

Swami Keshvanand Institute of Technology, Management & Gramothan

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Sample Assignment Sheets Session: 2023-24

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Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur

Assignment-I

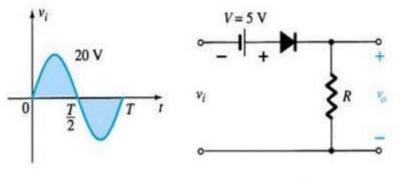
B.Tech. / Semester: II/III	Branch: ECE
Subject: Electronic Devices	Subject Code: 3EC4-07
Date of submission: 4/10/2023	MM: 10

Part A

- 1. Define mobility and conductivity of semiconductors.
- 2. What are Degenerate and non-degenerate semiconductors.
- 3. What is mass action law? Also write Einstein relation.
- 4. Why is silicon preferred over germanium in the manufacturing of semiconductor devices?
- 5. State continuity equation and write its expression.
- 6. What is Poisson's equation?
- 7. Define drift current and diffusion current.
- 8. Discuss the effect of temperature on conductivity of a semiconductor.
- 9. Differentiate between insulator, metal and semiconductor according to the energy band diagrams.
- 10. Differentiate between Direct and Indirect band gap semiconductors.

Part B

1. V_i is applied to the circuit with ideal diodes, as shown in the figure. Draw the output (V_o)waveform of the circuit.



- 2. Find the density of impurity atom that must be added to an intrinsic silicon crystal in order to convert it to
 - a) P type silicon of resistivity 100 ohm-cm.
 - b) N type silicon of resistivity 20 ohm-cm.

Also calculate the concentration of minority carriers in each case. Given $\mu e = 1350$ cm²/V-sec, $\mu_h = 450$ cm²/V-sec, $n = 1.5 \times 10^{10}$ cm⁻³

- 3. What is Hall effect? Describe with the suitable diagram.
- 4. Explain avalanche and zener breakdown?



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Assignment-I

B.Tech. / Semester: II/III	Branch: ECE
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5. The electron concentration in a sample of uniformly doped n – type silicon at 300^{0} K varies linearly from $10^{17}/cm3$ at x = 0 to $6 \times 10^{16}/cm3$ at $x = 2\mu m$. Assume a situation that electrons are supplied to keep this concentration gradient constant with time. If electronic charge is 1.6×10^{-19} coulomb and the diffusion constant $D_n = 35 \ cm^2/S$. Find the current density in the silicon, if no electric field is present.

Part C

- 1. Discuss Thermistors and Sensistors with their applications
- 2. Define Generation and recombination rate of charge carriers in semiconductor and derive continuity equation.
- 3. Derive expression for total current density in semiconductors.
- 4. Find the resistivity of intrinsic silicon and when it is doped with a pentavalent impurity of one atom for each 60 million Si atoms. Given: No of Si atoms = $4.5*10^{28}$ m⁻³, intrinsic concentration ni= $1.5*10^{16}$ m⁻³. $\mu e = 0.135$ m²/v-sec, $\mu_h = 0.048$ m²/v-sec,





Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur

B.Tech. / Semester: II/III Subject: Electronic Devices Date of submission: 25/11/2023

Branch: ECE Subject Code: 3EC4-07 MM: 10

Part A

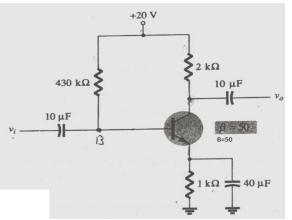
- 1. What is the working principle of photo diode?
- 2. Write the characteristic equation of a semiconductor diode and give the name of all the parameters used in equation.

Assignment-II

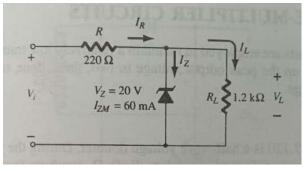
- 3. What is thermal runaway and how can we avoid it?
- 4. Explain the need of biasing in BJT?
- 5. Distinguish between wet and dry etching.
- 6. How FET differs from BJT?
- 7. What is photolithography?
- 8. A diode current is 0.6 mA when applied voltage is 400mV and 20mA when applied voltage is 500mV. Find η . Assume V_T = 26mV.
- 9. Differentiate between enhancement & Depletion type MOSFET.
- 10. Draw the input and output characteristics of common base configuration of BJT.

Part B

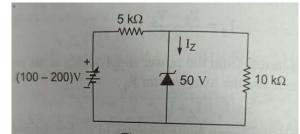
1. For the network given below If β =50, V_{BE}= 0.7V, Determine I_B, I_C, V_{CE}, V_C, V_E, V_B, V_{BC}



2. Determine the range of Vi that will maintain the Zener diode in "on" state.



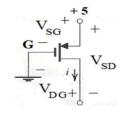
3. For the circuit shown in fig., determine the maximum and minimum current Iz



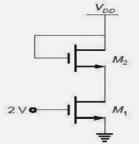
- 4. Explain Ebers-moll model with circuit diagram.
- 5. Draw the small signal model of MOSFET and explain its all components.

