANSIWAL	1	1	2	N/A	4	N/A	4	N/A	12		12
49	19ESKCE051	JAYANT KUMAR	0	1	2	N/A	3	0	2	N/A	8		8
50	19ESKCE052	JENISHA DEVNANI	2	2	2	4	4	N/A	1	N/A	15		15
51	19ESKCE053	KAHKASHAN KHANAM	ABSENT								AB		AB
52	19ESKCE055	KANISHKA	2	2	2	4	4	N/A	5	N/A	19		19
53	19ESKCE056	KARAN MEENA	2	2	2	4	1	N/A	N/A	1	12		12
54	19ESKCE057	KARTIKAY SINGHAL	2	2	2	N/A	4	0	N/A	2	12		12
55	19ESKCE058	KAVYA KULSHRESTHA	2	2	2	4	4	N/A	3	N/A	17		17
56	19ESKCE059	KULDEEP TIWARI	1	N/A	2	N/A	N/A	N/A	N/A	0	3		3
57	19ESKCE060	KUMKUM MAURYA	2	2	2	4	3	N/A	N/A	3	16		16
58	19ESKCE061	LALIT KUMAR SUWALKA	2	2	2	4	3	N/A	N/A	N/A	13		13
59	19ESKCE062	LOKESH MALI	1	0	2	1	0	N/A	N/A	N/A	4		4
60	19ESKCE063	LUV KUMAR SUHAG	1	0	2	N/A	N/A	N/A	N/A	N/A	3		3
61	19ESKCE064	MAHENDRA MEENA	0	0	2	0	0	N/A	0	N/A	2		2
62	19ESKCE065	MANISH CHOUDHARY	N/A	N/A	1	N/A	N/A	N/A	N/A	N/A	1		1
63	19ESKCE066	MANISH CHOUDHARY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0		0
64	19ESKCE067	MANISH KUMAR MEENA	ABSENT								AB		AB
65	19ESKCE068	MANISH RAD	2	1	2	N/A	4	3	N/A	N/A	12		12
66	19ESKCE069	MEHUL AGARWAL	N/A	N/A	N/A	N/A	4	4	N/A	N/A	8		8
67	19ESKCE070	MOHAMMAD RAMJAN	ABSENT								AB		AB
68	19ESKCE071	MOHD ARIF CHOWDHARY	ABSENT								AB		AB
69	19ESKCE072	MOHIT MEENA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0		0
70	19ESKCE073	MUKUL MANGAL	2	2	2	N/A	3	N/A	3	N/A	12		12
71	19ESKCE074	MUSKAN MEENA	2	2	2	4	3	N/A	4	N/A	17		17

Total No. of DEBARRED (DB)	0	0	0	0	0	0	0	0
Total No. of ABSENT (AB)	7	7	7	7	7	7	7	7
Total Students Appreaed for Exam (A)	64	64	64	64	64	64	64	64
Total Students Attempted the Question (A)	43	40	42	17	39	10	15	13
No. of Students scored >=50% marks (B)	39	35	39	11	22	5	9	2
Percentage Attainment of Criterion (B/A)	0.91	0.88	0.93	0.65	0.56	0.50	0.60	0.15
CO Attainment Level	3	3	3	1	0	0	1	0
Attainment of CO-1	--	--						
Attainment of CO-2	--	--						
Attainment of CO-3	**49%**	**0**						
Attainment of CO-4	**86%**	**3**						
Attainment of CO-5	**91%**	**3**						

Criterion of Percentage for CO Attainment Level	**Attainment Level**
*** If below 60% students get 50% marks or less, than attainment level is**	0
*** If 60-69% students get 50% marks or more, than attainment level is**	1
*** If 70-79% students get 50% marks or more, than attainment level is**	2
*** If 80-100% students get 50% marks or more, than attainment level is**	3

Pooja Jain

Faculty name with signature

Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur

B.Tech III Year V Semester (Session 2021-2022)

CO's Attainment (Theory Mid Term : II) | Department: CIVIL ENGINEERING

Faculty Name: POOJA JAIN | Course Name with CODE: Structure Analysis-I, 5CE4-02

Upon successful completion of this course, students will be able to:

CO1: To calculate the static and kinematic indeterminacy of structure

CO2: To analyze of indeterminate structure using area moment method, conjugate beam method and three moment's theorem

CO3: To analyze of statically indeterminate structures using slope-deflection and moment-distribution method

CO4: To understand the basic concept of structural vibration and its mathematical models

CO5: To understand the undamped free, damped, force vibration theories for single degree of freedom system

MID TERM EVALUATION (Section-B)

S.NO.	ROLL NO	PART →	A			B			C		Total (20)	Assignment	Total (20)
		Note→	Attempt All			Attempt Any Two			Attempt Any One				
		QUESTION NO.→	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8			
		COURSE OUTCOME(S) SATISFIED →	CO5	CO4	CO4	CO4	CO3	CO3	CO3	CO3			
		MAXIMUM MARKS →	2	2	2	4	4	4	6	6			
		MINIMUM QUALIFYING MARKS (50%) →	1	1	1	2	2	2	3	3			
		NAME OF STUDENT ↓											
1	19ESKCE075	NAMAN SINGHAL	1	N/A	2	N/A	4	3	2	N/A	12		12
2	19ESKCE076	NAVEEN KUMAR	N/A	1	0	N/A	3	N/A	2	N/A	6		6
3	19ESKCE077	NITESH KUMAR	ABSENT								AB		AB
4	19ESKCE078	NITIN GOYAL	2	0	2	N/A	4	3	N/A	2	13		13
5	19ESKCE079	PIYUSH JAIN	1	2	1	N/A	2	N/A	N/A	N/A	6		6
6	19ESKCE080	POOJA KUMARI MEENA	2	2	2	N/A	1	N/A	N/A	N/A	7		7
7	19ESKCE081	PRADEEP KUMAR MEENA	N/A	N/A	2	N/A	3.5	1	0	N/A	6.5		7
8	19ESKCE082	PRAVESH SEHRA	2	2	2	4	1	N/A	N/A	N/A	11		11
9	19ESKCE083	RAGHVENDRA SINGH RATHOR	ABSENT								AB		AB
10	19ESKCE084	RAHUL GHORELA	0	0	1	2	1	N/A	1	N/A	5		5
11	19ESKCE085	RAHUL MEENA	N/A	N/A	3	N/A	N/A	N/A	N/A	N/A	3		3
12	19ESKCE086	RAHUL SHARMA	N/A	1	N/A	3	2	N/A	N/A	1	7		7
13	19ESKCE087	RAHUL SINGH SHEKHAWAT	N/A	N/A	N/A	N/A	4	N/A	N/A	N/A	4		4
14	19ESKCE088	RAJAT SINGH	N/A	N/A	N/A	N/A	2	2	3	N/A	7		7
15	19ESKCE089	RAKESH JAKHAR	0	1	2	N/A	2	0	N/A	1	6		6
16	19ESKCE090	RAKESH MINA	1	2	2	N/A	0	0	N/A	N/A	5		5
17	19ESKCE091	RAKESH SINGH	1	0	0	1	N/A	N/A	N/A	1	3		3
18	19ESKCE092	RAMESH CHOUDHARY	2	2	2	4	4	N/A	5	N/A	19		19
19	19ESKCE093	RANDHEER	N/A	2	2	1	N/A	N/A	N/A	N/A	5		5
20	19ESKCE094	REDDY SAI PRAVEEN REDDY	1	1	N/A	N/A	3	2	3	N/A	10		10
21	19ESKCE095	RITESH KUMAR MAURYA	N/A	1	N/A	N/A	3	N/A	N/A	3	7		7
22	19ESKCE096	ROHIT MEHTA	1	2	2	0	0	N/A	N/A	N/A	5		5
23	19ESKCE097	SACHIN REWADIA	N/A	N/A	N/A	N/A	3	1	N/A	1	5		5
24	19ESKCE099	SAGAR MEENA	ABSENT								AB		AB
25	19ESKCE100	SAHI RAM GODARA	1	1	2	1	3	N/A	3	N/A	11		11
26	19ESKCE102	SAMYAK JAIN	2	1	N/A	N/A	4	N/A	1	N/A	8		8
27	19ESKCE103	SANUJ MOHAN	1	N/A	2	N/A	N/A	N/A	N/A	N/A	3		3
28	19ESKCE104	SATISH SAINI	N/A	N/A	2	N/A	N/A	N/A	N/A	N/A	2		2
29	19ESKCE105	SAURABH KUMAR MEENA	2	2	2	N/A	N/A	N/A	N/A	N/A	6		6
30	19ESKCE107	SHAILESH KUMAR	2	N/A	2	1	N/A	N/A	N/A	N/A	5		5
31	19ESKCE108	SHIV SINGH NARUKA	N/A	N/A	N/A	N/A	4	N/A	3	N/A	7		7
32	19ESKCE109	SHIVANI MEENA	2	2	1	N/A	1	N/A	N/A	N/A	6		6
33	19ESKCE110	SHUBHAM SAXENA	2	2	2	1	2	N/A	N/A	6	15		15
34	19ESKCE111	SONAL MEENA	2	2	2	N/A	4	N/A	4	N/A	14		14
35	19ESKCE112	SOURABH MEENA	1	1	2	N/A	N/A	N/A	N/A	N/A	4		4
36	19ESKCE113	SUBHASH SIHAG	1	2	2	1	0	N/A	0	N/A	6		6
37	19ESKCE114	SUMIT DANGDA	2	2	1	4	4	N/A	1	N/A	14		14
38	19ESKCE115	TANMAY JAISWAL	ABSENT								AB		AB
39	19ESKCE116	UJJWAL TRIPATHI	ABSENT								AB		AB
40	19ESKCE117	UMANG PANCHAL	2	1	0	1	N/A	N/A	N/A	N/A	4		4
41	19ESKCE118	UTKARSH DAUKIYA	2	0	0	N/A	N/A	N/A	N/A	N/A	2		2
42	19ESKCE119	VED PRATAP SINGH	N/A	N/A	2	4	2	N/A	N/A	N/A	8		8
43	19ESKCE120	VIKAS AECHARA	N/A	N/A	1	N/A	2	N/A	N/A	N/A	3		3
44	19ESKCE121	VIKASH MAHAWAR	1	1	N/A	N/A	3	N/A	4	N/A	9		9
45	19ESKCE122	VIMAL KUMAWAT	2	2	2	4	N/A	4	4	N/A	18		18
46	19ESKCE123	VINOD KUMAR MEENA	2	2	2	4	4	N/A	N/A	N/A	14		14

