

# Swami Keshvanand Institute of Technology, Management & Gramothan

(Accredited by NAAC with 'A++' Grade)

Approved by AICTE, Ministry of Education, Government of India Recognized by UGC under Section 2(f) of the UGC Act, 1956 Affiliated to Rajasthan Technical University, Kota

# Campus Recruitment Training Programme (CRT) Sample Session: 2023-24

# CRT Schedule: 15.02.2024-20.04.2024

# **VI Semester**

Day	9 am – 11 am	11.30 am – 1.30 pm
Monday	CS E (106)	CS A (405)
Wionday	CS AI-B (105)	CS AI-A (104)
	CS C (105)	IT B (206)
Tuesday	EC (201)	CS DS (103)
	CE B (1F3)	EE B, ME (6FL6)
Wednesday	CS AI-B (105)	IT A (206)
	EE A (6FL6)	CE A (1F2)
	IT B (206)	CS C (104))
Thursday	CS AI-A (104)	CS E (ME-105)
	CS D (104)	CS B (ME-104)
Friday	IT A (206)	CS DS (103)
	CE B (1F3)	EE A (6FL6)
	CS D (105)	EC (201)
Saturday	CS B (104)	CS A (ME 105)
	EE B, ME (6FL6)	CE A (1F2)

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Swami Keshvanand Institute of Technology Management & Gramothan Pamnagaria, Jagatpura, JAIPUR-17

# VII Semester Refresher Aptitude Training Schedule: 2024 Batch (25.09.2023 – 20.10.2023)

Day	10 AM- 12 Noon	12.30 pm – 2.30 pm
Monday	CS – A, C, D (JC Bose Seminar Hall)	IT- A, B ECE – A, B (JC Bose Seminar Hall)
Tuesday	CS – A, C, D (JC Bose Seminar Hall)	IT- A, B ECE – A, B (JC Bose Seminar Hall)
Thursday		CS – B, E CS (AI) (JC Bose Seminar Hall)
Friday		CS – A, C, D (JC Bose Seminar Hall)

(Dr Amber Srivastava) Head, Training & Placement Cell

Coordinator, Skill Development Cell

Copy to:

Director

Director (Academics)

Principal

Registrar

Dean

HODs -CS, CS (AI), ECE

Concerned CRT Coordinators, ERP, Charan Singh Ji

Concerned 2024 Batch students

Notice Boards

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Swami Keshvanand Institute of Technology Management & Gramothan Ramnagaria, Jagatpura, JAIPUR-17

# CRT Schedule: 2023 (4.09.2023- 24.11.2023)

# V Semester CS,IT,ECE

Day	10.00 am - 12.00 noon	12.30 pm - 2.30 pm
Monday	CS E (106) IT A (401)	CS B (405) IT B (402)
Tuesday	CS (DS) (306) CS (AI) B (ME-302)	CS (AI) A (305) ECE (201)
W <mark>ed</mark> nesday	CS C (105) CS D (404)	
Thursday	IT A (401) CS E (106)	CS (AI) B (403) CS B (ME-302)
Friday	CS D (106) CS A (ME-302)	IT B (402) CS (AI) A (405)
Saturday	ECE (201) CS (DS) (306)	CS A (403) CS C (ME 302)

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#### JAIPUR CENTRE

#### M/s. COMPREP LLP

(Licensee of Advanced Educational Activities Pvt. Ltd.)

# Memorandum of Understanding

This MOU is hereby signed on 2nd September,2023 between T.I.M.E. (Comprep LLP) Jaipur and SKIT Jaipur regarding conduct of CRT (Campus Recruitment Training) classes at SKIT college campus.

- 1. T.I.M.E. will conduct CRT full-length module with students of B.Tech. 3rd year.
- 2. T.I.M.E will provide following CRT COURSE STRUCTURE (starting from Sept,2023):
- 60 hours of aptitude training (56 hours of teaching and 4 hours of testing) in phase-I covering various questions asked in Aptitude Tests of companies, specially IT companies, to be done section-wise @ 2 hours a day spread over 6<sup>th</sup> Semester; 6 hours of doubt-solving and feedback sessions; and 24 hours (16 hours of teaching and 8 hours of testing) in phase-II in VII semester as a refresher to be done in 2-3 groups.
- Comprehensive study material consisting of Books and handouts.
- Experienced faculty members to impart the best classroom inputs.
- Paper-based Comprehensive Tests, 20 online Mock Tests Based on TCS, Infosys etc for online practice along with some sectional tests.
- Guidance about the selection processes followed by various companies to ensure focus.
   Additional web-based support through user name and password to be provided by T.I.M.E. (profiles of major companies, IT & ITES Industry updates, GD topics and interview questions for practice, etc.)
- 3. Faculty members will come to SKIT and expenses will be borne by T.I.M.E. Jaipur.
- 4. Necessary tools for teaching (whiteboard,marker,projector) will be provided by SKIT.
- 5. SKIT will arrange basic requirements viz tea, water and suitable rest space for faculty visiting the campus for taking classes.
- 6. SKIT will inform necessary changes in schedule well in advance (a week before). In case of any cancellation of class same should be communicated by SKIT timely.
- 7. SKIT will provide Academic Calendar, Holiday list to T.I.M.E.
- 8. Number of batches 11 of approx 60 students each, within college timing between 8 AM to 2:30 PM.
- 9. The total lumpsum cost of entire training module for above students will be Rs. 30,00,000/- (Rupees Thirty Lakhs Only), inclusive of GST. If number of students exceed this number but number of batches remain the same i.e. 11, then Study Material charges @ Rs 500 + GST will be billed for the additional number of students.
- 10. 25% payment to be made in advance at the beginning of the course, 25% in Nov'23, 25% in Jan'24 and balance 25% on course completion. Cheques to be issued in favour of Comprep LLP.

For T.I.M.E. Jaipur (Comprep LLP)

Centre Director

Registrar .

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Swami Keshvanand Institute of Technology Management & Gramothan

Rammagaria, Jagatpura, JAIPUR-17

Civil Lines: Mob: 7230810003 | JLN Marg: Mob: 8094411666 | Vaishali Nagar: Mob: Tel: 7232893893 | Vidyadhar Nagar: Mob: 0141-4359303

e-mail: jaipur@time4education.com

website: www.time4education.com

Head Office: 95B, 2" Floor, Siddamsetty Complex, Park Lane, Secunderabad - 500 003. Tel: 40088300/400

# Memorandum of Understanding & Agreement For

Outcome based Education and Employability Index Enhancement Platform (Myperfectice) for 2025 batch Students

# Between

Perfectice Eduventure Private Ltd.



# And

Swami Keshwanand Institute of Technology

On Date: 23.10.2023

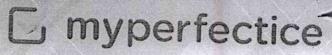
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The information in this document shall not be disclosed outside the management of SWAMI KESHWANAND INSTITUTE OF TECHNOLOGY and shall not be duplicated, used or disclosed, in whole or in part, for any purpose other than to evaluate the proposal.

+91 9850696969, 7586035806, +1 8478485798 Mello@myperfectice.com | CIN: U74120UP2016PTC075832 ommunication Address - 1501, Tower1, Tropical Lagoon, Anand Nagar, Ghodbunder, Thane(W), Mumbai - 400607 Registered Office: House No. 706, Tower No. 11, Plot No GH-05, Sector 110, Noida, UP 201301 and office At Advisor Described Character Dalli Described 11 CA Office At Atlanta China



# MEMORANDUM OF UNDERSTANDING & AGREEMENT

This Memorandum of Understanding ("MoU") dated 23.10.2023 and effective immediately is signed by and between

Perfectice Eduventure Private Limited, hereby referred to as Perfectice, with its principal place of business at E-45, Sector 3, Noida, 201301. Represented by its Co-founder Dr. Rakesh Kumar Sharma herein referred to as the party of the FIRST PART

**Swami Keshwanand Institute of Technology**, with its principal place of business at, Ram Nagariya Rd, Shivam Nagar, Jagatpura, Jaipur, Rajasthan 302017, Represented by its Group Head of HRD Ms. Suma Hiremath herein referred as the party of the SECOND PART.