Part C

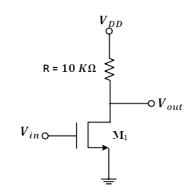
- 1. Explain Twin-tub process for CMOS fabrication with the help of diagrams in each step.
- 2. An enhancement PMOS transistor has $K_p = \mu_p C_{ox} \frac{W}{L} = 80 \text{ mA/V}^2$, $V_{th} = -1.5 \text{V}$ and $\lambda = -0.2 \text{ V}^{-1}$. The gate is connected to ground and the source is connected to +5 V supply. Find the drain current for $V_D = 4 \text{V}$, 1.5V, 0V and -5V.



3. In the circuit shown below, both the enhancement mode NMOS transistors have the following characteristics: $K_n = \mu_n C_{ox} \frac{W}{L} = 1 \text{mA/V}^2$, threshold voltage $V_{\text{TN}} = 1 \text{volt}$. Assume that the channel length modulation parameter is zero and body is shorted to source. What is the minimum supply voltage V_{DD} (in volts) needed to ensure that transistor M1 operates in saturation mode of operation?



4. For the MOSFET M1 shown in figure, assume, W/L=2, VDD=2.0V, $\mu_n c_{ox}=100 \ \mu m/V^2$ and $V_{TH}= 0.5V$. For what value of V_{in} , The transistor M1 switches from saturation region to linear region.





Assignment Sheet-I Session 2023-24 (Even Semester)

Subject: Power System-II (6EE4-02)

असतो मा सदममय

Dub	Ject: Power System-II (6EE4-02) Max M	ui iss	τu	
	(Set-I)			
Q.	Question	BL	CO	MM
1.	The single-line diagram of a simple three-bus power system with generation at buses 1 and 3 is as shown in Fig. below. The voltage at bus-1 is $(1.025 + j \ 0.0)$ per unit. The voltage magnitude at bus-3 is fixed at 1.03 per unit with a real power generation as shown in Table. The scheduled loads on bus-2 are shown in Table. Line impedances are marked in per unit. The line resistances and line charging suscepetances are neglected. Compute bus-voltages using the Gauss-Seidel method for two iterations. Also determine the line flows and line losses and the slack bus real and reactive power. (Reference: Power System Analysis by Hadi Saadat, TMH Pub.)) $V_1 = 1.025/0^{\circ} j_{0.05} j_{0.025} P_3 = 300 \text{ MW}$	4	1	10
	Table: Different Data for Experiment Table: Different Data for Experiment S. No. P2 Q2 P3 1. 300 100 200 2. 305 105 205 3. 310 110 210 4. 315 115 215 5. 320 120 220			
2.	Solve the same problem-1 using the Newton-Raphson method with tolerance 0.001 pu for two iterations. (Reference: Power System Analysis by Hadi Saadat, TMH Pub.)	4	1	10
3.	A 50-Hz, 100-MVA, 4-pole synchronous generator has an inertia constant of 3.5 sec and is supplying 0.16 pu power on a system base of 5000 MVA. The input to the generator is increased to 0.18 pu. Determine i) the kinetic energy stored in the moving parts of the generator and ii) the acceleration of the generator. If the acceleration continuous for 7.5 cycles, calculate iii) the change in rotor angle and iv) the speed in rpm at the end of acceleration. (Reference: Power System Analysis by Nagsarkar & Sukhija, Oxford Pub.)	3	2	10
4.	Figure below shows a 3-phase synchronous generator connected through a line whose reactance is 0.15 pu to an infinite bus, whose voltage is 1.0 pu, and is delivering real power 0.8 pu at 0.8 power factor lagging to the bus. i) What is magnitude of the power input which can be suddenly increased without the generator losing synchronism? ii) If the input power is zero initially, calculate the sudden increase in input power without the generator losing synchronism. All values shown in the circuit diagram in per unit on a common system base. (Reference: Power System Analysis by Nagsarkar & Sukhija, Oxford Pub.)	3	2	10

Faculty Name	Dr. Dhanraj Chitara
Faculty Name	Mr. Ajay Bhardwaj



Assignment Sheet-I Session 2023-24 (Even Semester)

Subject: Power System-II (6EE4-02)