47	19ESKCE124	VISHAL KUMAR	ABSENT								AB		AB
48	19ESKCE125	VISHNU GOYAL	1.5	0	2	N/A	2	N/A	N/A	N/A	5.5		6
49	19ESKCE126	VISHNU MEENA	ABSENT								AB		AB
50	19ESKCE127	VIVEK VERMA	1	2	2	N/A	4	0.5	N/A	1	10.5		11
51	19ESKCE128	YASH CHAUDHARY	1	1	2	N/A	1	N/A	N/A	1	6		6
52	19ESKCE129	YOUVAN JAIN	2	2	2	3	4	N/A	4	N/A	17		17
53	19ESKCE300	NITESH	N/A	N/A	2	N/A	4	3	N/A	4	13		13
54	19ESKCE301	RISHABH	1.5	N/A	2	N/A	3	N/A	4	N/A	10.5		11
55	19ESKCE302	SHOURYARAJ SINGH	2	1	2	N/A	3.5	0	N/A	4	12.5		13
56	19ESKCE303	ANUSH SHARMA	2	2	2	N/A	4	0	4	N/A	14		14
57	20ESKCE200	ADITYA SINGH PARIHAR	0	N/A	N/A	N/A	1	N/A	N/A	N/A	1		1
58	20ESKCE202	ASHISH VERMA	2	1	2	N/A	3	N/A	N/A	N/A	8		8
59	20ESKCE203	CHITRANSH SRIVASTAVA	0	2	2	N/A	1	3	6	N/A	14		14
60	20ESKCE204	MUKUL SAINI	2	0	2	N/A	2	2	3	N/A	11		11
61	20ESKCE205	PANKAJ SHARMA	N/A	N/A	N/A	N/A	2	N/A	N/A	N/A	2		2
62	20ESKCE206	PRIYANKA SHARMA	2	1	2	N/A	3.5	N/A	N/A	2	10.5		11
63	20ESKCE207	RAHUL SAINI	N/A	N/A	N/A	N/A	2	N/A	N/A	N/A	2		2
64	20ESKCE208	RAKESH KUMAR MEENA	N/A	N/A	1	N/A	3	2	N/A	4	10		10
65	20ESKCE209	SHIV DATT BORANA	N/A	0	N/A	N/A	2	N/A	N/A	N/A	2		2
66	20ESKCE210	SHUBHAM JAIN	0	0	2	0	3.5	N/A	N/A	2	7.5		8
67	20ESKCE211	SIMRAN SINGH	N/A	2	N/A	4	N/A	N/A	4	N/A	10		10
68	20ESKCE212	UDIT NARAYAN AVASTHI	2	N/A	2	N/A	4	N/A	1.5	N/A	9.5		10
69	20ESKCE213	YASH SARSWAT	N/A	N/A	2	N/A	4	1	N/A	2	9		9
70	20ESKCE215	YASH SHARMA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0		0
Total No. of DEBARRED (DB)			0	0	0	0	0	0	0	0			
Total No. of ABSENT (AB)			7	7	7	7	7	7	7	7			
Total Students Appreaed for Exam (A)			63	63	63	63	63	63	63	63			
Total Students Attempted the Question (A)			42	42	48	19	50	17	22	15			
No. of Students scored >=50% marks (B)			37	34	44	10	40	9	14	5			
Percentage Attainment of Criterion (B/A)			0.88	0.81	0.92	0.53	0.80	0.53	0.64	0.33			
CO Attainment Level			3	3	3	0	3	0	1	0			
Attainment of CO-1			--	--									
Attainment of CO-2			--	--									
Attainment of CO-3			65%	1									
Attainment of CO-4			81%	3									
Attainment of CO-5			88%	3									

Criterion of Percentage for CO Attainment Level	Attainment Level
* If below 60% students get 50% marks or less, than attainment level is	0
* If 60-69% students get 50% marks or more, than attainment level is	1
* If 70-79% students get 50% marks or more, than attainment level is	2
* If 80-100% students get 50% marks or more, than attainment level is	3

Pooja Jain

Faculty name with signature

Date: 22/12/21 I Sessional

Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur

B.Tech II Mid Term Examination DEC-2021

Semester/Session: V / 2021-22 | **Branch: Civil**

Subject: CT&E | **Subject Code : 5CE3-01**

Time: 1½ Hours | **Maximum Marks : 20**

Instruction to Candidates:

Attempt all three questions from Part A, two questions out of three questions from Part B and one question out of two questions from Part C.

PART-A

(Answer should be given up to 25 words only) **[3x2=6]**

All questions are compulsory

Q1. What are the five types of fire?

Q2. What is the Indian Standard Code for a) Demolition of buildings-Code of safety, b) Safety code for handling and storage of building materials?

Q3. Mention different types of earthmoving equipment used in construction.

PART-B

Attempt any Two questions **[2x4=8]**

Q1. Explain demolition methods and process for building structures.

Q2. Write down the difference between hauling and hoisting equipment in construction.

Q3. Which personal protective equipment is used for a) Head protection, b) Eye and face protection, c) Foot and leg protection.

PART-C

Attempt any One question **[1x6=6]**

Q1. What is pile driving? Explain the various equipments for pile driving.

Q2. What are the safety measures for storage and handling of a) Cement, lime and pozzolana, b) Reinforcing and structural steel.

Swami Keshvanand Institute of Technology, Management &Gramothan,
Ramnagaria, Jagatpura, Jaipur-302017

Question Paper Solution

Branch: Civil **Semester: V semester** **Subject: CONSTRUCTION TECHNOLOGY AND EQUIPMENT**
Mid Term: IInd Midterm Exam December- 2021
Submitted By: Gaurav Gupta & Ajay mandrawalia

PART-A

Q.1 What are the five types of fire?

Ans: 1) A-type fire: Commonly used house hold materials like paper, card board, wood and products made from these materials.

2) B-type fire: The unsafe storage, dispensing or disposal of flammable liquids can be a prime source of this type of fires and explosions.

3) C-type fire: Over loaded circuits, fuse boxes, damaged wiring and defective switches can lead to this type of fires.

4) D-type fire: Machines when not lubricated properly can over heat and start fire.

5) K-type fire: Kitchen fires involving large amounts of heated oil, flames coming from gas pipes etc.

Q2. What is the Indian Standard Code for a) Demolition of buildings-Code of safety, b) Safety code for handling and storage of building materials?

Ans: a) Demolition of buildings-Code of safety: IS 4130: 1991.

b) Safety code for handling and storage of building materials: IS:7969-1975.

Q3. Mention different types of earthmoving equipment used in construction.

Ans:

- Bulldozer
- Drag Line
- Tractors
- Clam Shell
- Scrapers
- Hoes
- Power Shovel
- Trenching Machine

PART-B

Q1. Explain demolition methods and process for building structures.

Ans: Precautions before Demolition:

- Danger signs should be placed
- All Openings (Doors or Window) should be barricaded.
- At least two independent exits are provided for escape

Question Paper Solution

Branch: Civil **Semester: V semester** **Subject: CONSTRUCTION TECHNOLOGY AND EQUIPMENT**
Mid Term: IInd Midterm Exam December- 2021
Submitted By: Gaurav Gupta & Ajay mandrawalia

- Lights shall be placed for visibility in night.
- A watchmen should be employed to restrict the entry of outsider on demolition site.
- All workers should have safety appliances and their supervisor should take care that they should use these appliances during the demolition.
- A special protection should be provided to prevent any damage on adjoining structure.

Sequences of Demolition Operations:

- Proceeded with in such a way that
  (i)causes the least damage and nuisance to the adjoining building and the members of the public.
  (ii) Satisfies all safety requirements to avoid any accidents.
- Before demolition work is started, glazed doors and windows, etc, and all loose plaster shall be stripped off throughout the entire building.
- The demolition shall always proceed systematically storey by storey in descending order and the work on the upper floors shall be completely over before any of the supporting members or other important portion on the lower floor is disturbed.

Protection of Public:

- Sidewalk or adjacent road shall be closed.
- Building or adjacent yard should be kept free from children and members of public.
- A toe board of at least 1 m high shall be provided with inclination 45 degree outward or vertical.

Q2. Write down the difference between hauling and hoisting equipment in construction.

Ans: Hauling Equipment's

Hauling is defined as the movement of the material from one place to another. So, the equipment used for the transportation of the material are known as hauling equipment's or haulers. Haulers may operate on the roadways or the railways.

Road hauler can be classified according to the method of dumping of the load as-

1. Dump Trucks

These are the trucks which are fitted with automatic unloading devices. The loading is normally done by loading shovels or loaders. These trucks have capacities as high as 53 tonnes. They can be -

- Rear dump trucks
- Side dump Truck
- Bottom dump trucks

Question Paper Solution

Branch: Civil **Semester: V semester** **Subject: CONSTRUCTION TECHNOLOGY AND EQUIPMENT**
Mid Term: IInd Midterm Exam December- 2021
Submitted By: Gaurav Gupta & Ajay mandrawalia

2. Dumpers:

These are the high-speed pneumatic wheeled trucks with short chassis and long bodies. These are most versatile, labour-saving hauling equipment's for the horizontal movement of materials such as bricks. Aggregates, sanitary fittings, scaffolding and fluids as wet concrete.

These are usually diesel-powered vehicles requiring only the driver and can traverse the rough terrain on many building sites.

They are available in different sizes and variants giving many options such as –

Two- or four-wheel drive,

Hydraulic or Gravity operated container,

Side or High-level discharge,

Self-loading facilities.

Hoisting Equipment's:

Hoisting is known as the process of lifting a weight form one location and moving it to another location n, and dumping it.
Now a days, many big projects as construction of dams, industrial buildings etc. require hoisting equipment's
Hoisting equipment's are used for transporting materials or passengers vertically by means of moving level platform. Material hoist can be either Static or Mobile.

Static Hoist: - It consist of a mast or tower with the lift platform either cantilevered from the small section mast or centrally suspended with guides on either side within an enclosing tower.

Mobile Hoist: - It usually have a maximum height of 24m. Mobile hoists are positioned on a firm level base and jacked to ensure the stability.

As a hoisting equipment, a crane is the only single machine, which as a single piece is capable of providing three-dimensional movement of a weight. It does hoist operation speedily with safety and precision.