WHEREAS, Perfectice is an Education Technology Company incorporated in USA, Perfectice LLC, with an operating legal entity in India as Perfectice Eduventure Private Ltd. The Company is formed with a mission to use technology (data and insight) to help teachers, students, and parents, bring personalized learning to students. The leadership team brings in technology and education expertise and experience from USA and India.

WHEREAS, Swami Keshwanand Institute of Technology's academicians, the highly committed team facilitates all-round development of students to help them acquire the ability of lifelong learning and to make them competent professionals as well as a good human being.

Whereas the parties have decided to enter into a strategic alliance on terms mutually beneficial to them.

PURPOSE: "Outcome-based Education and Employability Index Enhancement Platform" will be used by Swami Keshwanand Institute of Technology, to enhance the Employability of the students & academic unproctored tests, quizzes of all the branches selected by the Management of the Institute in the campus. SWAMI KESHWANAND INSTITUTE OF TECHNOLOGY has an ambitious plan to introduce TECHNOLOGY for education to enhance the student's /teacher's experience, engagement, and outcome. Progressive Universities across the world – USA and India are blending technology with the traditional pedagogy to differentiate and produce a unique outcome/world-class citizen. Perfectice Technology platform is helping institutions across the globe – USA & India, realize that dream.

The platform will also be used by the faculties and potential student's parents/mentors.

The proposal consists of...

- 1. Perfectice Introduction
- 2. Scope of Engagement
- 3. Deliverables
- 4. Duration
- 5. Cost and Payment
- 6. Confidentiality
- 7. Intellectual Property
- 8. Limitation of Liability
- 9. General terms and conditions
- 10. Termination
- 11. Jurisdiction

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#### 1. Perfectice Introduction

Myperfectice is a data-driven online learning & assessment platform. This is an advanced technology platform designed in the USA for Higher Educational Institutes to help Faculties and Students in achieving the goals of OBE by Solving Bloom's 2 sigma problem. The core of the platform is analytics i.e. it uses student's data and insight to help them learn at self-pace as per their learning requirements. The likes of KIIT, LPU, JIS, Kalinga University, SRM Institute of Science and Technology, DY Patil University, Techno group, etc have been trusted partners

The platform has been developed in USA on the latest technology with multiple layers of security to meet the client's requirements. Co-founders of Perfective has combined experience of 50 years in technology, consulting, business, and leadership – USA, India, and China. Perfectice has registered offices in USA and India.

Perfectice was SELECTED by Govt of India, MHRD/AICTE to be one of the 13 (out of 300) EdTech companies as part of the NEAT program to provide a digital learning platform to students across PAN India.

Perfectice was shortlisted by **Scoonews** as One of the Top 50 EdTech disrupters in bringing innovative solutions to learning & that will redefine the education system in India.

## 2. Scope of Engagement

Perfectice scope of work is to provide the technology platform, including the mobile app, for SWAMI KESHWANAND INSTITUTE OF TECHNOLOGY to run the employability enhancement program and Academic practice tests. The platform should consist of,

- A dedicated instance for Swami Keshwanand Institute of Technology
- Cognitive Contents.
- Programming Content
- Domain Module contents
- E-learning contents
- Smart Resume feature
- Mentor-Mentee Feature
- Discussion Forum
- Training Recommendations
- The system should facilitate the faculties to create tests as per their need.
- Virtual classroom feature with AI-based Analytics
- Assessment Module for students to take the practice tests on the mobile app (Android) or mobile browser or web browser.
- The system will monitor the student's activities on the platform and shall provide real-time results
- The system will support a subjective question response where students can take the picture
  of the handwritten response and upload real-time for assignment purposes.
- Ability to support (through chat and application monitor window) student technical issues with Myperfectice team or Swami Keshwanand Institute of Technology's administrators.

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- Compile the result/performance and download it in a specified format to be delivered to Swami Keshwanand Institute of Technology.
- Automate publication of tests, schedule on time, and other reporting to keep a track of the attempt.
- Configuration of the platform to include all the courses code, classroom, users students, faculties, and administrative staff for the smooth functioning of the operations.
- Role-based access-controlled login credentials.
- Orient the students and faculties of SWAMI KESHWANAND INSTITUTE OF TECHNOLOGY
  to use the platform so that they can be properly acquainted with appearing for the
  examinations in the future.
- Condition the platform create a user profile and configure with course code, classroom, and role access for the smooth functioning of the examination.
- Raise invoice to SWAMI KESHWANAND INSTITUTE OF TECHNOLOGY as per the terms and conditions outlined in this agreement.

#### SWAMI KESHWANAND INSTITUTE OF TECHNOLOGY will be responsible for,

- Provide all the user information to Perfectice for credential creation in Perfectice template (desired format).
- Provide all the required information like course details, course code, classroom details, and any other information to configure the platform in the Perfectice format (desired format) using Perfectice template.
- Communication with all the users (students, faculty, and administrators) about the platform.
- Provide all the general (non-technical) and process-related support to the users through a
  command center, except the technical support which will be provided by Perfectice. SWAMI
  KESHWANAND INSTITUTE OF TECHNOLOGYneeds to create an internal support team to
  run the process smoothly.
- Question Paper Uploading, Moderation, and Test Creation in Perfectice platform based on own academic or placement requirements.
- Payment for the product and services to Perfectice as per the condition outlined in this agreement.

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# 3. Myperfectice Deliverables to Swami Keshwanand Institute of Technology

The following are the Deliverables to Swami Keshwanand Institute of Technology.

# Employability Module Offering -

MyPerfectice offers a one-stop solution for all the learning needs of a student. The platform keeps a track of student's proficiency levels and the personalization engine keeps guiding them towards success. The discussion forum and online classroom encourage peer-to-peer learning. The employability index and job profiling recommend him relevant training, project & internship to undertake to acquire niche skills in his area of strength. The virtual classroom provides detailed insight into student's performance and learning gaps to all the stakeholders. Mentor-mentee features help faculties become the coach.

Following are the employability modules, being offered to Swami Keshwanand Institute of Technology by MyPerfectice. The product is owned and operated by MyPerfectice and includes the technology platform with content (questions & elearning material) and limited hours of live training in Cognitive Domain through Webinars. The products are described below in detail-

# 1. Campus Placement Preparedness -

The campus placement preparedness kick start with the conduction of baseline assessment of the students to evaluate their cognitive, coding & core domain skills. It is being followed by student's orientation sessions & rollout of different gamification products to augment the skills of students.

# A. Cognite Game - Level 1 to 4 Gamification to enhance cognitive skills

The product has been designed as per bloom's taxonomy of incremental difficulty level which helps the student to develop a higher form of thinking such as analyzing and evaluating concepts rather than just remembering facts (rote learning) in a guided way. The Student starts the package from the basic level of Level-1 and attains higher Level 4 by solving around 2000+ questions distributed in the quant, verbal and reasoning section.

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## The main features of Cognite Game is:

- Gamification package having 180 tests (2800questions) tagged from Level 1 to 4 with Level 1 being the easiest one & Level 4 being the most difficult one.
- Guided and sequence-based learning to ensure progressive learning & uniform practice effort distribution in the area of quant, verbal & reasoning.
- E-books & Videos to help students to learn anytime and anywhere as per convenience.
- Live Query Resolution through Discussion forum

#### The outcome of Cognite Game:

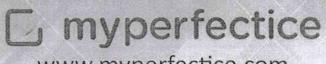
- Minimum Cognitive Skill Growth of students in the range of 20 to 30%
- Average 80 online test attempts in 6 to 8 months with minimum 100 learning hours spent on the platform
- 30% improvement in the Qualification of students in the written round of Campus Placement Drive
  - B. Programming Skills (Novice to Ninja: C&C++ / Java & Python) –

This product is designed to enhance the coding skills of Engineering students in C /C++ , Java & Python through Gamification packages of Novice to Ninja (N2N) by exhausting hands-on coding practice and recommended learning.