असतो मा सदममय

Dub	Ject: Power System-II (6EE4-02) Max Mai	Ко- т	U	
0	(Set-II)	рт	CO	МЛА
Q.	Question The single line diagram of a simple three bus power system with generation at buses	BL	CO	MM
1.	The single-line diagram of a simple three-bus power system with generation at buses 1 and 3 is as shown in Fig. below. The voltage at bus-1 is $(1.025 + j \ 0.0)$ per unit. The voltage magnitude at bus-3 is fixed at 1.03 per unit with a real power generation as shown in Table. The scheduled loads on bus-2 are shown in Table. Line impedances are marked in per unit. The line resistances and line charging suscepetances are neglected. Compute bus-voltages using the Gauss-Seidel method for two iterations. Also determine the line flows and line losses and the slack bus real and reactive power. (Reference: Power System Analysis by Hadi Saadat, TMH Pub.) $V_1 = 1.025 \angle 0^\circ \qquad j_{0.05} \qquad V_3 = 300 \text{ MW}$ $V_1 = 1.025 \angle 0^\circ \qquad j_{0.05} \qquad V_3 = 1.03$	4	1	10
	Table: Different Data for Experiment S. No. P2 Q2 P3 6. 325 125 225 7. 330 130 230 8. 335 135 235 9. 340 140 240 10. 345 145 245			
2.	Solve the same problem-1 using the Newton-Raphson method with tolerance 0.001 pu for two iterations. (Reference: Power System Analysis by Hadi Saadat, TMH Pub.)	4	1	10
3.	A 50-Hz synchronous generator is supplying 0.8 pu real power at 0.8 lagging power factor to an infinite bus via transmission line whose reactance is 0.4 pu. If the direct axis transient reactance of the generator is 0.2 pu and the inertia constant $H = 10$ MJ/MVA, determine i) the steady state power limit ii) synchronizing power coefficient iii) the frequency of free oscillations and iv) the time period of free oscillations. Assume the infinite bus voltage equal to $1.0 + j 0.0$. (Reference: Power System Analysis by Nagsarkar & Sukhija, Oxford Pub.)	3	2	10
4.	Figure below shows a 3-phase synchronous generator connected through a line whose reactance is 0.15 pu to an infinite bus, whose voltage is 1.0 pu, and is delivering real power 0.8 pu at 0.8 power factor lagging to the bus. A temporary 3-phase fault occurs at the sending end of the line which is cleared after five cycles and the line remains intact. Determine whether the generator will lose synchronism or not. i) If the generator remains stable calculate the maximum swing of the rotor ii) Compute the critical angle and critical clearing time of the fault. (Reference: Power System Analysis by Nagsarkar & Sukhija, Oxford Pub.) $V_B = 1 < 0$	3	2	10

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Assignment Sheet-I Session 2023-24 (Even Semester)

Subject: Power System-II (6EE4-02)

असती मा सदममय

	oject: Power System-II (6EE4-02) Max (Set-III)			
Q.	Question	BL	СО	MM
×.	The single-line diagram of a simple three-bus power system with generation at			
	buses 1 and 3 is as shown in Fig. below. The voltage at bus-1 is $(1.025 + j 0.0)$			
	per unit. The voltage magnitude at bus-3 is fixed at 1.03 per unit with a real			
	power generation as shown in Table. The scheduled loads on bus-2 are shown in			
	Table. Line impedances are marked in per unit. The line resistances and line			
	charging susceptances are neglected. Compute bus-voltages using the Gauss-			
	Seidel method for two iterations. Also determine the line flows and line losses			
	and the slack bus real and reactive power. (Reference: Power System Analysis by Hadi Saadat, TMH Pub.)			
1	$V = 1.025/0^{\circ}$ $P = 200 \text{ MW}$		1	10
1.	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	4	1	10
	Slack $ V_3 = 1.03$			
	j0.025 j0.025			
	···· ¥ ···· ¥ ·			
	Table : Different Data for Experiment			
	S. No. P_2 Q_2 P_3 11. 350 150 250			
	12. 355 155 255			
	13. 360 160 260 14. 365 165 265			
	15. 370 170 270			
	Solve the same problem-1 using the Newton-Raphson method with tolerance			
2.	0.001 pu for two iterations.	4	1	10
	(Reference: Power System Analysis by Hadi Saadat, TMH Pub.)			
	A synchronous generator is delivering 1.0 pu active power to an infinite bus of			
	1.0 pu voltage through a transmission line of 0.2 pu reactance and negligible			
2	resistance. The generator reactance is 0.3 pu and the voltage behind the reactance	3		10
3.			2	10
	Determine the torque angle before which the fault must be cleared by circuit			
	breaker if the stability is to be maintained.			
	(Reference: Electrical Power System by AShfaq Husain, CBS Pub.)			
	A 3-phase, 50-Hz synchronous generator is delivering 0.9 pu real power to an			
	infinite bus via the transmission line shown in figure below. All values shown in			
	the circuit diagram in per unit on a common system base. A temporary 3-phase			
	fault occurs in the middle of line-2. Determine the rotor angle position before the			
	fault occurs. Also compute the critical clearing angle if the fault is cleared by			
4.	opening the faulted line. Assume $H = 4.5 \text{ MJ/MVA}$.	3	2	10
	(Reference: Power System Analysis by Nagsarkar & Sukhija, Oxford Pub.)			
	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			
	$X_{d}^{\prime} = j0.2$ $E' = 1.20 \swarrow \delta$ $X_{d} = j0.2$ $Line 2$ F $X = j0.6$ $Infinite$ bus			
	$E = 1.20 \ge 0$ $A_1 = 10.21$ T			

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Assignment Sheet-I Session 2023-24 (Even Semester)