Crane: A crane is a type of machine, generally equipped with a hoist rope, wire ropes or chains, and sheaves, that can be used both to lift and lower materials and to move them horizontally. It is mainly used for lifting heavy things and transporting them to other places.
Cranes are found in a number of varieties according to their uses, few of them are –
Tower crane
Mobile Crane
Giant cantilever crane
Gantry Crane

Question Paper Solution

Branch: Civil **Semester: V semester** **Subject: CONSTRUCTION TECHNOLOGY AND EQUIPMENT**
Mid Term: IInd Midterm Exam December- 2021
Submitted By: Gaurav Gupta & Ajay mandrawalia

Q3. Which personal protective equipment is used for a) Head protection, b) Eye and face protection, c) Foot and leg protection

Ans: a) Head protection

- Crash Helmets (IS: 4151-1993): Used for scooter and motorcycle riding.
- Industrial Safety Helmets (IS: 2925-1984): Protection to the wearer against falling objects and other hazards which may be encountered in mining, tunneling, quarrying, ship building, construction projec and similar other industrial occupations.
- Firemen's Helmets (IS: 2745-1983): protection against falling objects during firefighting, rescue operations and to some extent, against heat or electric shock.

b) Eye and face protection

- Safety goggles, safety spectacles and safety clip-ons: Protection from dust, flying particles, harmful radiation, accidental splashes of chemicals.
- Eye shield, face-shield and wire mesh screen guard: Protection from Welding and cutting, foundry work, glass furnace works, Wire mesh screen guard provide protection to the face against flying particles and spray of hazardous liquids.
- Hoods: Hoods also protect the face and eyes and are used in operations involving handling of highly caustic chemicals or exposure to excessive heat, such as in firefighting operations.

c) Foot and leg protection

- Safety-toe shoes: required when handling heavy materials, rolling objects like barrels, heavy pipes, rolls, truck wheels, to protect against kicking sharp sheet metal.
- Conductive shoes: required when work in dusty, chemical or explosives plants or where the atmosphere may contain a flammable mixture.
- Foundry (molder) shoes: required by workers employed in operations where molten materials are used for preventing sparks and spattering of molten compounds from entering inside the shoe.
- Explosives-operations (non-sparking) shoes: In hazardous locations, when cleaning tanks that contain gasoline or other volatile hydrocarbons.
- Electrical hazard shoes: used in areas where potential for electrical shocks exists

Question Paper Solution

Branch: Civil **Semester: V semester** **Subject: CONSTRUCTION TECHNOLOGY AND EQUIPMENT**
Mid Term: II[nd] Midterm Exam December- 2021
Submitted By: Gaurav Gupta & Ajay mandrawalia

PART-C

Q1. What is pile driving? Explain the various equipment's for pile driving.

Ans: Pile Driving Equipment's

- The process of forcing a pile into the ground is termed as 'Pile Driving'. The piles should be driven vertically.
- The process of pile driving involves lifting the piles into position, holding it to refusal or to a specified depth.
- Driving is accomplished through hammering the pile top with a hammer.
- Equipment's are designed for driven effectively at an economical cost.

Pile driving is adopted in a number of projects for following purposes-

a. To affect a cut-off of seepage water.
b. To consolidate soft density soil.
c. To transfer load through soil formation having poor supporting properties.

Some of the pile driving equipment's are-

1. Pile Driving Rigs
2. Pile driving hammers

Pile Driving Rigs:

The pile driving operation consists of lifting and holding the pile in position, hammering it into ground and guiding it accurately to the desired direction of movement which is performed using driving rigs.

There are three type of Rigs –

a. Skid Mounted Rigs
b. Crane Mounted Rigs
c. Floating Rigs

Pile Driving Hammers:

The main function of the pile driving hammer is to furnish the energy required to drive pile into the soil by dropping from a height.

The weight of the hammer varies from 225 kg to 1350 kg, and the drop height varies from 1.5m to 6m.

The different type of pile driving hammers are –

a. Drop Hammer
b. Single acting Hammer
c. Double acting Hammer

Question Paper Solution

Branch: Civil **Semester: V semester** **Subject: CONSTRUCTION TECHNOLOGY AND EQUIPMENT**
Mid Term: IInd Midterm Exam December- 2021
Submitted By: Gaurav Gupta & Ajay mandrawalia

d. Hydraulic Hammer
e. Diesel Hammer
f. Vibratory Hammer

Q2. What are the safety measures for storage and handling of a) Cement, lime and pozzolana, b) Reinforcing and structural steel?

Ans: Storage and Handling of Materials: Cement, Lime & Pozzolana:

- Workman who handling cement, lime or fine pozzolana shall wear (i) Protective clothing (ii) Respirators (iii) Goggles.
- He also shall be provided with hand cream, petroleum jelly, or similar preparation for protection of exposed skin.
- Stacks shall not be higher than 15 bags.
- If the stack has to be more than 8 bags high, the bags shall be arranged in header and stretcher wise.
- When necessary for a workman to enter such storage area like silos shall wear a life-line, with another workman outside the silo or hopper attending the rope.
- Unslaked lime shall be stored in a place inaccessible to water.

Storage and Handling of Materials: Reinforcing and Structural Steel:

- Reinforcing steel shall be stored according to length, size and shape.
- Shall be piled in such a manner as to prevent tipping or falling.
- Adequate spacing shall be maintained between piles to ensure safe access.
- Workmen handling deformed steel bars and wire shall be required to wear gloves.
- Heavy steel sections and bundles shall be lifted and carried with the help of slings and tackles and shall not be carried on the shoulders of the workman.
- There should be no open electric connection near storage of reinforcement.

Swami Keshvanand Institute of Technology, Management & Gramothan, Ramnagaria, Jagatpura, Jaipur-302017

Analysis of Question Paper Mid Term: I/II/Extra/Imp. Examination-20

Branch : Civil | Semester/session: V/2021-22 | Max Marks: 20
Subject Code: 5CE3-01 | Subject: CT&E | Duration: 90 Minutes

A. Distribution of Course Outcome and Bloom's Taxonomy in Question Paper

Q.No	Questions	Marks	CO	BL
	PART A			
Q1.	What are the five types of fire?	2	2	1
Q2.	What is the Indian Standard Code for a) Demolition of buildings-Code of safety, b) Safety code for handling and storage of building materials?	2	2	1
Q3.	Mention different types of earthmoving equipment used in construction.	2	5	2
	PART B			
Q1.	Explain demolition methods and process for building structures.	4	2	3
Q2.	Write down the difference between hauling and hoisting equipment in construction.	4	5	2
Q3.	Which personal protective equipment is used for a) Head protection, b) Eye and face protection, c) Foot and leg protection.	4	2	2
	PART C			
Q1.	What is pile driving? Explain the various equipments for pile driving.	6	5	2
Q2.	What are the safety measures for storage and handling of a) Cement, lime and pozzolana, b) Reinforcing and structural steel.	6	4	3

BL – Bloom's Taxonomy Levels
(1- Remembering, 2- Understanding, 3 – Applying, 4 – Analyzing, 5 – Evaluating, 6 - Creating)
CO – Course Outcomes

Swami Keshvanand Institute of Technology, Management & Gramothan, Ramnagaria, Jagatpura, Jaipur-302017

Analysis of Question Paper Mid Term: I/II/Extra/Imp. Examination-20

Branch : Civil | Semester/session: V/2021-22 | Max Marks: 20
Subject Code: 5CE3-01 | Subject: CT&E | Duration: 90 Minutes

B. Questions and Course Outcomes (COs) Mapping in terms of correlation

COs	PART A			PART B			PART C	
	Q1.	Q2.	Q3.	Q1.	Q2.	Q3.	Q1.	Q2.
CO1	0	0	0	0	0	0	0	0
CO2	3	3	0	3	0	3	0	0
CO3	0	0	0	0	0	0	0	0
CO4	0	0	0	0	0	0	0	3
CO5	0	0	3	0	3	0	3	0

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

C. Mapping of Bloom's Level and Course Outcomes with Question Paper

Bloom's Level Mapping		CO Mapping	
Bloom's Level	Percentage	CO	Percentage
BL1	25	CO1	-
BL2	50	CO2	50
BL3	25	CO3	-
BL4	00	CO4	12.5
BL5	00	CO5	37.5
BL6	00	CO6	-

Swami Keshvanand Institute of Technology, M & G, Jaipur

Department of Civil Engineering

Mark List Cum Attainment Level of Subject

II Midterm Exam (2021)

Subject Code : 5CE3-01 **Subject : CT&E (V-A)**

	Q. No.	1	2	3	4	5	6	7	8	TOTAL
	MM.	2	2	2	4	4	4	6	6	
	CO	2	2	5	2	5	2	5	4	
	Criterion: 50% of MM	1	1	1	2	2	2	3	3	
Roll No.	Name of Student	Part A			Part B			Part C		
19ESKCE001	Abhay Singh Dhaka	0	0	2		3	3		5	13
19ESKCE002	Abhijeet Singh Nathawat	1		2	3.5		4	5		16
19ESKCE003	Abhishek Lodwar					3	2	3		8
19ESKCE004	Abhishek Meena	1.5	0	0	1					3
19ESKCE005	Abhishek Moond		0	1	4		3.5		4.5	13
19ESKCE006	Aditya Choudhary						3		4	7
19ESKCE007	Aditya Raj	0		1		2	4		2	9
19ESKCE008	Aditya Saini	1.5	0	1.5	0		3.5		4	11
19ESKCE009	Ajay Kumar Meena	0		1			2.5		3	7
19ESKCE011	Akanksha Foujdar	2	1	1	3		3.5		5	16
19ESKCE012	Aman Suthar	0	1	1.5	3		3.5		2	11
19ESKCE013	Amit Kumar	1		2	2		1.5	5		12
19ESKCE014	Amit Kumar Sonwal	1.5	1	1.5	2		2		2	10
19ESKCE015	Anand Joshi	1.5	1	0	2		3		4	12
19ESKCE016	Anand Kumar	1.5		2	3		3.5		3.5	14
19ESKCE017	Ankit Mina	2	2	2		4	3	3		16
19ESKCE018	Anshaj Goyal	1	2	1		1				5
19ESKCE019	Anurag Meena	2	0	2	3		3.5		5	16
19ESKCE020	Arpit Meena	1.5		1.5	2		3		4	17
19ESKCE021	Arpit Mukesh Meena	2	0	1.5	3.5		3		3	13
19ESKCE022	Arvind Kumawat	1.5	1	1.5	4		3		4	15
19ESKCE023	Aryan Khatri	1.5	0	1.5	3		3		3.5	13
19ESKCE024	Ashish Singh Jadaun	2		1	0		3		3	9
19ESKCE025	Ashok Bairwa	0	0	1.5	1		3.5		2	8
19ESKCE026	Atiba Qureshi	2	0	1.5	4		4		5.5	17
19ESKCE027	Ayush Choudhary	1.5	0	1.5	3.5		3		3	13
19ESKCE028	Ayush Kumar	0	0	1	2		3.5		4	11
19ESKCE029	Banwari Lal Meena	1.5	0	1.5	3		3.5		4	14
19ESKCE030	Brijesh Jatoliya	2	0	1.5		1		1		6
19ESKCE031	Chitranshu Meena	ABSENT								
19ESKCE032	Deepak Meena	1.5	2	1.5	3		1		1	10
19ESKCE033	Dipak Kumar	ABSENT								
19ESKCE034	Divyanshu Jain	1.5	1	1.5	2.5		3	3		13
19ESKCE036	Harsh Kumawat	1.5		1.5	1		1.5	1		7
19ESKCE037	Harsh Meena	1.5	0	1.5	2.5		3	3		12