# The main features of the Novice to Ninja (N2N) package is:

- Enhancement of the coding skills through exhaustive hands-on coding practice of 1200 +questions in C/C++, Java & Python language.
- Guided and sequence-based learning to ensure progressive learning & uniform practice effort distribution in the language of C/C++, Java & Python.
- Exposure of basic level of Coding (Level 1 ) to Competitive Coding level (Level 3) questions to students.
- E-learning for reference and learning anytime and anywhere by the students.

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#### The outcome of Novice to Ninja (N2N):

- The growth in the Coding Skill of the students happens in the range of 15 to 20%.
- Average 40 online coding test attempts in a duration of 6 months by the students
- 20% improvement in the Qualification of students in the Coding round of Companies

# 2. Personality Assessment - Psychometric Test

Personality test helps to understand student's characteristic trait which helps in better analysis of a student fitment in different domains. Every Organization is including this parameter in its recruitment process to get the best fit for their organization. This parameter helps in increasing the productivity of the students and also it is beneficial for understanding the teaching methods that could be most effective in classes. These would be conducted at the beginning and the end of each semester.

#### 3. Duration

Unless terminated by either party, this MoU shall be valid for a period of **ONE (01)** year from the Effective Date. Either party may terminate this MoU for material breach by giving the other at-least ninety (90) days' notice in writing. Both Parties may terminate this MoU for convenience by giving SWAMI KESHWANAND INSTITUTE OF TECHNOLOGYat-least ninety (90) days' notice in writing.

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# 5.Cost and Payment

The cost of the CORE product is Rs. 2200\* per student per year but a special introductory discounted price we are offering to your esteemed institution. There is no charge for teacher, institute and parents/mentors, it's FREE.

No restriction on the number of attempts - unlimited access and unlimited attempts

Item Description	Unit Cost*	No. of Studen	ts
			Amount
Subscription Fee for 2025 batch Students for Coding and Cognitive	Rs. 450000/- (Four Lacs Fifty Thousand only)	/ Full Strength	12 Months

The subscription fee for students is valid for 12 months whereas the white label is valid for a lifetime.

Late Fee: Failure to pay the invoice on time (30 days from the date of submission) will result in a penalty, a late fee will be 10% of the unpaid invoice amount (past due) calculated every day from the due date, and will be solely incurred by Swami Keshwanand Institute of Technology. However, such late fees shall be claimed by Perfective only after the delay is brought to the notice of Swami Keshwanand Institute of Technology. Perfectice reserves the right to suspend and/or cancel access to the application and in the case of late payments. However, such suspension and/or cancel access to the application shall be resorted by Perfectice only if mutual negotiations/discussions between the parties fail irrevocably.

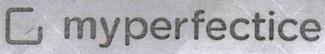
# Payment Schedule

100% Payment will be made at the time of signing the MOU

# 6.Confidentiality

In the course of carrying out the Service undertaken under this Agreement, both the Parties may have access to or may obtain certain information related to each other business activities. The scope of this clause shall apply to all information that both the Parties may have access to in connection with carrying out the Service undertaken under this Agreement. Both the Parties are responsible for compliance with this Agreement by its employees or agents. "Confidential Information" means all information that the Parties, its employees or agents, receive from each other or observe or obtain relating to the Service, facilities, marketing strategies, products, capabilities, financial information, needs, developments, and plans of each other, its affiliates and group companies. Both the Parties will not permit its employees or agents to disclose to any third party or to use for any purpose other than carrying out the Service under this agreement without other's written permission (except as may be required by law or as necessary to carry out the Service. The Parties will hold all Information in trust for this agreement's sole use and benefit. This Clause will not apply to information that is publicly known other than through disclosure by or through the Parties or its employees or agents.

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## 7.Intellectual Property

Perfectice owns the software product, content and the data generated by the application, and SWAMI KESHWANAND INSTITUTE OF TECHNOLOGY will have no right to claim such Intellectual Property. SWAMI KESHWANAND INSTITUTE OF TECHNOLOGY will do not copy or reverse engineer any of the Perfectice Intellectual Property during or after the expiration or termination of the contract. Any Intellectual Property Rights violation will result in immediate termination of the contract.

## 8.Limitation of liability

In any event, shall either party be liable to the other for any loss of profits, loss of revenue, loss of data, loss of use, any indirect, incidental, special, exemplary, punitive, or consequential damages, incurred by either party or any third party in respect of this MOU, whether in an action in contract or tort, strict liability or other legal or equitable theory regardless of whether such damages were foreseeable or if the other party or any other person has been advised of the possibility of such damages.

### 9. General Terms and Conditions

This MoU is not intended to constitute, create, give effect to, or otherwise recognize a joint venture, partnership, or formal business organization of any kind, and the rights and obligations of the parties shall be only those expressly set forth herein.

Nothing in this MoU shall be construed to grant either party the right to make commitments of any kind for or on behalf of the other without the other's prior written consent. At all times contemplated herein, Perfectice and SWAMI KESHWANAND INSTITUTE OF TECHNOLOGYshall remain independent contractors, each responsible for its employees. Each party assumes no responsibility to the other for costs, expenses, risks, and liabilities arising from the efforts of the other.

Neither party shall assign, or in any manner, transfer its interest or any part thereof in this MoU, except to wholly-owned subsidiaries.

Notwithstanding anything to the contrary in this MoU, any Exhibit or Attachment or any other document signed between the Parties regarding the subject matter of this MoU, either prior or after this MoU, in any event, shall either Party be liable for any loss of profits or revenue, or loss or inaccuracy of data or any direct, indirect, incidental, special or consequential damages incurred by the other Party.

The software, all content including but not limited to all packages, questions, tests, eLearning materials, data captured and generated by the software, and anything not exclusively mentioned in the agreement are assets of Perfectice and can't be reproduced and uses in any context without written approval from Perfectice.

#### 10. Termination

a) The term of this Agreement shall commence on the Effective Date and shall continue for 12 months from the Effective Date i.e. Oct 23 until terminated in accordance with the terms of this Agreement.

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- b) Either Party may terminate this Agreement or a Statement of Work:
  - (i) If the other party commits a material breach of this Agreement or such Statement of Work and fails to cure such breach within thirty (30) days of receiving written notice of the breach and intention to terminate
  - (ii) No refund shall be entertained after 3 months of the service

## 11.Jurisdiction

This MOU shall be governed by the laws of India and the jurisdiction of competent courts in Noida , India. The Parties agree to make efforts in good faith to resolve all disputes amicably and expeditiously between themselves and any unresolved matters should be referred expeditiously to mediation to resolve the same.

All and any disputes and claim aforesaid, which cannot be fully and satisfactorily resolved or settled by the parties as aforesaid, shall be referred to a Sole Arbitrator jointly to be appointed by Perfectice and Swami Keshwanand Institute of Technology. The provisions of the Arbitration and Conciliation Act, 1996. [As amended in 2015] will be applicable and the award made thereunder shall be final and binding upon both the parties hereto and subject to legal remedies available under the provision of law. The place of arbitration shall be Bengaluru. The arbitration shall be conducted in English and all written documents used during the arbitration shall be in English.

After both party signatures, this proposal will be deemed contract and both the parties can use their logo for marketing.

IN WITNESS whereof, the Parties below have executed this proposal on 23 10 2023

For and on behalf of Perfectice Eduventure Private Ltd.

Name: Dr. Rakesh Kumar Sharma

Title: Co-founder

Perfectice Eduventure Pvt. Ltd.

For and on behalf of Swami Keshwanand Institute of Technology

Name: Jaipal Meet

Title: Director - SKIT



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## Aon | Swami Keshvanand Institute of Technology, Management & Gramothan | Contract | Engineering

Sparsh Vij <sparsh.vij@aon.com>

To: vineet Jain <vineet@skit.ac.in>, Amber Srivastava <amber@skit.ac.in>

Cc: Shashank Shekhar Mishra <shashank.mishra@aon.com>, Vinay Singh <vinay.singh3@aon.com>

Fri. Oct 27, 2023 at 2:49 PM

Respected Mr. Vineet Jain and Mr. Amber Srivastava,

Greetings from Aon!