Subject: Power System-II (6EE4-02)

असतो मा सदनमार

Sub	ject: Power System-II (6EE4-02) Max N	Tarks	- 40	
~	(Set-IV)			-
Q.	Question	BL	CO	MM
	The single-line diagram of a simple three-bus power system with generation at			
	buses 1 and 3 is as shown in Fig. below. The voltage at bus-1 is $(1.025 + j 0.0)$ per			
	unit. The voltage magnitude at bus-3 is fixed at 1.03 per unit with a real power			
	generation as shown in Table. The scheduled loads on bus-2 are shown in Table.			
	Line impedances are marked in per unit. The line resistances and line charging			
	suscepetances are neglected. Compute bus-voltages using the Gauss-Seidel			
	method for two iterations. Also determine the line flows and line losses and the			
	slack bus real and reactive power.			
	(Reference: Power System Analysis by Hadi Saadat, TMH Pub.)			
1.	$V_1 = 1.025 \angle 0^\circ$ $j0.05$ $P_3 = 300 \text{ MW}$	4	1	10
1.			1	10
	Slack $ V_3 = 1.03$ j0.025 $j0.025$			
	···· \ -··· \ -			
	Table: Different Data for Experiment			
	$\begin{array}{c c c c c c c c c c c c c c c c c c c $			
	17. 380 180 280			
	18. 385 185 285 19. 390 190 290			
	20. 395 195 295			
	Solve the same problem-1 using the Newton-Raphson method with tolerance			
2.	0.001 pu for two iterations.	4	1	10
	(Reference: Power System Analysis by Hadi Saadat, TMH Pub.)			
	A synchronous generator is delivering 0.5 of maximum power to an infinite bus			
	through a transmission line. A fault occurs such that the new maximum power is			
	0.3 of the original. When the fault is cleared, the maximum power that can be	_	_	
3.	delivered is 0.8 of the original maximum value. Determine the critical clearing	3	2	10
	angle. If the fault is cleared at $\delta = 75^{\circ}$. Find the maximum value of δ for which			
	machine swings around its new equilibrium position.			
	(Reference: Electrical Power System by AShfaq Husain, CBS Pub.)			
	A synchronous generator is supplying power to an infinite bus via two parallel			
	lines as shown in figure below. All values shown in the circuit diagram in per unit			
	on a common system base. If the power frequency 50-Hz and the inertia constant			
	of generator is 4 MJ/MVA, calculate the voltage behind transient reactance and			
	write the swing equation. Assume that the machine is delivering a power of 0.8 at			
4.	a power factor of 0.85 lagging. A 3-phase fault occurs at the generator end through	3	2	10
т.	a reactance of 0.05 pu. Determine the accelerating power and acceleration at the	5	2	10
	time of fault. (Reference: Power System Analysis by Nagsarkar & Sukhija, Oxford Pub.)			
	$X = j0.3 \qquad V = 1 < 0^{\circ}$ Line 1			
	G Infinite bus			
	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$			
	$X_d = f0.10$ M_t for t_t Line 2 All values in pu			

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Assignment Sheet-I Session 2023-24 (Even Semester)

Subject: Power System-II (6EE4-02)

असती मा सदममय

Sub	Ject: Power System-II (6EE4-02) Max N	larks	- 40	
-	(Set-V)		~ ~	
Q.	Question	BL	CO	MM
	The single-line diagram of a simple three-bus power system with generation at			
	buses 1 and 3 is as shown in Fig. below. The voltage at bus-1 is $(1.025 + j 0.0)$ per			
	unit. The voltage magnitude at bus-3 is fixed at 1.03 per unit with a real power			
	generation as shown in Table. The scheduled loads on bus-2 are shown in Table.			
	Line impedances are marked in per unit. The line resistances and line charging			
	susceptances are neglected. Compute bus-voltages using the Gauss-Seidel			
	method for two iterations. Also determine the line flows and line losses and the			
	slack bus real and reactive power.			
	(Reference: Power System Analysis by Hadi Saadat, TMH Pub.)			
1		4	1	10
1.	$V_1 = 1.02520^{\circ}$ $j0.05$ $P_3 = 300$ MW	4	1	10
	Slack $ V_3 = 1.03$			
	j0.025 $j0.025$			
	···· \ -··· \			
	Table: Different Data for Experiment			
	S. No. P_2 Q_2 P_3 21. 400 200 300			
	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			
	23. 410 210 310			
	24. 415 215 315 25. 420 220 320			
	Solve the same problem-1 using the Newton-Raphson method with tolerance			
2.	0.001 pu for two iterations.	4	1	10
	(Reference: Power System Analysis by Hadi Saadat, TMH Pub.)			
	For the power system shown in Fig below, an inductor of reactance 0.6 pu per			
	phase is connected at the mid-pint of transmission line. Determine the steady state			
	power limit when switch is opened and closed.			
3.	(Reference: Electrical Power System by AShfaq Husain, CBS Pub.)	3	2	10
5.	(-)	5	2	10
	$E = 1.2 \text{ pu}^{10.1}$ $K_{dg} = 10.8 \text{ pu}$			
	3 10.6 pu			
	A 60-Ha synchronous generator has a transient reactance of 0.2 pu and inertia			
	constant of 5.66 MJ/MVA. The generator is connected to an infinite bus through a			
	transformer and a double circuit transmission line as shown in Fig. Resistances are			
	neglected and reactances are expressed on a common MVA base and are marked			
	on the diagram. The generator is delivering a real power of 0.77 pu to bus-bar 1.			
4.	Voltage magnitude at bus-1 is 1.1 pu. The infinite bus voltage is 1.0 pu. Determine	3	2	10
••	the generator excitation voltage and obtain the swing equation. Also find the	-	_	10
	maximum power input that can be added without loss of synchronism.			
	(Reference: Power System Analysis by Hadi Saadat, TMH Pub.)			
	$ \begin{array}{c} E' & X_t = 0.158 \\ \bigcirc & & \\ X'_d = 0.2 \end{array}^1 \begin{array}{c} 1 & X_{L1} = 0.8 \\ \hline & & \\ V = 1.020 \\ \hline & & \\ X_{L2} = 0.8 \end{array} \end{array} $			
	$X'_d = 0.2$			