19ESKCE038	Harsh Singhal	0	0	1.5	2		2		2	8
19ESKCE039	Harshvardhan Rawat	1.5	0	1.5		3.5	2.5		3.5	13
19ESKCE040	Himanshu Agarwal	2	1	1.5		4	3.5		5.5	18
19ESKCE041	Himanshu Choudhary	1.5	0	1.5	3.5		4	5		16
19ESKCE042	Himanshu Vijayvargia	1.5	0	1.5	3.5		3.5		5	15
19ESKCE043	Hitesh Kumar Meena	1.5	0	1.5	1.5	3		5.5		13
19ESKCE044	Hitesh Sharma	1.5	0	1.5		3	3.5		4	14
19ESKCE045	Ishant Jogani	1.5	0	1.5	3		3.5		4	14
19ESKCE046	Jagender Baknad	1.5	0	1.5	2		2.5		5	13
19ESKCE047	Jatin Meena	1.5	0	1.5			3		4	10
19ESKCE048	Jatin Pratap Meena	1.5		1.5		2	3.5		4	13
19ESKCE049	Jatin Vedwal	0	1	1.5		3	3.5		4.5	14
19ESKCE050	Jay Kumar Bansiwal	1.5		1.5		3	3.5	5		15
19ESKCE051	Jayant Kumar	2	2	1.5		3.5	4		4.5	18
19ESKCE052	Jenisha Devnani	2	2	1.5	4		4	5.5		19
19ESKCE053	Kahkashan Khanam	ABSENT								
19ESKCE055	Kanishka	1.5	1	1.5	3.5		3.5		4.5	16
19ESKCE056	Karan Meena	1.5	1	1.5		3.5	3.5		2.5	14
19ESKCE057	Kartikay Singhal	2	1	1.5		4	3.5	5.5		18
19ESKCE058	Kavya Kulshrestha	2	1	2		3.5	4		5.5	18
19ESKCE059	Kuldeep Tiwari	2	1	1.5	2		3	1.5		11
19ESKCE060	Kumkum Maurya	2	1	1.5		2	3.5		4	13
19ESKCE061	Lalit Kumar Suwalka	1.5	2	2	1		3		3	13
19ESKCE062	Lokesh Mali	1.5	2	1.5		2.5	2.5		4	14
19ESKCE063	Luv Kumar Suhag	1.5	0	1.5		2.5	2.5		1	9
19ESKCE064	Mahendra Meena	1.5	0	0					0	2
19ESKCE065	Manish Choudhary	1.5	0	1	0		3			6
19ESKCE066	Manish Choudhary	0	0	1	1		2		1	5
19ESKCE067	Manish Kumar Meena	ABSENT								
19ESKCE068	Manish Rad	1.5	0	1.5	1		3		3	10
19ESKCE069	Mehul Agarwal	1.5	0	1.5	1		2.5		4	11
19ESKCE070	Mohammad Ramjan	ABSENT								
19ESKCE071	Mohd Arif Chowdhary	ABSENT								
19ESKCE072	Mohit Meena	0	0	1	2		2		2	7
19ESKCE073	Mukul Mangal	1.5	0	1.5		3	4		3.5	14
19ESKCE074	Muskan Meena	1.5	0	1.5		2.5	3	3.5		12
No. of Students attempt question		**62**	**53**	**63**	**40**	**22**	**60**	**15**	**47**	
No. of student get marks greater than 50		**52**	**21**	**60**	**29**	**20**	**57**	**12**	**36**	
%		**83.87**	**39.62**	**95.24**	**72.50**	**90.91**	**95.00**	**80.00**	**76.60**	
Attainment level gain		**3**	**0**	**3**	**2**	**3**	**3**	**3**	**3**	
*** If >75% students get 50% marks or more, than attainment level is**									**3**	
*** If 66-75% students get 50% marks or more, than attainment level is**									**2**	
*** If 56-65% students get 50% marks or more, than attainment level is**									**1**	
*** If 45-55% students get 50% marks or more, than attainment level is**									**0**	

Gaurav Gupta

25/12/21

Swami Keshvanand Institute of Technology, M & G, Jaipur

Department of Civil Engineering

Mark List Cum Attainment Level of Subject

II Midterm Exam (2021)

Subject Code : 5CE3-01 **Subject : CT&E (V-B)**

	Q. No.	1	2	3	4	5	6	7	8	TOTAL
	MM.	2	2	2	4	4	4	6	6	
	CO	2	2	5	2	5	2	5	4	
	Criterion: 50% of MM	1	1	1	2	2	2	3	3	
Roll No.	Name of Student	Part A			Part B			Part C		
19ESKCE075	NAMAN SINGHAL	2	0	2	3		3		5	15
19ESKCE076	NAVEEN KUMAR	2	0	2		2	2.5		3.5	12
19ESKCE077	NITESH KUMAR	ABSENT								
19ESKCE078	NITIN GOYAL	2	2	2	1.5		3		5	16
19ESKCE079	PIYUSH JAIN	2	0	1.5		2	3	1.5		10
19ESKCE080	POOJA KUMARI MEENA	2	0	1	3.5		3.5		5	15
19ESKCE081	PRADEEP KUMAR MEENA	2	2	1.5	2		3		4.5	15
19ESKCE082	PRAVESH SEHRA	2	2	2	3		3.5		5	18
19ESKCE083	RAGHVENDRA SINGH RATHOR	2	0	1.5	0		3	1		8
19ESKCE084	RAHUL GHORELA	2	0	1	0.5		2.5		2	8
19ESKCE085	RAHUL MEENA	2		1	2		2.5			8
19ESKCE086	RAHUL SHARMA	2	2	1.5			3	2		11
19ESKCE087	RAHUL SINGH SHEKHAWAT	1		1	1.5		2.5		3.5	10
19ESKCE088	RAJAT SINGH	2	1.5	0	1.5		2.5		3	11
19ESKCE089	RAKESH JAKHAR	1		1	2		2.5		3.5	10
19ESKCE090	RAKESH MINA	0.5	0.5	0.5		2	3	2.5		9
19ESKCE091	RAKESH SINGH	0.5	0	1.5	1		2.5	2		8
19ESKCE092	RAMESH CHOUDHARY	2	0	2	3		2.5	1		11
19ESKCE093	RANDHEER	2		1.5	1.5		2.5			8
19ESKCE094	REDDY SAI PRAVEEN REDDY	2	0	2	3		4	0.5		12
19ESKCE095	RITESH KUMAR MAURYA	2	0	1.5	3		3.5	4		14
19ESKCE096	ROHIT MEHTA	2	0			1	2.5		3.5	9
19ESKCE097	SACHIN REWADIA	2	0	1.5		3	3		2.5	12
19ESKCE099	SAGAR MEENA	ABSENT								
19ESKCE100	SAHI RAM GODARA	0.5	0	1	1		3.5	2		8
19ESKCE102	SAMYAK JAIN	2	0	1	2.5		2		4	12
19ESKCE103	SANUJ MOHAN		0		3		1.5		3	8
19ESKCE104	SATISH SAINI	0.5		1		1	2.5	1		6
19ESKCE105	SAURABH KUMAR MEENA	2	0	1			2.5		3	9
19ESKCE107	SHAILESH KUMAR	0.5	0	1	1.5		2.5		3	9
19ESKCE108	SHIV SINGH NARUKA	2	0	2	2		3.5		4.5	14
19ESKCE109	SHIVANI MEENA	2	0	1.5		2.5	2.5		3.5	12
19ESKCE110	SHUBHAM SAXENA	2	0	1.5	3		2.5	1		10
19ESKCE111	SONAL MEENA	2		1.5	2.5				3	9
19ESKCE112	SOURABH MEENA		0	1	2		2		3	8
19ESKCE113	SUBHASH SIHAG	2	0	1.5	1		2.5		3	10
19ESKCE114	SUMIT DANGDA	2	1.5	1.5		3	3.5		5.5	17
19ESKCE115	TANMAY JAISWAL	ABSENT								