This is in reference to our discussions with you regarding the engagement by Swami Keshvanand Institute of Technology, Management & Gramothan of Aon Consulting Private Limited ("Aon"), for availing the Services defined hereinafter. We are bringing a proposal for a better understanding of our solutions. Please send us an email confirmation on the below Scope and Fees.

Scope of Services and Project Plan -

Our scope of services for this Agreement will be limited to CoCubes and will include the following

Teoris St	Offering.	Degree	Student Count	Exclusive Price For Jalpuria
2025	7 DCT's + CoCubes Y-1+ 2 CoCubes Test	Engineering	Complete Batch	INR 1,65,000 + Taxes

<sup>\*</sup>For 2 year of service

#### 2. Timelines

This Agreement shall commence on 25<sup>th</sup> October 2023 (the "Effective Date") and shall remain in effect for a period of 2 Years ("Term"), unless terminated earlier in accordance with the provisions of this Agreement. Any deviation/delay, that impacts the timelines from the project plan and is not attributable to Aon, shall not constitute a delay by Aon.

#### 3. Professional Fees

The total professional fees payable for the scope outlined above will be a consolidated amount of INR 1,65,000 + GST one-time professional fees and on the professional fee to be paid as per the terms/ tranches as mentioned in Payment Terms below.

#### 4. Payment Terms

100% payment is to be paid at the time of signup.

All payments become due immediately from the date of invoice and shall be made to Aon within 30 days from the date of receipt of the invoice without any deduction or set-off, provided that nothing set forth herein shall restrict the Client from deducting taxes at source.

#### 5. Client Details

- a.) Name of the Entity: Swami Keshvanand Institute of Technology, Management & Gramothan
- b.) Invoice Address: Ram Nagariya Rd, Shivam Nagar, Jagatpura, Jaipur, Rajasthan 302017
- c.) Name of Contact Person: SPOC : Mr. Vineet Jain
- d.) Contact Tel. no. and email ld: Phone: 9828655525 Email: vineet@skit.ac.in

#### 6. Project Coordinator details

#### AON

- a.) Name of Contact Person: Sparsh Vij
- b.) Contact Email Id: +91-9958183377 & sparsh.vij@aon.com

#### Client

- c.) Name of Contact Person: Mr. Vineet Jain
- d.) Contact Email Id: vineet@skit.ac.in

#### SECTION-B - GENERAL TERMS AND CONDITIONS OF ENGAGEMENT "GT&Cs"

- 1. These GT&Cs constitute the final understanding between the Client and Aon and supersedes all previous agreements oral or written.
- 2. This Agreement shall be on a "principal to principal" basis.
- 3. The Client shall promptly notify in writing its acceptance to the Aon Project Coordinator, within one week of rendering of the Services or delivery of the deliverables by Aon. In case no such notification is received within one week, it shall be presumed that the Services rendered and deliverables made by Aon are accepted by the Client.
- 4. Aon reserves the right to suspend performance of the Services or any part thereof or terminate this Agreement, if the Clien fails to pay any fees and expenses when due.
- 5. Any change in the Scope of Work will be agreed to by the Parties in writing.

Swami Keshvanand Institute of

6. This Agreement may be terminated for cause by the affected Party if the defect is not cured within six weeks of the winter negrod to cause by the affected Party.

Ramnagaria, Jagatpura, JAIPUR-17

<sup>\*</sup>This price is exclusive of government taxes.

<sup>\*18%</sup> GST Applicable

- Termination of this Agreement shall not affect the rights and obligations of the Parties accrued prior to the effective date of termination. Upon the effective date of termination, the Client shall pay Aon forthwith on demand all fees and expenses due hereunder till the effective date of termination.
- 8. Neither Party will be liable for any indirect, incidental, special or consequential damages, including the loss of profits, revenue, data, or use or cost of procurement of substitute goods, incurred by either Party or any third Party, whether in an action in contract, tort, based on a warranty or otherwise, even if the other Party or any other person has been advised of the possibility of such damages. Aon's liability for damages under this Agreement will not exceed the amounts actually
- 9. Each Party agrees to indemnify the other Party for such claims, suits, losses and damages, including litigation costs, attorney fee and settlement costs (if any), collectively Liabilities) being suffered by the aggrieved Party as a direct consequence of breach of its confidentiality and intellectual property related obligations

#### 10. Ownership and Control of Data and Work Product

#### a. Client Information

Client Information shall include all nonpublic information, data, and materials (in whatever form or media), including personal information of its employees, provided to Aon, under this Agreement, by or on behalf of Client. Subject to Client's payment of relevant fees, Client will own all "Deliverables" which means all material specifically developed for the Client by or on behalf of Aon relating to the services including written advice, letters, and reports. The Client represents that the use of the Client Information contemplated in this Agreement will not infringe the privacy and/ or intellectual property rights of any third party and that the Client has obtained all consents or authorizations of any such third party necessary for such use of Client Information. Client Information will remain the property of the Client, and Aon agrees not to remove any copyright notices from such Client Information or use such Client Information except internally in connection with the corresponding Services.

#### b. Aon information

Aon retains all proprietary rights in the "Aon Information" which means (i) the general knowledge, know-how (including processes, methodologies, ideas, concepts, techniques and other tools that are of generic application to the business of Aon), any skill acquired or developed by Aon in the course of this Agreement and any and all proprietary rights therein and any other documents, information or materials of generic application to Aon's business and derivatives thereof and client by or on behalf of Aon or which is embedded in the Deliverables; (iii) all information and materials which are not Deliverables but which are provided to the and software tools, templates, standard materials and derivatives thereof, through which Aon may perform the services), and all intellectual property rights therein.

#### c. Advice and Exclusive Use

Deliverables will be addressed to the Client and provided for Client's exclusive benefit and use and solely for the purpose for which it is provided. Other than as permitted in this Clause, Client agrees not to distribute or disclose, in whole or in part, any Deliverables and Aon Information to any third party.

Notwithstanding the above, where necessary for the management of Client's affairs Client may pass Deliverables and Aon Information to its group companies or its professional business advisers for information purposes only provided that:

- any such disclosure is made in the normal course of Client's business affairs;
- the Information is disclosed in full and no disclaimers are removed from the Deliverables and Aon Information prior to disclosure; and ii.
- where disclosure is to its group companies, Client agrees to procure that all such recipients accept such Deliverables and Aon Information on the basis that (i) our aggregate liability, collectively, to those recipients and Client, is not greater than Aon's aggregate liability to the Client as set out in this Agreement and (ii) they are subject to an obligation not to disclose such Deliverables and Aon Information to third parties.

#### d. License to Use

To the extent that Aon utilizes any Aon Information, in connection with the performance of Services, such Aon Information shall remain the property of Aon. Except for the limited license expressly granted in the following paragraph, the Client shall acquire no right or interest in such property.

Subject to the provisions of this Agreement, Aon grants to the Client a non-exclusive, non-sub-licensable, non-transferable license to use the Aon Information solely for the Client's internal use. To the extent such license covers Aon Software; such license shall terminate and expire upon the termination or expiration of Aon's for the back-up or archival purposes.

Except as otherwise expressly permitted herein, the Client will not copy Aon Information, except for one copy for the back-up or archival purposes.

#### e. Restrictions

Client will not (i) create derivative works based on, modify, or translate the Aon Information, (ii) sell, assign, distribute, lease, market, rent, sublicense, transfer, or otherwise grant rights to the Aon Information in whole or in part to any third party; (iii) obfuscate, remove or alter any of the internet links or copyright or other proprietary legends that are in the Aon Information or that are displayed on pages served by the Aon Information, (iv) reverse engineer, decompile or disassemble Aon Software or any part thereof or otherwise obtain or attempt to obtain the source code for Aon Software.

#### f. Ownership or proprietary rights

This Agreement does not grant or otherwise give either Party ownership in or other proprietary rights to use the other Party's trademarks and other intellectual property, except as explicitly authorized for herein.