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Assignment Sheet-I Session 2023-24 (Even Semester)

Subject: Power System-II (6EE4-02)

असतो मा सदममय

Max Marks- 40

Su 0			arks- 40		
	(Set-VI)	1	1	1	
Q.	Question	BL	CO	MM	
1.	The single-line diagram of a simple three-bus power system with generation at buses 1 and 3 is as shown in Fig. below. The voltage at bus-1 is $(1.025 + j \ 0.0)$ per unit. The voltage magnitude at bus-3 is fixed at 1.03 per unit with a real power generation as shown in Table. The scheduled loads on bus-2 are shown in Table. Line impedances are marked in per unit. The line resistances and line charging suscepetances are neglected. Compute bus-voltages using the Gauss-Seidel method for two iterations. Also determine the line flows and line losses and the slack bus real and reactive power. (Reference: Power System Analysis by Hadi Saadat, TMH Pub.) $V_1 = 1.025 \angle 0^\circ$ $j_{0.05}$ $P_3 = 300 \text{ MW}$ $V_3 = 1.03$	4	1	10	
	Table: Different Data for ExperimentS. No. P_2 Q_2 P_3 26.42522532527.43023033028.43523533529.44024034030.445245345				
	Solve the same problem-1 using the Newton-Raphson method with tolerance 0.001				
2.	pu for two iterations.	4	1	10	
	1			10	
	(Reference: Power System Analysis by Hadi Saadat, TMH Pub.)				
3.	For the power system shown in Fig below, a capacitor of reactance 0.6 pu per phase is connected at the mid-pint of transmission line in place of inductive reactance. Determine the steady state power limit when switch is opened and closed. (Reference: Electrical Power System by AShfaq Husain, CBS Pub.) $\bigvee_{\substack{E=1,2 \text{ pu}^{10.1}\\ \times_{ap}=10.8 \text{ pu}}^{10.3 \text{ pu}} \xrightarrow{10.3 \text{ pu}}^{10.3 \text{ pu}} \bigvee_{\substack{E=1,2 \text{ pu}^{10.1}\\ \times_{ap}=10.8 \text{ pu}}^{10.3 \text{ pu}}}$	3	2	10	
4.	A 60-Ha synchronous generator has a transient reactance of 0.2 pu and inertia constant of 5.66 MJ/MVA. The generator is connected to an infinite bus through a transformer and a double circuit transmission line as shown in Fig below. Resistances are neglected and reactances are expressed on a common MVA base and are marked on the diagram. The generator is delivering a real power of 0.77 pu to bus-bar 1. Voltage magnitude at bus-1 is 1.1 pu. The infinite bus voltage is 1.0 pu. Determine the generator excitation voltage and obtain the swing equation. A temporary 3-phase fault occurs at the sending end of one of the transmission lines. When the fault is cleared, both lines are intact. Using equal area criterion, determine the critical clearing angle and critical fault clearing time. (Reference: Power System Analysis by Hadi Saadat, TMH Pub.)	3	2	10	

(Set-VII)

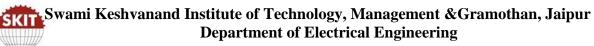
Faculty Name	Dr. Dhanraj Chitara
Faculty Name	Mr. Ajay Bhardwaj