19ESKCE116	UJJWAL TRIPATHI	2	0	2		3	2.5		2	12
19ESKCE117	UMANG PANCHAL	2	0	2		3.5	3.5	4.5		16
19ESKCE118	UTKARSH DAUKIYA	0.5	0	1		1	3		2	8
19ESKCE119	VED PRATAP SINGH	2	0.5	1.5	1.5		3	2.5		11
19ESKCE120	VIKAS AECHARA	2	0	1	2		3		3	11
19ESKCE121	VIKASH MAHAWAR	2	2	2	0.5		3	1		11
19ESKCE122	VIMAL KUMAWAT	2	2	2		4	4		5	19
19ESKCE123	VINOD KUMAR MEENA	2	2	2		3.5	3.5	4		17
19ESKCE124	VISHAL KUMAR	ABSENT								
19ESKCE125	VISHNU GOYAL	2	0				2			4
19ESKCE126	VISHNU MEENA	ABSENT								
19ESKCE127	VIVEK VERMA	2	0	2		2	4	3		13
19ESKCE128	YASH CHAUDHARY	2	0	2	1		3	2		10
19ESKCE129	YOUVAN JAIN	2	1	1.5	4	1			5.5	15
19ESKCE300	NITESH	2	0	2		4	2.5	5.5		16
19ESKCE301	RISHABH	2	0	1.5	2		3		4	13
19ESKCE302	SHOURYARAJ SINGH	2	0	1		2.5	3.5	1.5		11
19ESKCE303	ANUSH SHARMA	1	0	1.5	3		2.5		5	13
20ESKCE200	ADITYA SINGH PARIHAR	2		1	0.5		2.5		2.5	9
20ESKCE202	ASHISH VERMA	2	0	2	3		2.5		5	15
20ESKCE203	CHITRANSH SRIVASTAVA	2	1	1.5	2.5		2.5		4	14
20ESKCE204	MUKUL SAINI	2	0	1	2.5		3		3.5	12
20ESKCE205	PANKAJ SHARMA	0	0		1.5		2.5	1		5
20ESKCE206	PRIYANKA SHARMA	2	0	1	3.5		3.5		4	14
20ESKCE207	RAHUL SAINI	2		1.5	2		2.5		2	10
20ESKCE208	RAKESH KUMAR MEENA	2	0	0	1.5		2		2	8
20ESKCE209	SHIV DATT BORANA	2	0	1	1.5		2.5		2	9
20ESKCE210	SHUBHAM JAIN	2	0	2	2		3		3	12
20ESKCE211	SIMRAN SINGH	2	0	2	2.5	2.5			3.5	13
20ESKCE212	UDIT NARAYAN AVASTHI	2	1	0.5	3.5		3.5		2.5	13
20ESKCE213	YASH SARSWAT	1	0	1.5	1		1.5		3.5	9
20ESKCE215	YASH SHARMA	0.5		1	2		2.5		5	11
No. of Students attempt question		63	56	61	46	18	62	20	42	
No. of student get marks greater than 50		55	12	57	28	14	60	5	33	
%		87.30	21.43	93.44	60.87	77.78	96.77	25.00	78.57	
Attainment level gain		3	0	3	1	3	3	0	3	

*** If >75% students get 50% marks or more, than attainment level is**	**3**
*** If 66-75% students get 50% marks or more, than attainment level is**	**2**
*** If 56-65% students get 50% marks or more, than attainment level is**	**1**
*** If 45-55% students get 50% marks or more, than attainment level is**	**0**

Ajay

Ajay K Mandrawalia
Faculty name with Sign

Swami Keshvanand Instituteof Technology, Management &Gramothan, Jaipur

II Mid Term Examination, December 2021

B.Tech./ Semester –III/V **Branch: Civil Engg.**

Subject: GE **Subject Code:5CE4-04**

Time: 1½ Hours **Maximum Marks:24**

Note:- 1.Attempt all questions from part –A (Q.No. 1,2,3&4)

2. Attempt any two questions from part –B (Q.No. 5,6&7)

3. Attempt any one questions from part -C (Q.No.8&9)

PART A (All questions carry 2 marks)

Q.1 What is the stability number in Taylor's Method?

Q.2 What is Time Factor?

Q.3 Differentiate normally and over consolidated soils.

Q.4 What do you mean by disturbed and undisturbed soil samples?

PART B (Attempt any two questions)

Q.5 What are assumptions of Rankine's theory? Derive the expression for active earth pressure.

Q.6 A saturated soil has a compression index of **0.25.** Its void ratio at a stress of **10 kN/m^2** is **2.02** and its permeability is **3.4 × 10^{-7} mm/s.** Compute:

(i) Change in void ratio if the stress is increased to **19 kN/m^2**;

(ii) Settlement in (i) if the soil stratum is **5 m** thick; and

(iii) Time required for **40%** consolidation if drainage is **one-way**

Q.7 A uniform soil deposit has a void ratio **0.6** and specific gravity of **2.65**. The natural ground water is at **2.5 m** below natural ground level. Due to capillary moisture, the average degree of saturation above ground water table is **50%**. Determine the neutral pressure, total pressure and effective pressure at a depth of **6 m**. Draw a neat sketch.

PART C (Attempt any one question)

Q.8. A gravity retaining wall retains **12 m** of a backfill, $\gamma = 17.7$ **kN/m^3**, $\varphi = 25°$ with a uniform horizontal surface. Assume the wall interface to be vertical, determine the magnitude and point of application of the total active pressure. If the water table is a height of **6 m**, how far do the magnitude and the point of application of active pressure changed? (Take submerged unit weight $\gamma' = 10$ **kN/m^3**) **(8)**

Q.9. A foundation, **2.0 m** square is installed **1.2 m** below the surface of a uniform sandy gravel having a density of **19.2 kN/m^3**, above the water table and a submerged density of **10.1 kN/m^3**. The strength parameters with respect to effective stress are $c' = 0$ and $\phi' = 30°$.

Find the gross ultimate bearing capacity for the following conditions:

(i) Water table is well below the base of the foundation (i.e., the whole of the rupture zone is above the water table);

(ii) Water table rises to the level of the base of the foundation; and

(iii) the water table rises to ground level.

(For $\phi' = 30°$, Terzaghi gives $N_q = 22$ and $N_\gamma = 20$) **(8)**

Question Paper Solution for Mid Term: II Examination-2021

Branch : CE **Semester/session: V/21-22** **Submitted by:Manmohan Sharma**
Subject Code: 5CE4-04 Subject: GE

PART A (All questions carry 2 marks)

Q.1 What is the stability number in Taylor's Method?

Ans - $N_s = \frac{\gamma H}{c}$

Q.2 What is Time Factor?

Ans- t is the parameter used to find the consolidation coefficient with time taken for consolidation settlement in soil. It is a non-dimensional number. The expression used to computethe time factor is as given below.

$T = \frac{c_v t}{H_{dr}^2}$

Q.3 Differenced Normally and over consolidated soils.

If the current effective stress, s', is equal to the preconsolidation stress, then the deposit is said to be normally consolidated (NC). If the current effective stress is less than the preconsolidation stress, then the soil is said to be over-consolidated (OC)

Q.4 What do you mean by disturbed and undisturbed soil samples?

Ans- A disturbed sample is that in which the natural structure of soils gets partly or fully modified and destroyed, although, with suitable precautions, the natural water content may be preserved. An undisturbed sample is that in which the natural structure and properties remain preserved.

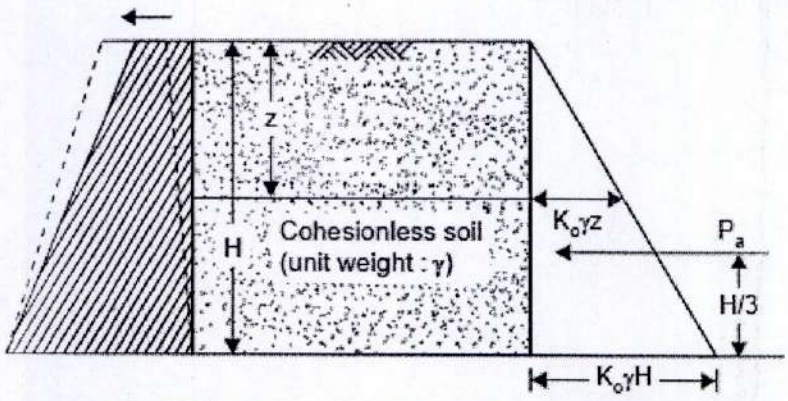
PART B (Attempt any two questions)

Q.5 What are assumptions of Rankine's theory? Derive the expression for active earth pressure.

Ans - Assumptions of Rankine's theory:

1. The soil is homogeneous and isotropic, which means c, φ and γ have the same values everywhere, and they have the same values in all directions at every point (i.e., the strength on a vertical plane is the same as that on a horizontal plane). This discussion will be expanded later to consider layered soils, where each layer has different values of c, φ and γ.
2. The most critical shear surface is a plane. In reality, it is slightly concave up, but this is a reasonable assumption (especially for the active case) and it simplifies the analysis.
3. The ground surface is a plane (although it does not necessarily need to be level).
4. The wall is infinitely long so that the problem may be analyzed in only two dimensions. Geotechnical engineers refer to this as a plane strain condition.
5. The wall moves sufficiently to develop the active or passive condition.
6. The resultant of the normal and shear forces that act on the back of the wall is inclined at an angle parallel to the ground surface (Coulomb's theory provides a more accurate model of shear forces acting on the wall).

Let us consider a retaining wall a vertical back, retaining a mass of cohesionless soil, the surface of which is level with the top of the wall, as shown in Fig.



(a) Retaining wall with cohesionless backfill (moving away from the fill)

(b) Active pressure distribution with depth

σ_v at a depth z below the surface = $\gamma.z$

Assuming that the wall yields sufficiently for the active conditions to develop,

$$\sigma_h = K_a.\ \sigma_v = K_a.\ \gamma.z,$$

where $K_a = \dfrac{1-\sin\phi}{1+\sin\phi} = \tan^2(45° - \phi/2)$

The distribution of the active pressure with depth is obviously linear, as shown in Fig. 13.7 (*b*).

For a total height of H of the wall, the total thrust P_a on the wall per unit length of the wall, is given by:

$$P_a = \frac{1}{2} K_a \gamma H^2 \qquad \text{...(Eq. 13.10)}$$

This may be taken to act at a height of $(1/3)H$ above the base as shown, through the centroid of the pressure distribution diagram.

The appropriate value of the unit weight γ should be used.

Q.6 A saturated soil has a compression index of **0.25.** Its void ratio at a stress of **10kN/m^2** is **2.02** and its permeability is **3.4×10^{-7} mm/s.** Compute:

(i) Change in void ratio if the stress is increased to **19kN/m^2**;

(ii) Settlement in (i) if the soil stratum is **5m** thick; and

(iii) Time required for **40%** consolidation if drainage is **one-way**

Compression index, $C_c = 0.25$

$e_0 = 2.02$ $\quad \bar{\sigma}_0 = 10$ kN/m^2 $\quad k = 3.4 \times 10^{-7}$ mm/s

$\bar{\sigma}_1 = 19$ kN/m^2

(*i*) $$C_c = \frac{\Delta e}{\log_{10}(\bar{\sigma}_1 / \bar{\sigma}_0)} \therefore\ 0.25 = \frac{\Delta e}{\log_{10}(19/10)}$$

$\therefore$ $\Delta e = 0.25 \log_{10}(1.9) \approx \mathbf{0.07}$

or Void ratio at a stress of 19 kN/m^2 = 2.02 − 0.07 = 1.95

$a_v = \Delta e / \Delta\bar{\sigma} = 0.07/9 = 0.00778$ m^2/kN

$m_v = a_v/(1 + e_0) = 0.00778/(1 + 2.02) = 2.575 \times 10^{-3}$ m^2/kN

(*ii*) Thickness of soil stratum, $H = 5$ m.