#### 11. Confidentiality

a. For the purposes of this Agreement, "Confidential Information" includes: (i) the terms of this Agreement; (ii) Client Information; (iii) Aon Information; (iv) oral and written information designated by a Party as confidential prior to the other Party obtaining access thereto; and (v) oral and written information which should reasonably be deemed confidential by the recipient whether or not such information is designated as confidential. Each Party's respective Confidential Information will remain its sole and exclusive property.

b. No Party will disclose the other Party's Confidential Information to a third party without the prior written consent of the other Party, except to their employees who have a need to know the Confidential Information of the other Party (and in case of Aon, any affiliate or third party service providing back office/IT support). Aon may use Client's Confidential Information in combination with other data for statistical or analytical purposes provided that no such Client Confidential Information is identifiable by the Client or the Client employee and either Party may disclose the other Party's Confidential Information to its legal counsel and auditors. Aon may also disclose Client's Confidential Information to any subcontractor or to any other third party, as instructed by the Client, providing services to the Client in connection with this Agreement as reasonably necessary for such subcontractor or third party to perform its services, provided that any such subcontractor is subject to a confidentiality agreement. The confidentiality obligations set out in this Agreement will continue in full force for a period of 3

years from the Execution Date.

c. If so requested by the disclosing Party and subject to the provisions of this Agreement, the receiving Party will promptly destroy or cause to be destroyed, or return or cause to be returned to the disclosing Party, all Confidential Information received from or on behalf of the disclosing Party. Either party may retain a Confidential Information as required by any law or regulation, their record retention policy, or to defend its work product provided that such technically impossible to expunge any Confidential Information from the receiving Party's IT systems, such residual Confidential Information will continue to be subject to the confidentiality obligations set out in this Agreement.

- d. Confidential Information does not include information if and to the extent such information: (i) is or becomes generally available or known to the public through no fault of the receiving Party; (ii) was already known by or available to the receiving Party prior to the disclosure by the disclosing Party; (iii) is subsequently to be disclosed to the receiving Party by a third party who is not under any obligation of confidentiality to the Party who disclosed the information; (iv) is required by law independently acquired or developed by the receiving Party without violating any confidentiality agreement with or other obligation to the Party who disclosed the information; (iv) is required by law independently acquired or developed by the receiving Party without violating any confidentiality agreement with or other obligation to the Party who disclosed the
- information.

  e. If the receiving Party is required to disclose the Confidential Information of the disclosing Party as part of a judicial process, government investigation, legal proceeding, or other similar process, the receiving Party will give prior written notice of such requirement to the disclosing Party.

  f. Aon and the Client shall comply at all times with any and all applicable laws relating to personal data protection and any and all legal conditions that must be satisfied in relation to the collection, transfer, processing, storage, and destruction of personal information. Client agrees that Aon may transfer these documents, the internal part of this Agreement. physically or electronically, to its personnel and affiliates in India or overseas in connection with the performance of this Agreement
- 12. Both Parties will comply with all applicable laws, rules, orders, statutes, and regulations.
- 13. Parties agree that during the term of this Agreement and for a period of 12 months after the expiry or termination of this Agreement, neither Party will induce or attempt to influence, directly or indirectly, any employee of the other Party or its contractors to terminate his/her employment and work for such Party dramy outer of

echnology Management & Gramothan Ramnagaria, Jagatpura, JAIPUR-17

person. Nothing herein shall prevent either Party from hiring an employee of the other Party who responds to an advertisement (through mass media) for employment

- 14. This Agreement will be governed by and construed in accordance with the laws of India. Each Party agrees to submit itself to the exclusive jurisdiction of the courts of New Delhi.
- 15. In the event of disputes, claims arising out of or in connection with this Agreement or in any way relating hereto or any term, condition or provision herein mentioned or the construction or interpretation thereof the same shall be governed by the Indian Arbitration and Conciliation Act 1996. The Tribunal shall consist of a of arbitration will be borne by the Party as directed in the arbitration award.
- 16. This Agreement, (i) embodies the final, complete and exclusive understanding between the Parties with respect to its subject matter; (ii) replaces and supersedes all previous oral or written agreements, understandings or arrangements between the Parties; (iii) may be signed in counterparts, each of which will be an original and acknowledge and agree that any pre-printed terms on any transactional or other document used in connection herewith are per se null and void and of no force or

Warm Regards,

Sparsh Vij

Senior Manager- Education and Strategic Partnerships

North India

m +91 99581 83377

www.aon.com

Aon

Building No.2, 9-11th Floor Candor,

Gurugram 1 Reality Project Pvt. Ltd. Villag Tikri,

Sector - 48, Gurugram, India - 122001

PL.

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Swami Keshvanand Institute of Technology Management & Gramothan Pamnagaria, Jagatpura, JAIPUR-17



### **JAIPUR CENTRE**

#### M/s. COMPREP LLP

(Licensee of Advanced Educational Activities Pvt. Ltd.)

# Memorandum of Understanding

This MOU is hereby signed on 2nd September, 2023 between T.I.M.E. (Comprep LLP) Jaipur and SKIT Jaipur regarding conduct of CRT (Campus Recruitment Training) classes at SKIT college campus.

- 1. T.I.M.E. will conduct CRT full-length module with students of B.Tech. 3rd year.
- 2. T.I.M.E will provide following CRT COURSE STRUCTURE (starting from Sept,2023):
- 60 hours of aptitude training (56 hours of teaching and 4 hours of testing) in phase-I covering various questions asked in Aptitude Tests of companies, specially IT companies, to be done section-wise @ 2 hours a day spread over 6th Semester; 6 hours of doubt-solving and feedback sessions; and 24 hours (16 hours of teaching and 8 hours of testing) in phase-II in VII semester as a refresher to be done in 2-3 groups.
- Comprehensive study material consisting of Books and handouts.
- Experienced faculty members to impart the best classroom inputs.
- Paper-based Comprehensive Tests, 20 online Mock Tests Based on TCS, Infosys etc for online practice along with some sectional tests.
- Guidance about the selection processes followed by various companies to ensure focus. Additional web-based support through user name and password to be provided by T.I.M.E. (profiles of major companies, IT & ITES Industry updates, GD topics and interview questions for practice, etc.)
- 3. Faculty members will come to SKIT and expenses will be borne by T.I.M.E. Jaipur.
- 4. Necessary tools for teaching (whiteboard, marker, projector) will be provided by SKIT.
- 5. SKIT will arrange basic requirements viz tea, water and suitable rest space for faculty visiting the campus for taking classes.
- 6. SKIT will inform necessary changes in schedule well in advance (a week before). In case of any cancellation of class same should be communicated by SKIT timely.
- 7. SKIT will provide Academic Calendar, Holiday list to T.I.M.E.
- 8. Number of batches 11 of approx 60 students each, within college timing between 8 AM to 2:30 PM.
- 9. The total lumpsum cost of entire training module for above students will be Rs. 30,00,000/- (Rupees Thirty Lakhs Only), inclusive of GST. If number of students exceed this number but number of batches remain the same i.e. 11, then Study Material charges @ Rs 500 + GST will be billed for the additional number of students.

10, 25% payment to be made in advance at the beginning of the course, 25% in Nov'23, 25% in Jan'24 and balance 25% on course completion. Cheques to be issued in favour of Comprep LLP.

For T.I.M.E. Jaiou

Centre Director

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Swami Keshvanand Institute of Technology Management & Gramothan

tunnagaria, Jagatpi

Civil Lines: Mob: 7230810003 | JLN Marg: Mob: 8094411666 | Vaishali Nagar: Mob: Tel: 7232893893

Vidyadhar Nagar: Mob: 0141-4359303

website: www.time4education.com e-mail: jaipur@time4education.com

Head Office: 95B, 2- Floor, Siddamsetty Complex, Park Lane, Secunderabad - 500 003. Tel: 40088300/400



# **Memorandum of Understanding**

This MOU is hereby signed on 8th April, 2024 between IMS (Karpan) and SKIT Jaipur regarding conduct of CRT (Campus Recruitment Training) classes at SKIT college campus.