असतो मा सन्ममय



Sub	ject: Power System-II (6EE4-02) Max M	<u>Marks</u>	- 40	
Q.	Question	BL	CO	MM
	The single-line diagram of a simple three-bus power system with generation at			
	buses 1 and 3 is as shown in Fig. below. The voltage at bus-1 is $(1.025 + j \ 0.0)$ per			
	unit. The voltage magnitude at bus-3 is fixed at 1.03 per unit with a real power			
	generation as shown in Table. The scheduled loads on bus-2 are shown in Table.			
	Line impedances are marked in per unit. The line resistances and line charging			
	suscepetances are neglected. Compute bus-voltages using the Gauss-Seidel			
	method for two iterations. Also determine the line flows and line losses and the			
	slack bus real and reactive power.			
	(Reference: Power System Analysis by Hadi Saadat, TMH Pub.)			
1.	$V_1 = 1.025 \angle 0^\circ$ $j0.05$ $P_3 = 300 \text{ MW}$	4	1	10
1.			1	10
	Slack $ V_3 = 1.03$ j0.025 $j0.025$			
	<i>j</i> 0.025 <i>j</i> 0.025			
	\downarrow \downarrow \downarrow \downarrow			
	Table: Different Data for ExperimentS. No.P2Q2P3			
	S. No. P_2 Q_2 P_3 31. 450 250 350			
	32. 455 255 355			
	33. 460 260 360 34. 465 265 365			
	35. 470 270 370			
_	Solve the same problem-1 using the Newton-Raphson method with tolerance			10
2.	0.001 pu for two iterations.	4	1	10
	(Reference: Power System Analysis by Hadi Saadat, TMH Pub.)			
	For the power system shown in Fig. below, determine the maximum steady state			
	power transfer when a shunt inductive reactor is connected and disconnected.			
3.	(Reference: Electrical Power System by AShfaq Husain, CBS Pub.) $x_{11} = 0.20 \text{ pu}$	3	2	10
	$\bigcirc + $			
	E = 2.4 pu $X_{ab} = 1.5 \text{ pu}$ Reactor 15.5 pu $X_{i2} = 0.8 \text{ pu}$ $V = 1.0 \angle 0^{\circ} \text{ pu}$			
	A 60-Ha synchronous generator has a transient reactance of 0.2 pu and inertia			
	constant of 5.66 MJ/MVA. The generator is connected to an infinite bus through a			
	transformer and a double circuit transmission line as shown in Fig. Resistances are			
	neglected and reactances are expressed on a common MVA base and are marked			
	on the diagram. The generator is delivering a real power of 0.77 pu to bus-bar 1.			
	Voltage magnitude at bus-1 is 1.1 pu. The infinite bus voltage is 1.0 pu. Determine			
4	the generator excitation voltage and obtain the swing equation. A 3-phase fault	3	n	10
4.	occurs at the middle of one of the lines, the fault is cleared and the faulted line is	3	2	10
	isolated. Determine the critical clearing angle.			
	(Reference: Power System Analysis by Hadi Saadat, TMH Pub.)			
	$E' \qquad X_t = 0.158 \qquad \qquad$			
	$ \begin{array}{c} E' & X_t = 0.158 \\ \bigcirc \\ X'_d = 0.2 \end{array} \begin{array}{c} 1 & X_{L1} = 0.8 \\ \bigcirc \\ V_1 = 1.1 \\ X_{L2} = 0.8 \\ \bigcirc \\ & X_{L2} = 0.8 \end{array} \begin{array}{c} 2 \\ V = 1.020 \\ \bigcirc \\ & & \\$			

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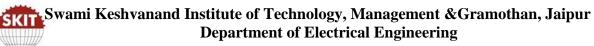


Subject: Power System-II (6EE4-02)