Settlement, $$S = \frac{H.C_c}{(1+e_0)} \log_{10}\left(\frac{\bar{\sigma}_0 + \Delta\bar{\sigma}}{\bar{\sigma}_0}\right) = \frac{H.C_c}{(1+e_0)} \log_{10}\left(\frac{\bar{\sigma}_1}{\bar{\sigma}_0}\right)$$

$$= \frac{5 \times 1000 \times 0.25}{(1+2.02)} \log_{10}(19/10) \text{ mm} \approx \mathbf{115.4 \text{ mm}}$$

(iii) If drainage is one way, drainage path, H = thickness of stratum = 5 m

$$T_{40} = \frac{C_v t_{40}}{H^2}; \quad T_{40} = (\pi/4)U^2 = (\pi/4) \times (0.40)^2 = 0.04\,\pi = 0.125664$$

$$C_v = k/m_v \cdot \gamma_w$$

$$= \frac{3.4 \times 10^{-7} \times 10^{-3}}{2.575 \times 10^{-3} \times 9.81} \text{ m}^2/\text{s} = 1.346 \times 10^{-8} \text{ m}^2/\text{s}$$

$$\therefore \quad t_{40} = \frac{T_{40} \cdot H^2}{C_v}$$

$$= \frac{0.125664 \times 5 \times 5}{1346 \times 10^{-8} \times 60 \times 60 \times 24} \text{ days}$$

$$\approx \mathbf{270.14 \text{ days}}.$$

Q.7A uniform soil deposit has a void ratio **0.6** and specific gravity of **2.65**. The natural ground water is at **2.5 m** below natural ground level. Due to capillary moisture, the average degree of saturation above ground water table is **50%**. Determine the neutral pressure, total pressure and effective pressure at a depth of **6 m**. Draw a neat sketch.

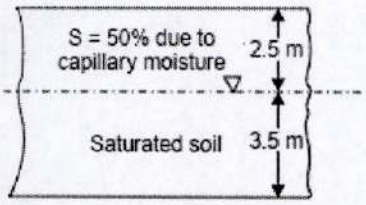
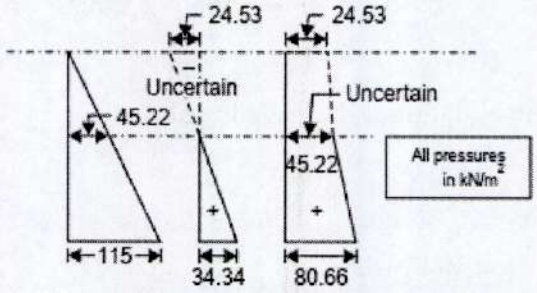


Fig. 5.27 Soil profile (Example 5.4)



(a) Total pressure (b) Neutral pressure
(c) Effective pressure

Fig. 5.28 Pressure diagrams (Example 5.4)

Void ratio, $e = 0.6$

Specific gravity $G = 2.65$

$$\gamma_{sat} = \left(\frac{G+e}{1+e}\right) \cdot \gamma_w = \frac{(2.65+0.60)}{(1+0.60)} \times 9.81 \text{ kN/m}^3$$

$$= 19.93 \text{ kN/m}^3$$

γ at 50% saturation

$$= \left(\frac{G+Se}{1+e}\right) \cdot \gamma_w = \frac{(2.65 \times 0.5 + 0.60)}{(1+0.60)} \times 9.81 \text{ kN/m}^3 = 18.09 \text{ kN/m}^3.$$

Total pressure, σ at 6 m depth $= 2.5 \times 18.09 + 3.5 \times 19.93$

$= 115 \text{ kN/m}^2$

Neutral pressure, u at 6 m depth $= 3.5 \times 9.81 = \mathbf{34.34 \text{ kN/m}^2}$

Effective pressure, $\bar{\sigma}$ at 6 m depth $= (\sigma - u)$

$= 115.00 - 34.34 = \mathbf{80.66 \text{ kN/m}^2}$

PART C (Attempt any one question)

Q.8.A gravity retaining wall retains **12 m** of a backfill, γ = **17.7 kN/m^3**,φ = **25°** with a uniform horizontal surface. Assume the wall interface to be vertical, determine the magnitude and point of application of the total active pressure. If the water table is a height of **6 m**, how far do the magnitude and the point of application of active pressure changed? (Take submerged unit weight γ' = 10 kN/m^2) **(8)**

Ans-

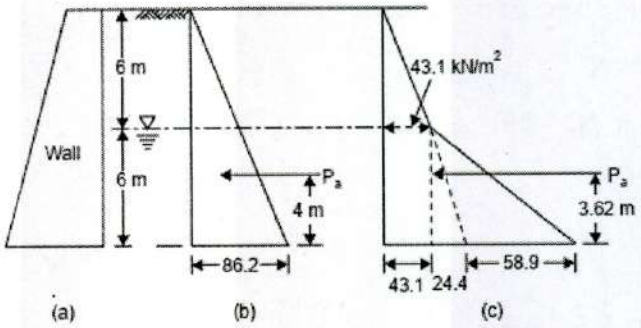


Fig. 13.53 Retaining wall and pressure distribution (Ex. 13.3)

(*a*) Dry cohesionless fill:

$$H = 12 \text{ m} \quad \phi = 25° \quad \gamma = 17.7 \text{ kN/m}^3$$

$$\therefore \quad K_a = \frac{1-\sin 25°}{1+\sin 25°} = 0.406$$

Active pressure at base of wall = $K_a . \gamma H = \frac{1-\sin 25°}{1+\sin 25°} \times 17.7 \times 12$

$= 86.2 \text{ kN/m}^2$

The distribution of pressure is triangular as shown in Fig. 13.53 (*b*).

Total active thrust per metre run of wall = $\frac{1}{2}\gamma H^2 K_a = \frac{1}{2} \times 12 \times 86.2 =$ **517.2 kN**

This acts at (1/3)*H* or 4 m above the base of the wall.

(*b*) Water table at 6 m from surface:

Active pressure at 6 m depth = 0.406 × 17.7 × 6 = 43.1 kN/m^2

Active pressure at the base of the wall = $K_a(\gamma . 6 + \gamma' . 6) + \gamma_w . 6$

$= 0.406 (17.7 \times 6 + 10 \times 6) + 9.81 \times 6 = 67.5 + 58.9 = 126.4 \text{ kN/m}^2$

(This is obtained by assuming γ above the water table to be 17.7 kN/m^2 and the submerged unit weight γ', in the bottom 6 m zone, to be 10 kN/m^2.

The pressure distribution is shown in Fig. 13.53 (*c*).

Total active thrust per metre run = Area of the pressure distribution diagram

$$= \frac{1}{2} \times 6 \times 43.1 + 6 \times 43.1 + \frac{1}{2} \times 6 \times 24.4 + \frac{1}{2} \times 6 \times 58.9$$

$$= 129.3 + 258.6 + 73.2 + 176.7 = \mathbf{637.8 \text{ kN}}$$

The height of its point of application above the base is obtained by taking moments.

$$\bar{z} = \frac{(129.3 \times 8 + 258.6 \times 3 + 73.2 \times 2 + 176.7 \times 2)}{637.8} = \mathbf{3.62 \text{ m}}$$

Total thrust increase by **120.6 kN** and the point of application gets lowered by **0.38 m.**

Q.9. A foundation, **2.0 m** square is installed **1.2 m** below the surface of a uniform sandy gravel having a density of **19.2 kN/m^3**, above the water table and a submerged density of **10.1 kN/m^3**. The strength parameters with respect to effective stress are **$c' = 0$** and **$\phi' = 30°$**.

Find the gross ultimate bearing capacity for the following conditions:

(i) Water table is well below the base of the foundation (i.e., the whole of the rupture zone is above the water table);

(ii) Water table rises to the level of the base of the foundation; and

(iii) the water table rises to ground level.

(For $\phi' = 30°$, Terzaghi gives $N_q = 22$ and $N_\gamma = 20$) **(8)**

Ans-

Square $b = 2$ m $D_f = 1.2$ m $c' = 0$ $\phi' = 30°$

$\gamma = 19.2$ kN/m^3 $\gamma' = 10.1$ kN/m^3 $N_q = 22$ $N_\gamma = 20$

(*i*) Water table is well below the base of the foundation:

$$q_{ult} = 1.3\,c\,N_c + 0.4\,\gamma\,b\,N_\gamma + \gamma D_f N_q = 0.4\,\gamma\,b\,N_\gamma + \gamma D_f N_q, \text{ in this case.}$$

or $$q_{ult} = 0.4 \times 19.2 \times 2 \times 20 + 19.2 \times 1.2 \times 22 = 814 \text{ kN/m}^2$$

(*ii*) Water table rises to the level of the base of the foundation:

$$q_{ult} = 0.4\,\gamma'\,b\,N_\gamma + \gamma D_f N_q$$

$$= 0.4 \times 10.1 \times 2 \times 20 + 19.2 \times 1.2 \times 22 = 668 \text{ kN/m}^2$$

(*iii*) Water table rises to the ground level:

$$q_{ult} = 0.4\,\gamma'\,b N_\gamma + \gamma' D_f N_q$$

$$= 0.4 \times 10.1 \times 2 \times 20 + 10.1 \times 1.2 \times 22 = 428 \text{ kN/m}^2$$

Swami Keshvanand Institute of Technology, Management & Gramothan, Ramnagaria, Jagatpura, Jaipur-302017

Analysis of Question Paper Mid Term II Examination-2021

Branch : Civil **Semester/session: V/2021-22** **Max Marks:24**
Subject Code: 5CE4-04 **Subject: Geotechnical Engineering** **Duration: 1.5 hours**