- 1. IMS will conduct CRT full-length module with students of B.Tech. 3rd year (Branch-ME, CE, EE).
- 2. CRT COURSE STRUCTURE (starting from 20th Nov, 2023) as below:
  - 100 hours of Offline/Online classes
  - 4 Practical Workshops on new-Age Technical Skills
  - 75 sectional tests
  - 50 Company-specific full-length tests
  - GDPI sessions & 2 online HR interviews 30+hrs of Concept Videos
  - Comprehensive study material consisting of E-Books/Hard Books and handouts.
  - Experienced faculty members to impart the best inputs.
- 3. 4 Batches at a cost of Rs.210000/- per batch (all inclusive) i.e. Total Rs. 8, 40,000/-
- 4. In second round of revision, Faculty members will come to SKIT (if state government permits) and expenses will be borne by IMS Jaipur.
- 5. Necessary tools for teaching will be provided by SKIT.
- 6. SKIT will arrange basic requirements viz tea, water and suitable rest space for faculty visiting the campus for taking classes in second phase.
- 7. SKIT will inform necessary changes in schedule well in advance (a week before). In case of any cancellation of class same should be communicated by SKIT timely.
- 8. SKIT will provide Academic Calendar, Holiday list to IMS.
- 9. Payment Terms: 50% Advance, 50% after course completion.
- \*\*Cheque to be issued in favor of Karpan.

For Karpan

Centre Director

For SKIT

Registrar

PRINCIPAL

Address: 514, Fourth Floor, Apex Mall, Lalkothi Jaipur-302015 echnology Management & Gramothan Tel: - 0141-4040522/622 (M) 7737129169, 7737660307

E-Mail ID: - karpanjp@gmail.com



# Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur

Department of Electronics & Communication Engineering

Session 2023-24 Odd SEM

Wef 18-323 SECA

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Timetable generated, 9/13/2023

CA - Computer Architecture
CRT 1- EC-A - CRT 1- EC-A
CRT 2- EC-A - CRT 2- EC-A
CS - Control System
DSP Lab - Digital Signal Processing
K DSP - Digital Signal Processing
ES - Embedded System
EW - Electro Magnetic Wave
GATE - Gate Class
Gate Class 1 - Gate Class 1

Swami Keshvanand Institage. Gr. Pallav Rathis Swami Lord Policy Cr. Pooja Choudhary P. Dr. Vikas Pathak anology Management of the Parks Parks Swami Reshvanand Institage. Gr. Pallav Rawal Technology Management & Gramothan Pamnagaria, Jagatpura, JAIPUR-17

Gate Class 2 - Gate Class 2
Gate Class V sem - Gate Class
1T-5EC - Industrial Training- SEC
Library - Library - Therowave Theory Techniques
MIY Lab - Microwave Lab Project Lab - Project Lab RFS Lab - RF Simulation Lab WA - Wed Activity

Moder. (HoD, ECE)

	CRT S	udent List
S.No.	Roll No.	Name
1	21ESKEC001	Aakash Yadav
2	21ESKEC002	Aarohi Malsaria
3	21ESKEC003	Abhay Raj Shukla
4	21ESKEC004	Abhijeet Agarwal
5	21ESKEC005	Abhijeet Giri
6	21ESKEC007	Abhishek Kumar
7	21ESKEC008	Aditya Rawat
8	21ESKEC012	Ameen Zehra
9	21ESKEC013	Anmol Gupta
10	21ESKEC014	Anupam Jain
11	21ESKEC015	Arsh Lakhwal
12	21ESKEC016	Aryan Birla
13	21ESKEC017	Aryan Sharma
14	21ESKEC019	Bhavesh Agarwal
15	21ESKEC020	Chirag Gurnani
16	21ESKEC021	Deepanshu Khandelwal
17	21ESKEC022	Devang Joshi
18	21ESKEC023	Dishika Sharma
19	21ESKEC024 21ESKEC026	Diya Sharma
1910911		Hardik Sharma
21	21ESKEC027	Himanshu Agarwal
23	21ESKEC030 21ESKEC031	Jai Kumar Bisaria Jai Prakash Anand
24		ACCOUNT OF A CONTRACT OF THE PARTY OF THE PA
25	21ESKEC033 21ESKEC034	Karan Sharma Karishma Kumawat
26	21ESKEC034	Khushi Rajawat
27	21ESKEC038	Lovesh Chhabra
28	21ESKEC039	Manav Singh
29	21ESKEC040	Mohit Ramnani
30	21ESKEC041	Naman Tak
31	21ESKEC042	Nandani Khandelwal
32	21ESKEC043	Navneet Kaur
33	21ESKEC046	Omisha Pareek
34	21ESKEC047	Piyush Yadav
35	21ESKEC049	Rahul Kumawat
36	21ESKEC050	Raj Tiwari
37	21ESKEC051	Ravi Kumar
38	21ESKEC052	Rohan Raj
39	21ESKEC054	Ruchi Singh
40	21ESKEC056	Sanyam Bhura
41	21ESKEC057	Satvik Priyadarshi
42	21ESKEC058	Satyam Singh Sengar
43	21ESKEC059	Saurabh Mishra
44	21ESKEC060	Saxam Dixit
45	21ESKEC061	Shailendra Rathore
46	21ESKEC062	Shivansh Agarwal
47	21ESKEC063	Shivin Shyam Kasat
48	21ESKEC064	Shreya Jha
49	21ESKEC065	Siddharth Meena
50	21ESKEC066	Snehal Jain
51	21ESKEC068	Tariq Abdul Ghani
52	21ESKEC069	Ujjawal Sharma
53	21ESKEC070	Vanshaj Kataria
54	21ESKEC071	Varun Mathur
55	21ESKEC072	Vibhansh Jain
56	21ESKEC073	Vijay Jangid
57	21ESKEC074	Vikram Pal
58	21ESKEC075	Vishal Kumar
59	21ESKEC300	Jatin Bhagtani
60	21ESKEC301	Nitin Nagar
61	22ESKEC200	Arooja Hassan

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#### CHAPTER - 1

# NUMBERS AND NUMBER SYSTEMS

#### Addition

is the process of finding out single number or fraction equal to two or more quantities taken together.

#### Subtraction

is the process of finding out the quantity left when a smaller quantity (number/fraction) is reduced from a larger one.

#### Multiplication

signifies repeated addition. If a number has to be repeatedly added then that number is <u>Multiplicand</u>. The number of times the addition is to be done is <u>Multiplier</u>. The sum of repetition is <u>Product</u>. For example, in the <u>multiplication</u>  $3 \times 4 = 12$ , 3 is Multiplicand, 4 is <u>Multiplier</u> and 12 is Product.

#### Division

is a reversal of multiplication. In this we find how often a given number called

<u>Divisor</u> is contained in another given number called <u>Dividend</u>. The number expressing this is called the <u>Quotient</u> and the excess of the dividend over the product of the divisor and the quotient is called <u>Remainder</u>.

For example, in the division 32/5, 32 is Dividend, 5 is Divisor, 6 is Quotient and 2 is Remainder.

The same operations are performed in Algebra also. Algebra treats quantities as in Arithmetic but, with greater generality, for while the quantities used in arithmetical processes are denoted by figures which have single definite value, algebraic quantities are denoted by symbols which may have any value we choose to assign to them.

#### Certain rules to be remembered in Algebraic operations:

- (i) The sum of a number of like terms is a like term (like terms are the terms which differ only in their numerical components).
- (ii) If the terms are not all the same sign, add together separately the coefficient of positive terms and the coefficient of all the negative terms. The difference of these two results preceded by the sign of the greater will give the coefficient of sum required.
   2a²b 7a²b + 4a²b + 5a²b 3a²b
   = a²b(2 + 4 + 5) a²b(7 + 3)
   = 11a²b 10a²b = a²b
- (iii) When expression within the brackets is preceded by the sign "+", the sign of every term within the bracket remains unaltered even if the bracket is removed. However, if the bracket is preceded by the sign "-" the bracket may be removed if the sign of every item within bracket is changed.

$$a + (b - c + d) = a + b - c + d;$$
  
 $a - (b - c + d) = a - b + c - d$ 

#### Rule of Signs

The product of two terms with like signs is positive; the product of two terms with unlike signs is negative.