असतो मा सन्ममय

Sui	Subject: Power System-II (6EE4-02) Max N			
	(Set-VIII)	BL	CO	2020
Q.	Question			MM
	The single-line diagram of a simple three-bus power system with generation at buses			
	1 and 3 is as shown in Fig. below. The voltage at bus-1 is $(1.025 + j \ 0.0)$ per unit.			
	The voltage magnitude at bus-3 is fixed at 1.03 per unit with a real power generation			
	as shown in Table. The scheduled loads on bus-2 are shown in Table. Line			
	impedances are marked in per unit. The line resistances and line charging			
	suscepetances are neglected. Compute bus-voltages using the Gauss-Seidel method			
	for two iterations. Also determine the line flows and line losses and the slack bus			
	real and reactive power.			
	(Reference: Power System Analysis by Hadi Saadat, TMH Pub.)			
1.	$V_1 = 1.025 \angle 0^\circ$ $j0.05$ $P_3 = 300 \text{ MW}$	4	1	10
1.	$ $ $ $ $ $ $ $ $ $ $ $ $ $ $ $ $ $		-	10
	j0.025 j0.025			
	2			
	$\cdots \downarrow \cdots \downarrow \cdots \downarrow$			
	Table: Different Data for Experiment			
	S. No. P2 Q2 P3 36. 475 275 375			
	37. 480 280 380			
	38. 485 285 385 39. 490 290 390			
	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			
	41. 500 300 400			
	Solve the same problem-1 using the Newton-Raphson method with tolerance 0.001			10
2.	pu for two iterations.	4	1	10
	(Reference: Power System Analysis by Hadi Saadat, TMH Pub.)			
	For the power system shown in Fig. below, determine the maximum steady state			
	power transfer when a shunt capacitive reactor is connected and disconnected in			
3.	place of shunt inductor. (Reference: Electrical Power System by AShfaq Husain, CBS Pub.)	3	2	10
5.	$X_{T1} = 0.20 \text{ pu}$ 7000 $X_{T2} = 0.125 \text{ pu}$ Infinite bus	-		
	E = 2.4 pu $x_{ab} = 1.5 \text{ pu}$ Beactor y $y = 1.0 \angle 0^{\circ} \text{ pu}$			
	Reactor g_1 $X_{12} = 0.8 \text{ pu}$ (-1.023) (-1.023)			
	A 60-Ha synchronous generator has a transient reactance of 0.2 pu and inertia			
	constant of 5.66 MJ/MVA. The generator is connected to an infinite bus through a			
	transformer and a double circuit transmission line as shown in Fig. Resistances are			
	neglected and reactances are expressed on a common MVA base and are marked on			
	the diagram. The generator is delivering a real power of 0.77 pu to bus-bar 1.			
	Voltage magnitude at bus-1 is 1.1 pu. The infinite bus voltage is 1.0 pu. Determine			
4.	the generator excitation voltage and obtain the swing equation. The machine has per	3	2	10
	unit damping coefficient $D = 0.15$. Write the linearized swing equation for this			
	power system and find the equations describing the motion of the rotor angle and the			
	generator frequency for a small disturbance of $\Delta \delta = 15^{\circ}$.			
	(Reference: Power System Analysis by Hadi Saadat, TMH Pub.)			
	$ \underbrace{ \begin{array}{c} E' \\ C \\ $			

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Subject: Power System-II (6EE4-02)

असतो मा सदममय

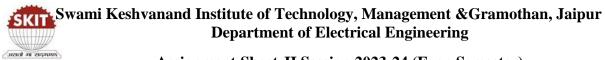
Sub	(Set-I)		••	
Q.	Question	BL	CO	MM
1.	A three-phase transmission line has a resistance 10 ohm per phase and a reactance of 30 ohm per phase. (a) Determine the maximum power which may be transmitted if 132 KV were maintained at each end. (b) What is the phase difference between the receiving end and sending end voltages for maximum power transmitted? (c) Also, determine the rating of synchronous phase modifier to supply following load the receiving end. $\frac{\textbf{S. No. load}}{1. 100 \text{ MW, 0.9 p.f. lagging}}$ $\frac{3. 110 \text{ MW, 0.80 p.f. lagging}}{1. 800 \text{ MW, 0.75 p.f. lagging}}$ (Reference: Electrical Power System by AShfaq Husain, CBS Pub.)	4	3	10
2.	A single area consists of two generating units the flowing characteristics: Unit-1, 600 MVA, 6% speed regulation Unit-2, 500 MVA, 4% speed regulation The units are operating in parallel, sharing 900 MW at the nominal frequency. Unit-1 supplies 500 MW and unit-2 supplies 400 MW at 60 Hz. The load is increased as tabulated below: a) Assume there is no frequency dependent load (D=0). Find the steady-state frequency deviation and new generation on each unit. b) Assume there is frequency dependent load (D=tabulated below). Find the steady-state frequency deviation and new generation on each unit. b) Assume there is frequency dependent load (D=tabulated below). Find the steady-state frequency deviation and new generation on each unit. Table: Different Data for Experiment S. No. Increased load D 1. 60 MW 1.1 2. 70 MW 1.2 3. 80 MW 1.3 4. 90 MW 1.4 5. 100 MW 1.5 (Reference: Power System Analysis by Hadi Saadat, TMH Pub.) 100 MW 1.5	4	3	10
3.	Explain preventive and emergency control in power system with suitable example.	3	4	10
5.	(Reference: https://archive.nptel.ac.in/courses/108/101/108101040/)	5		10
4.	Draw and explain energy control centre of India in detail. (Reference: https://www.youtube.com/watch?v=Trj33GHuEFI)	3	4	10