A. Distribution of Course Outcome and Bloom's Taxonomy in Question Paper

Part	Q. No	Questions	Marks	CO	BL
A	Q.1	What is the stability number in Taylor's Method?	2	5	4
	Q.2	What is Time Factor?	2	4	1
	Q.3	Differenced normally and over consolidated soils.	2	4	2
	Q.4	What do you mean by disturbed and undisturbed soil samples?	2	7	2
B	Q.1	What are assumptions of Rankine's theory? Derive the expression for active earth pressure?	4	8	1
	Q.2	A saturated soil has a compression index of 0.25. Its void ratio at a stress of 10kN/m^2 is 2.02 and its permeability is 3.4 × 10–7 mm/s. Compute: (i) Change in void ratio if the stress is increased to 19kN/m^2; (ii) Settlement in (i) if the soil stratum is 5m thick; and (iii) Time required for 40% consolidation if drainage is one-way	4	4	3, 5
	Q.3	A uniform soil deposit has a void ratio 0.6 and specific gravity of 2.65. The natural ground water is at 2.5 m below natural ground level. Due to capillary moisture, the average degree of saturation above ground water table is 50%. Determine the neutral pressure, total pressure and effective pressure at a depth of 6 m. Draw a neat sketch.	4	8	4, 5
C	Q.1	A gravity retaining wall retains 12 m of a backfill, γ = 17.7 kN/m^3,φ = 25° with a uniform horizontal surface. Assume the wall interface to be vertical, determine the magnitude and point of application of the total active pressure. If the water table is a height of 6 m, how far do the magnitude and the point of application of active pressure changed? (Take submerged unit weight γ' = 10 kN/m^3)	8	8	3, 5
	Q.2	A foundation, 2.0 m square is installed 1.2 m below the surface of a uniform sandy gravel having a density of 19.2 kN/m^3, above the water table and a submerged density of 10.1 kN/m^3. The strength parameters with respect to effective stress are c′ = 0 and ϕ' = 30°. Find the gross ultimate bearing capacity for the following conditions: (i) Water table is well below the base of the foundation (i.e., the whole of the rupture zone is above the water table); (ii) Water table rises to the level of the base of the foundation; and (iii) the water table rises to ground level. (For ϕ' = 30°, Terzaghi gives N_q = 22 and N_γ = 20)	8	6	4, 5

BL – **Bloom's Taxonomy Levels**
(1- Remembering, 2- Understanding, 3 – Applying, 4 – Analyzing, 5 – Evaluating, 6 - Creating)
CO – **Course Outcomes**

Swami Keshvanand Institute of Technology, Management & Gramothan, Ramnagaria, Jagatpura, Jaipur-302017

Analysis of Question Paper Mid Term II Examination-2021

Branch : Civil **Semester/session: V/2021-22** **Max Marks:24**
Subject Code: 5CE4-04 **Subject: Geotechnical Engineering** **Duration: 1.5 hours**

B. **Questions and Course Outcomes (COs) Mapping in terms of correlation**

COs	Part A				Part B			Part C	
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q1	Q2
CO1	0	0	0	0	0	0	0	0	0
CO2	0	0	0	0	0	0	0	0	0
CO3	0	0	0	0	0	0	0	0	0
CO4	0	2	2	0	0	3	0	0	0
CO5	2	0	0	0	0	0	0	0	0
CO6	0	0	0	0	0	0	0	0	3
CO7	0	0	0	3	0	0	0	0	0
CO8	0	0	0	0	3	0	3	3	0

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

C. **Mapping of Bloom's Level and Course Outcomes with Question Paper**

Bloom's Level Mapping		CO Mapping	
Bloom's Level	Percentage	CO	Percentage
BL1	16.67	CO1	00
BL2	11.11	CO2	00
BL3	16.67	CO3	00
BL4	22.22	CO4	22.22
BL5	33.33	CO5	5.56
BL6	00.00	CO6	22.22
		CO7	5.56
		CO8	44.44

Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur

B.Tech III Year V Semester (Session 2021-2022)

CO's Attainment (Theory Mid Term : II) | Department: Civil Engineering

Faculty Name: MANMOHAN SHARMA | Course Name with CODE: GE, 5CE4-04

Upon successful completion of this course, students will be able to:

CO1: Understand the engineering and index properties of soil and classification of soil..

CO2: Determine the permeability of soil by laboratory and field methods.

CO3: Understand working and representation of direct shear test, unconfined compression test and tri axial test.

CO4: Discuss compaction and consolidation of soil.

CO5: Understand the stability analysis of finite and infinite slopes.

CO6: Determine bearing capacity of soil using analytical and experimental methods.

CO7: Understand different methods of exploration and procedures of sampling.

CO8: Understand lateral earth pressure theories.

MID TERM EVALUATION

Sr. N0.	ROLL NO	PART →	A				B		C			Total (24)	Assignment (6)	Total (30)
		Note→	Attempt All				Attempt Any Two		Attempt Any One					
		QUESTION NO. →	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9			
		COURSE OUTCOME(S) SATISFIED →	5	4	4	7	8	4	8	8	6			
		MAXIMUM MARKS →	2	2	2	2	4	4	4	8	8			
		MINIMUM QUALIFYING MARKS (50%) →	1	1	1	1	2	2	2	4	4			
		NAME OF STUDENT ↓												
1	19ESKCE001	ABHAY SINGH DHAKA	0	2	0	2	2	0		0		6	6	12
2	19ESKCE002	ABHIJEET SINGH NATHAWAT		2	2	2	4		4	2		16	6	22
3	19ESKCE003	ABHISHEK LODWAR	2	2	2	0			2			8	6	14
4	19ESKCE004	ABHISHEK MEENA	0					0	0			0	6	6
5	19ESKCE005	ABHISHEK MOOND						0	0		8	8	6	14
6	19ESKCE006	ADITYA CHOUDHARY										0	6	6
7	19ESKCE007	ADITYA RAJ	0	0								0	6	6
8	19ESKCE008	ADITYA SAINI			2	2	2	2				8	6	14
9	19ESKCE009	AJAY KUMAR MEENA	0								0	0	6	6
10	19ESKCE011	AKANKSHA FOUJDAR	2	2	2	2	3				8	19	6	25
11	19ESKCE012	AMAN SUTHAR		0	0	2	2	4		4		12	6	18
12	19ESKCE013	AMIT KUMAR	2	2			4		4		8	20	6	26
13	19ESKCE014	AMIT KUMAR SONWAL										0	6	6
14	19ESKCE015	ANAND JOSHI			2	2		0	2			6	6	12
15	19ESKCE016	ANAND KUMAR		0	2	2	2	0				6	6	12
16	19ESKCE017	ANKIT MINA			2	2	2				6	12	6	18
17	19ESKCE018	ANSHAJ GOYAL										AB	6	6
18	19ESKCE019	ANURAG MEENA	1	2	2	2	4		4	6		21	6	27
19	19ESKCE020	ARPIT MEENA	2	1	2	2	4		4	6		21	6	27
20	19ESKCE021	ARPIT MUKESH MEENA	1	1	2	2	4		4	4		18	6	24
21	19ESKCE022	ARVIND KUMAWAT	0		2	2						4	6	10
22	19ESKCE023	ARYAN KHATRI	1	1	2		2		4		2	12	6	18
23	19ESKCE024	ASHISH SINGH JADAUN			2	2	2					6	6	12
24	19ESKCE025	ASHOK BAIRWA		0	2	2	2	0				6	6	12
25	19ESKCE026	ATIBA QURESHI	2	2			4	4		8		20	6	26
26	19ESKCE027	AYUSH CHOUDHARY					2	4			8	14	6	20
27	19ESKCE028	AYUSH KUMAR				2		4			4	10	6	16
28	19ESKCE029	BANWARI LAL MEENA	0	1	2	2		0	0	0		5	6	11
29	19ESKCE030	BRIJESH JATOLIYA							4		8	12	6	18
30	19ESKCE031	CHITRANSHU MEENA										AB	6	6
31	19ESKCE032	DEEPAK MEENA					2		4		8	14	6	20
32	19ESKCE033	DIPAK KUMAR										AB	6	6
33	19ESKCE034	DIVYANSHU JAIN		1	2		4		4		6	17	6	23
34	19ESKCE036	HARSH KUMAWAT	1	2	2	2	4		4		8	23	6	29
35	19ESKCE037	HARSH MEENA	0	1	2	1	4		4		8	20	6	26
36	19ESKCE038	HARSH SINGHAL	0		2	2	2					6	6	12
37	19ESKCE039	HARSHVARDHAN RAWAT		0			4		4		8	16	6	22
38	19ESKCE040	HIMANSHU AGARWAL		2	2	2	4		4	8		22	6	28
39	19ESKCE041	HIMANSHU CHOUDHARY	0	1	2	2	4		4		8	21	6	27

40	19ESKCE042	HIMANSHU VIJAYVARGIA	2	1	2	2	4		4		8	23	6	29
41	19ESKCE043	HITESH KUMAR MEENA	0	1	2		4		4		8	19	6	25
42	19ESKCE044	HITESH SHARMA	2	1	0	1	4		3		8	19	6	25
43	19ESKCE045	ISHANT JOGANI	0	1	2	2	3					8	6	14
44	19ESKCE046	JAGENDER BAKNAD		2	2	2	4	4			0	14	6	20
45	19ESKCE047	JATIN MEENA					4		4		6	14	6	20
46	19ESKCE048	JATIN PRATAP MEENA		1	2	2	0					5	6	11
47	19ESKCE049	JATIN VEDWAL					4		0	6		10	6	16
48	19ESKCE050	JAY KUMAR BANSIWAL	2	1	2	2	4		4		8	23	6	29
49	19ESKCE051	JAYANT KUMAR	2	1	2	2	4		4		8	23	6	29
50	19ESKCE052	JENISHA DEVNANI	2	1	2	2	4	4			8	23	6	29
51	19ESKCE053	KAHKASHAN KHANAM	2	1	2	2	4	2			8	21	6	27
52	19ESKCE055	KANISHKA	2	2	2	2	2	4			8	22	6	28
53	19ESKCE056	KARAN MEENA	2	2	2	1	2		4		8	21	6	27
54	19ESKCE057	KARTIKAY SINGHAL	2	2	2	2	4	4		8		24	6	30
55	19ESKCE058	KAVYA KULSHRESTHA	1	2		2	4	4			8	21	6	27
56	19ESKCE059	KULDEEP TIWARI				2	4				0	6	6	12
57	19ESKCE060	KUMKUM MAURYA	1	1		2	4		4		8	20	6	26
58	19ESKCE061	LALIT KUMAR SUWALKA	0	2	0	2	4		4		8	20	6	26
59	19ESKCE062	LOKESH MALI			2	2	3		4		8	19	6	2
60	19ESKCE063	LUV KUMAR SUHAG			2	2	3		4		8	19	6	25
61	19ESKCE064	MAHENDRA MEENA				2			4		8	14	6	20
62	19ESKCE065	MANISH CHOUDHARY		1	0				4	2		7	6	13
63	19ESKCE066	MANISH CHOUDHARY	0	1	2	2	2	4			4	15	6	21
64	19ESKCE067	MANISH KUMAR MEENA										AB	6	6
65	19ESKCE068	MANISH RAD	2	2	2	2	2		4	8		22	6	28
66	19ESKCE069	MEHUL AGARWAL	2	2	2	2	2		4	8		22	6	28
67	19ESKCE070	MOHAMMAD RAMJAN	1	1	2	2	0					6	6	12
68	19ESKCE071	MOHD ARIF CHOWDHARY										AB	6	6
69	19ESKCE072	MOHIT MEENA		1	1	2	2	0				6	6	12
70	19ESKCE073	MUKUL MANGAL		2	2		4		4		8	20	6	26
71	19ESKCE074	MUSKAN MEENA	2	2	2		4		4		8	22	6	28