Example:  $-1 \times -1 = +1$ ;  $+1 \times -1 = -1$ ;  $+1 \times +1 = +1$ ;  $-1 \times +1 = -1$ :

#### Rule of Simplification:

In simplifying an expression various operations must be performed as per the following order.

V → Vinculum

B → Remove Brackets - in the order (), {}, []

O -> Of

D → Division

M → Multiplication

A → Addition

S → Subtraction

While performing mathematical operations on numbers speed is very important. Given unlimited time all problems can be solved. To develop the speed it is necessary to know certain simple guidelines. The basis for such rules is the assumption that the student is comfortable and fast in

(a) additions than in Multiplication

(b) multiplying by smaller numbers than bigger numbers.

(c) dividing by a small number than Multiplying by big numbers.

You have to know by heart Multiplication Tables up to 20 and Squares of numbers upto 25.

Some easy methods described below:

Multiplication by a number close to 10, 100, 1000, etc.
 For e.g. 9 = 10 - 1; 101 = 100 + 1;
 To multiply with such numbers, convert the number into (10 ± k), k = 1,2,3 and perform the operation.

#### Examples:

- 1.  $175 \times 12 = 175 \times (10 + 2) = 175 \times 10 + 175 \times 2$ = 1750 + 350 = 2100
- 2.  $46 \times 98 = 46(100 2) = (46 \times 100) (46 \times 2)$ = 4600 - 92 = 4508
- 3. 13456 × 9899 = (13456 × 10000) (13456 × 101) = 13456 × 10000 - 13456 (100 + 1) = 133200944
- (ii) Multiplication by 5 or powers of 5 can be simplified into multiplication by 10 and its powers and dividing by 2 and its powers. i.e.  $5^k = (10/2)^k$  PRINCIPAL

#### Examples:

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- 1. 68 × 5 = (68 × 10)/2 = 680/2 1340 ia, Jagatpura, JAIPUR-17
- 2.  $2345 \times 125 = 2345 (10/2)^3 = 2345000/8$  or 2345 (100 + 100/4)

Triumphant Institute of Management Education Pvt. Ltd. (T.I.M.E.) HO: 95B, 2<sup>nd</sup> Floor, Siddamsetty Complex, Secunderabad – 500 003.

Tel: 040-27898195 Fax: 040-27847334 email: info@time4education.com website: www.time4education.com

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#### CHAPTER - 1

# NUMBER AND LETTER SERIES, ANALOGIES. ODD MAN OUT, CODING-DECODING

#### Number and Letter Series:

Number and Letter Series form an important part of the Reasoning section in various competitive examinations.

In this category of questions, a series of numbers/letters is given with one number/letter (or two numbers/letters) missing, represented by a blank or a question mark. The given series of numbers/letters will be such that each one follows its predecessor in a certain way, i.e., according to a definite pattern. Students are required to find out the way in which the series is formed and hence work out the missing number/numbers or letter/letters to complete the series. Under this type of guestions there are a large variety of patterns that are possible and the student requires a proper understanding of various patterns to be able to do well in these types of questions.

#### Number Series

For better understanding, we will classify this into the following broad categories.

- Difference series
- 2. Product series
- Squares/Cubes series
- Miscellaneous series
- Combination series

#### Difference Series:

The difference series can be further classified as follows.

- (a) Number series with a constant difference.
- (b) Number series with an increasing or decreasing difference.

In the number series with a constant difference, there is always a constant difference between two consecutive. numbers. For example, the numbers of the series 1, 4, 7, 10, 13, .... are such that any number is obtained by adding a constant figure of 3 to the preceding term of the series.

If we have to find the next number in the above series, we need to add a 3 to the last term 13. Thus, 16 is the next term of the series.

Under the series with constant difference, we can have series of odd numbers or series of even numbers also.

In the series with increasing/decreasing difference, the difference between consecutive terms keeps increasing (or decreasing, as the case may be). For example, let us try to find out the next number in the series 2, 3, 5, 8, 12, 17, 23, .....

Here, the difference between the first two terms of the series is 1, the difference between the second and third terms is 2; the difference between the third and the fourth terms is 3 and so on. That is, the difference between any pair of consecutive terms is one more than the difference between the first number of this pair and

the number immediately preceding this number. Here, since the difference between 17 and 23 is 6, the next difference should be 7. So, the number that comes after 23 should be (23 + 7) = 30.

We can also have a number series where the difference is in decreasing order (unlike in the previous example where the difference is increasing). For example, let us find out the next term of the series 10, 15, 19, 22, 24, ....

Here the differences between 1st & 2nd, 2nd & 3rd, 3rd & 4th numbers, etc. are 5, 4, 3, 2, and so on. Since the difference between 22 and 24 is 2, the next difference should be 1. So, the number that comes after 24 should be 25.

#### **Product Series:**

A product series is usually a number series where the terms are obtained by a process of multiplication. Here also, there can be different types of series. We will look at these through examples.

Consider the series 2, 4, 8, 16, 32, 64, .....

Here, each number in the series is multiplied by 2 to get the next term. So, the term that comes after 64 is 128. So, each term is multiplied by a fixed number to get the next term. Similarly we can have a series where we have numbers obtained by dividing the previous term with a constant number. For example, in the series 64, 32, 16, 8, ...., each number is obtained by dividing the previous number by 2 (or in other words, by multiplying the previous term by 1/2). So, here, the next term will be 4 (obtained by dividing 8 with 2).

Consider the series 4, 20, 80, 240, .....

PRINCIPAL 20, 80, 240 Swami Keshvanand Institute of Technology Management & Gramothan Ramnagaria, Jagatpura, JAIPUR-17

Here, the first term is multiplied by 5 to get the second term; the second term is multiplied by 4 to get the third term; the third term is multiplied by 3 to get the fourth term. Hence, to get the fifth term, we have to multiply the fourth term by 2, i.e., the fifth term is 480. So, each term is multiplied by a decreasing factor (or it could also be an increasing factor) to get the next term. That is, with whatever number a particular term is multiplied to get the next term, this latest term is multiplied by a number different from the previous multiplying factor to get the next term of the series. All the multiplying factors

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#### Exercise - 1

Directions for questions 1 to 50: In each of the following questions, a capitalised pair of words is given followed by five numbered pairs of words. Select from choices the pair which exhibits the same relationship as the capitalised pair of words and mark its number as your answer.