Total No. of DEBARRED (DB)	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	
Total No. of ABSENT (AB)	5	5	5	5	5	5	5	5	5	
Total Students Appreaed for Exam (A)	66	66	66	66	66	66	66	66	66	
Total Students Attempted the Question (A)	37	45	47	46	52	20	37	14	36	
No. of Students scored >=50% marks (B)	**24**	**40**	**42**	**45**	**50**	**12**	**33**	**10**	**32**	
Percentage Attainment of Criterion (B/A)	64.86	88.89	89.36	97.83	96.15	60.00	89.19	71.43	88.89	
CO Attainment Level	**1**	**3**	**3**	**3**	**3**	**1**	**3**	**2**	**3**	**3**
Attainment of CO-1	NIL	NIL		NIL	NIL	NIL	NIL	NIL	NIL	NIL
Attainment of CO-2	NIL	NIL		NIL	NIL	NIL	NIL	NIL	NIL	NIL
Attainment of CO-3	NIL	NIL		NIL	NIL	NIL	NIL	NIL	NIL	NIL
Attainment of CO-4		**89%**	**89%**			60%				**3**
Attainment of CO-5	**65%**									**1**
Attainment of CO-6									88.89%	**3**
Attainment of CO-7				**98.00%**						**3**
Attainment of CO-8					96.15%		89.19%	71.43%		**3**

Criterion of Percentage for CO Attainment Level	**Attainment Level**
If below 60% students get 50% marks or less, than attainment level is	0
If below 60-69% students get 50% marks or less, than attainment level is	1
If below 70-79% students get 50% marks or less, than attainment level is	2
If below 80-100% students get 50% marks or less, than attainment level is	3

MANMOHAN SHARMA

Faculty name with signature

Swami Keshvanand Institute of Technology, M & G, Jaipur

Department of Civil Engineering

Mark List Cum Attainment Level of Subject

II Midterm Exam (2021)

Subject Code : 5CE4-04 | Subject : Geotechnical Engineering (V-B)

	Q. No.	1	2	3	4	5	6	7	8	9	Total (24)	Assignment (6)	Total (30)
	MM.	2	2	2	2	4	4	4	8	8			
	CO	5	4	4	7	8	4	8	8	6			
	Criterion: 50% of MM	1	1	1	1	2	2	2	4	4			
Roll No.	Name of Student	Part A				Part B			Part C				
19ESKCE075	Naman Singhal	1.5	1.5	1.5	0.5	3	1.5		5		15	6	21
19ESKCE076	Naveen Kumar	1.5	0.5	1	0.5	3		1	4		12	5	17
19ESKCE077	Nitesh Kumar	ABSENT									AB	NS	AB
19ESKCE078	Nitin Goyal		2	2	1		2	1		2	10	6	16
19ESKCE079	Piyush Jain	2		1.5	0.5	0.5			0.5		5	NS	5
19ESKCE080	Pooja Kumari Meena	0.5	1.5	2	1.5	4	1		7		18	5	23
19ESKCE081	Pradeep Kumar Meena	2	2	1	0.5	4	1		8		19	6	25
19ESKCE082	Pravesh Sehra	2	0.5	1	0.5	3	0		8		15	NS	15
19ESKCE083	Raghvendra Singh Rathor	ABSENT									AB	NS	AB
19ESKCE084	Rahul Ghorela	0.5	0	0.5	1	1		0.5	0.5		4	5	9
19ESKCE085	Rahul Meena	ABSENT									AB	NS	AB
19ESKCE086	Rahul Sharma	0	0	0.5	0	1	0		0		2	5	7
19ESKCE087	Rahul Singh Shekhawat	0.5	0	1	0.5	0.5					3	5	8
19ESKCE088	Rajat Singh			0.5	1	1.5			3		6	NS	6
19ESKCE089	Rakesh Jakhar	0	0	0.5	0.5	0	0.5			0	2	NS	2
19ESKCE090	Rakesh Mina	1	0.5	0.5	0.5				3		6	5	11
19ESKCE091	Rakesh Singh	0.5	0.5	0.5	1	1	0		0		4	5	9
19ESKCE092	Ramesh Choudhary	0	0.5	1.5	1.5	3		0	3		10	5	15
19ESKCE093	Randheer	0	0	0.5	1	1.5	0		2		5	5	10
19ESKCE094	Reddy Sai Praveen Reddy	0		1.5	0.5	3	2		3		10	6	16
19ESKCE095	Ritesh Kumar Maurya	0	0	0.5	0.5	1	0			0	2	5	7
19ESKCE096	Rohit Mehta	2	0	0.5	0.5	0.5				3	7	5	12
19ESKCE097	Sachin Rewadia	2		0.5	0		0	0	1		4	5	9
19ESKCE099	Sagar Meena	ABSENT									AB	NS	AB
19ESKCE100	Sahi Ram Godara	2	0	0.5	1.5	2	0.5		1		8	5	13
19ESKCE102	Samyak Jain	0	2	0.5				3	1		7	6	13
19ESKCE103	Sanuj Mohan							3			3	NS	3
19ESKCE104	Satish Saini	0	0	0.5	0.5	0.5	0.5				2	5	7
19ESKCE105	Saurabh Kumar Meena	0.5	0	0.5	0.5	0			8		10	5	15
19ESKCE107	Shailesh Kumar		0	0.5	0.5	3		0		0	4	NS	4
19ESKCE108	Shiv Singh Naruka		0.5	1	1	1			5		9	5	14
19ESKCE109	Shivani Meena	0.5	0	0	0.5	1			5		7	5	12
19ESKCE110	Shubham Saxena	0.5	2	0.5	1	2		2	0		8	6	14
19ESKCE111	Sonal Meena	1	2	1	1.5	2		2		5	15	6	21
19ESKCE112	Sourabh Meena	0.5	0.5	0.5	0.5			0	0		2	5	7
19ESKCE113	Subhash Sihag	0	0.5	0.5	0.5		0	0	0		2	5	7
19ESKCE114	Sumit Dangda	0.5	0	1	1.5	2		1	4		10	6	16
19ESKCE115	Tanmay Jaiswal	ABSENT									AB	6	AB
19ESKCE116	Ujjwal Tripathi	0	0	1	1		0	0	2		4	NS	4
19ESKCE117	Umang Panchal	0.5	0.5	1.5	1	0.5	0		0		4	5	9
19ESKCE118	Utkarsh Daukiya	0	0	0.5	0.5	0.5	0.5				2	NS	2
19ESKCE119	Ved Pratap Singh	0.5	0	1.5	2		1.5	2			8	NS	8
19ESKCE120	Vikas Aechara	1	0	0.5	0.5			2	3		7	5	12
19ESKCE121	Vikash Mahawar		0	0.5				1	6		8	5	13
19ESKCE122	Vimal Kumawat	1.5	2	0.5	1.5	3	0.5		7		16	5	21
19ESKCE123	Vinod Kumar Meena	2	0	0	0	1			7		10	5	15
19ESKCE124	Vishal Kumar	ABSENT									AB	NS	AB
19ESKCE125	Vishnu Goyal	0	0								0	6	6
19ESKCE126	Vishnu Meena	2	0								2	NS	2
19ESKCE127	Vivek Verma	2	0.5	1	0.5	1		0	0		5	5	10

19ESKCE128	Yash Chaudhary	2	0.5					0			3	6	9
19ESKCE129	Youvan Jain	1	1	1.5	1	3		0.5	3		11	6	17
19ESKCE300	Nitesh	1	1	0.5	1				7		11	NS	11
19ESKCE301	Rishabh	1	1	1	2	3			7		15	6	21
19ESKCE302	Shouryaraj Singh	2	1	2	2	3	1		4		15	6	21
19ESKCE303	Anush Sharma	2	0.5	2	0.5	3		2	6		16	6	22
20ESKCE200	Aditya Singh Parihar	0.5	0	0.5	0.5	1	0.5	0			3	NS	3
20ESKCE202	Ashish Verma	0.5	0	0	1	1			2		5	5	10
20ESKCE203	Chitransh Srivastava	1	1	1	1	3		0	4		11	6	17
20ESKCE204	Mukul Saini	1	1	0.5	0.5	1			8		12	6	18
20ESKCE205	Pankaj Sharma		0	0.5	0.5		0		1		2	6	8
20ESKCE206	Priyanka Sharma	2	2	2	1	4		2	7		20	6	26
20ESKCE207	Rahul Saini	0	0	0.5	0.5	2					3	NS	3
20ESKCE208	Rakesh Kumar Meena		0	0.5		2		0		1	4	6	10
20ESKCE209	Shiv Datt Borana	0	0	1	1	0.5					3	NS	3
20ESKCE210	Shubham Jain	0.5	0.5	0.5	1	1		0.5	0		4	NS	4
20ESKCE211	Simran Singh		0.5	0.5	1	2	0.5		0.5		5	6	11
20ESKCE212	Udit Narayan Avasthi	1	0.5	1	1	2		0.5	8		14	6	20
20ESKCE213	Yash Sarswat	0.5	0.5	0.5	0.5	3		2	7		14	6	20
20ESKCE215	Yash Sharma	0.5	0.5	0.5	0.5		1	0			3	NS	3
No. of Students attempt question		55	59	60	57	47	25	29	45	7			
No. of student get marks greater than 50%		25	15	25	27	24	2	9	21	1			
%		45.45	25.42	41.67	47.37	51.06	8.00	31.03	46.67	14.29			
Attainment level gain		0	0	0	0	0	0	0	0	0			
*** If 80-100% students get 50% marks or more, than attainment level is**									**3**				
*** If 70-79% students get 50% marks or more, than attainment level is**									**2**				
*** If 60-69% students get 50% marks or more, than attainment level is**									**1**				
*** If 50-59% students get 50% marks or more, than attainment level is**									**0**				

M. Bharathi

Faculty Name : Dr. Bharathi M.