WOI	as and mark its number as your answer.	
1.	ROAD: FOOT PATH  (1) drawing room: kitchen (2) river: riverbank (3) box: lock (4) window: shutter	16. URBAN: CITY (1) rustic: suburb (3) absolete: trendy (4) global: world
2.	CARPENTER : CHISEL (1) teacher : book (2) mason : cement (3) seamstress : needle (4) banker : money	17. CANVAS : ARTIST (1) verse : poet (3) rock : sculptor (4) lyrics : musician
3.	SUN: SUNLIGHT (1) moon: moonlight (2) bee-hive: bees (3) tap: water (4) flower: fragrance	18. SOLDIER : REGIMENT (1) clown : circus (2) performer : troupe (3) dancer : ballet (4) musician : instrument
4.	THERMOMETER: TEMPERATURE  (1) hygrometer: humidity  (2) voltmeter: electricity  (3) fathometer: surface tension  (4) dynamometer: revolution	19. PACHYDERM : ELEPHANT  (1) reptile : squirrel (3) simian : monkey  (4) guard : dog  20. MOON : SATELLITE
5.	HORSE: RIDING (1) car: speeding (3) boat: fishing (4) skate: dancing	(1) star: constellation (2) earth: planet (3) sun: universe (4) sky: dispersion  21. MODESTY: BRAGGART
6.	MINUTE: HOUR (1) ocean: drop (2) people: crowd	(1) humility : orator (2) innocence : puritan (3) kindness : butcher (4) showiness : actor
7.	(3) child : children (4) paise : rupee.  ERUDITE : ILLITERATE	22. BREAD : OVEN (1) ceramics : kiln (3) pottery : hearth (4) iron : furnace
	(1) romantic : realistic (2) lazy : idle (3) resentful : angry (4) employed : selected	23. NUMERATOR : DENOMINATOR (1) fraction : decimal (2) divisor : quotient
8.	CUBE : DICE (1) paper : thin (2) sphere : sun (3) mountain : height (4) glass : transparent	(3) multiple : multiplier (4) dividend : divisor  24. WATER : CONDUIT
9.	HERBS : MEDICINE (1) timber : furniture (2) sound : radio	(1) electricity : magnet (2) elevator : shaft (3) shell : rifle (4) noise : cannon
10.	(3) time : second (4) juice : orange  COLT : MARE	25. ORNITHOLOGIST : BIRDS (1) etymologist : fish (2) archaeologist : artefacts
	(1) state : nation (2) boat : ship (3) hen : chick (4) prince : queen	<ul><li>(3) cardiologist : liver</li><li>(4) architect : buildings</li></ul>
11.	CYGNET: SWAN  (1) egg: hen (2) goose: gander  (3) cub: lion (4) flower: bud	26. LANGUAGE : GRAMMAR  (1) mathematics : number  (2) zoology : plants  (3) music : songs
12.	FLOWER: INFLORESCENCE  (1) light: incandescence (2) fragrance: malodour  (3) plant: soil (4) bud: bloom	(4) medicine : herbs  27. NOVEL : AUTHOR
13.	SOUP : APPETIZER (1) coffee : bean (2) pudding : dessert	(1) ideas : brain (2) clouds : ocean (3) confectionary : baker (4) money : banker
14	(3) breakfast : cereal (4) tea : coffee  SLEEP : INSOMNIA	28. WARM : HOT  (1) cold : temperate (2) sob : fret  (3) smile : weep (4) glance : stare
15	(1) memory : amnesia (2) vitamin : deficiency (3) malady : sickness (4) virus : influenza PEDAGOGUE : TEACH	29. NEWSPAPER : JOURNALISM (1) currency : economics PRINCIPAL (2) land : acquisition
X The same		(2) land : acquisition Swami Keshvanand In-

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(2) priest : convert

(4) driver: navigate

(3) paper: formatting

(4) loan: employee

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(1) student : practice

(3) counsellor: advice

#### CHAPTER - 1

## **FUNCTIONS AND GRAPHS**

A relation f which associates each element of a set A to exactly one element of set B is called a function from A to B and is denoted as f: A → B (read as f maps A into B)

If  $(a, b) \in f$ , then 'b' is called the image of 'a' under f and is written as b = f(a). 'a' is called the preimage of b.

If f:  $A \rightarrow B$ , then A is called the domain of f and B is called the co-domain of f and the set  $R = \{f(a)/a \in A\}$  is called the range of f. The range of f is also called the image of f and is denoted by Im(f) or f(A).

Note:

- (1) Range ⊆ co-domain.
- (2) f ⊆ A × B.
- (3) Every element of A has a unique f-image in B.
- (4) Two or more elements of A can have the same f-image in B.
- (5) There may be elements in B which are not f-images of any element of A.
- (6) Number of functions from a set A containing m elements to another set B containing n elements is n<sup>m</sup>.

#### One-to-One Function (Injection):

A mapping f: A  $\rightarrow$  B is called as one-to-one function if distinct elements of A have distinct images in B. i.e., f: A  $\rightarrow$  B is one-one if  $x_1 \neq x_2 \Rightarrow f(x_1) \neq f(x_2)$ ,

Equivalently  $f(x_1) = f(x_2) \Rightarrow x_1 = x_2$ .

If f: A  $\rightarrow$  B is a one-one function, then  $n(A) \le n(B)$  and number of one – one functions defined from A to B =  $n(B)P_{n(A)}$ .

#### Many-One Function:

A function which is not one-one is called many-one function.

#### Onto Function (Surjection):

A function  $f: A \to B$  is called an onto function if every element of B is an image of at least one element of A i.e.,  $f: A \to B$  is onto if for each  $y \in B$ , there exists at least one value of x with  $x \in A$  such that f(x) = y

Note 1: If f is onto, range of f = co-domain of f.

Note 2: If  $f: A \to B$  is onto, then  $n(A) \ge n(B)$ .

**Note 3:** If n(A) = p; n(B) = 2 then number of onto functions defined from A to B is  $2^p - 2$ .

#### Into Function:

A function which is not onto is called an into function i.e.,  $f: A \rightarrow B$  is into, if range is a proper subset of co-domain.

#### Bijection:

If a function is both one-to-one and onto, then it is called a bijective function or bijection.

If f:  $A \rightarrow B$  is bijective, n(A) = n(B), and number of bijective functions = n!

#### Constant Function:

A function  $f: A \to B$  is said to be a constant function, if f(x) = k, a constant for all  $x \in A$ , where k is a fixed element of B. **Note:** Range of  $f = \{k\}$ 

#### Identity Function:

If A is a non-empty set, the function  $f: A \rightarrow A$ , defined by f(x) = x is called the identity function on A. It is denoted by  $I_A$ .

**Note:** (1) For identity function, Range = Domain. Symbolically,  $I_A(x) = x$ , for  $x \in A$ .

(2) Identity function is a bijection.

#### Inverse Function:

If  $f: A \to B$  is a bijective function, then the function  $f^{-1}: B \to A$ , where  $f^{-1} = \{(b, a)/(a, b) \in f\}$  is called the inverse of the function f.

Note: (1) If f: A → B is bijective, f⁻¹: B → A is also bijective.

(2) If f(a) = b, then  $a = f^{-1}(b)$ .

#### Composite Function or Product Function:

If f:  $A \to B$  and g:  $B \to C$  are two functions, then g o f is a function from A to C, such that g o f(a) = g[f(a)], for every  $a \in A$  and is called the composite mapping of f and g.

Note: (1) If  $f: A \to B$  and  $g: B \to C$  are two functions then,

- (a) f and g are injective ⇒ g o f is injective
- (b) f and g are surjective ⇒ g o f is surjective
- (c) f and g are bijective ⇒ g o f is bijective
- (2) Suppose f: A → A is injective. If A is finite, then f is bijective and if A is infinite, then this is not true.
- (3) If f: A  $\rightarrow$  B and g: B  $\rightarrow$  C are two bijective functions, then (g o f)<sup>-1</sup> = f<sup>-1</sup> o g<sup>-1</sup>.
- (4) If f: A  $\rightarrow$  B is bijective then f<sup>-1</sup> o f = I<sub>A</sub> and f o f<sup>-1</sup> = I<sub>B</sub>
- (5) If f: A → B and g: B → A are two functions such that g o f = I<sub>A</sub> and f o g = I<sub>B</sub>, then g = f<sup>-1</sup>.
- (6) If h: A → B, g: B → C and f: C → D be any three functions, then f o (g o h) = (f o g) o h.
- (7)  $(f \circ f^{-1})(x) = x \circ f \circ f^{-1} = I$ .

#### Real Function:

A function  $f: A \rightarrow R$  which maps a set A to real number set R is called a real valued function.

#### Operations on Real-Valued Functions:

If f:  $D_1 \to R$  and g:  $D_2 \to R$  and  $D = D_1 \cap D_2$ , then we can define

(a)  $f \pm g : D \rightarrow R$  such that for all  $x \in D$ ,

(f  $\pm$  g)(x) = f(x)  $\pm$  g(x) (b) f g : D  $\rightarrow$  R such that for all x  $\in$  D, PRINCIPAL (fg)(x) = f(x) . g(x) Swami Keshvanand Institute of

(c)  $f/g: D \to R$  such that for all  $x \in D$  Management & Gramothan f/g(x) = f(x)/g(x), provided  $g(x) \neq 0$ 

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