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$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	Sub	ject: Power System-II (6EE4-02) Max M	arks.	40	
by: $C_{1} = 500 + 5.3P_{1} + 0.004P_{1}^{2}$ $C_{2} = 400 + 5.5P_{2} + 0.006P_{2}^{2}$ $C_{3} = 200 + 5.8P_{3} + 0.009P_{3}^{2}$ Where P_{1}, P_{2} and P_{3} are in MW and total demand is tabulated below with following generation limits: 5. $200 \le P_{1} \le 450$ $150 \le P_{2} \le 350$ $100 \le P_{3} \le 225$ Table: Different Data for Experiment $\boxed{\frac{1}{2}, \frac{800}{800}}$ (Reference: Power System Analysis by Hadi Saadat, TMH Pub.) The fuel cost in S/hr. of three power plants are given by: $C_{1} = 200 + 7.0P_{1} + 0.008P_{2}^{2}$ $C_{2} = 180 + 6.3P_{2} + 0.009P_{2}^{2}$ $C_{1} = 140 + 6.8P_{1} + 0.007P_{3}^{2}$ Where P_{1}, P_{2} and P_{3} are in MW. Plant outputs are subjected to the following limits (MW): $10 \le P_{2} \le 85$ $10 \le P_{2} \le 80$ $10 \le P_{2} \le 80$ $10 \le P_{2} \le 80$ $10 \le P_{2} \le 70$ 6. For this problem, assume the real power loss is given by the simplified expression: $P_{L}(pu) = 0.0218P_{1}^{2}(pu) + 0.0228P_{2}^{2}(pu) + 0.0179P_{3}^{2}(pu)$ Where loss coefficients are specified in pu on a 100 MVA base. Determine the optimal dispatch of the generation and total fuel cost when the total system load is tabulated below using iteration methods. Table: Different Data for Experiment $\boxed{\frac{1}{2}, \frac{81}{32}}$ $\boxed{\frac{1}{2}, \frac{12}{3}}$			ai K 5-	40	
$\begin{array}{ c c c c c } \hline C_2 = 400 + 5 \cdot F_2 + 0.006 P_2^2 \\ \hline C_3 = 200 + 5 \cdot 8P_3 + 0.009 P_3^3 \\ \hline Where P_1, P_2 \mbox{ and } P_3 \mbox{ are in MW and total demand is tabulated below with following generation limits:} \\ \hline 200 \le P_i \le 450 & 4 \\ 150 \le P_2 \le 350 & 100 \le P_2 \le 225 \\ \hline {\bf Table: Different Data for Experiment} \\ \hline \hline \hline \frac{8 \cdot No. Power Domand}{\frac{1}{2} \cdot \frac{8005}{300}} \\ \hline \frac{8}{3} \cdot \frac{810}{310}} \\ \hline (Reference: Power System Analysis by Had(Saadat, TMH Pub.) \\ \hline \hline The fuel cost in $.hr. of three power plants are given by: \\ \hline C_1 = 200 + 7 \cdot 0P_1 + 0.008 P_1^3 \\ \hline C_2 = 180 + 6 \cdot 3P_2 + 0.007 P_3^2 \\ \hline C_3 = 140 + 6 \cdot 8P_3 + 0.007 P_3^2 \\ \hline Where P_1, P_2 \mbox{ and } P_3 \mbox{ are in MW}. Plant outputs are subjected to the following limits (MW): \\ \hline 10 \le P_1 \le 85 \\ 10 \le P_2 \le 80 \\ 10 \le P_2 \le 70 \\ \hline {\bf 6}. \hline For this problem, assume the real power loss is given by the simplified expression: \\ \hline P_1(\mu u) = 0.0218P_1^2(\mu u) + 0.0228P_2^2(\mu u) + 0.0179P_3^2(\mu u) \\ \hline Where loss coefficients are specified in pu on a 100 MVA base. Determine the optimal dispatch of the generation and total fuel cost when the total system load is tabulated below using iteration methods. \\ \hline {\bf Table: Different Data for Experiment} \\ \hline {\bf E \ No. \ Total exstem load \ 12 \ 23 \ 22 \ 23 \ 23 \ 23 \ 23 \ 23$					
$\begin{array}{ c c c c c }\hline C_3 &= 200 + 5.8P_3 + 0.009P_3^2 \\ \hline \\ Where P_1, P_2 and P_3 are in MW and total demand is tabulated below with following generation limits: \\ \hline \\ & 200 \leq P_1 \leq 450 \\ 150 \leq P_2 \leq 350 \\ 100 \leq P_1 \leq 225 \\ \hline \\ $		$C_1 = 500 + 5.3P_1 + 0.004P_1^2$			
Where P_1, P_2 and P_3 are in MW and total demand is tabulated below with following generation limits:45105. $200 \le P_1 \le 450$ $150 \le P_2 \le 350$ $100 \le P_3 \le 225$ Table: Different Data for Experiment4510(Reference: Power System Analysis by Hadl Saadat, TMH Pub.)The fuel cost in \$/hr. of three power plants are given by: $C_1 = 200 + 7.0P_1 + 0.008P_1^2$ $C_2 = 180 + 6.3P_2 + 0.009P_2^2$ $C_3 = 140 + 6.8P_3 + 0.007P_1^2$ Where P_1, P_2 and P_3 are in MW. Plant outputs are subjected to the following limits (MW):10 $\le P_1 \le 85$ $10 \le P_2 \le 80$ $10 \le P_2 \le 80$ 		$C_2 = 400 + 5.5P_2 + 0.006P_2^2$			
5. $200 \le P_1 \le 450$ $150 \le P_2 \le 350$ $100 \le P_3 \le 225$ Table: Different Data for Experiment4510 $\overline{100} \le P_3 \le 225$ Table: Different Data for Experiment $\overline{100} \le P_3 \le 225$ Table: Different Data for Experiment4510 $\overline{100} \le P_3 \le 225$ Table: Different Data for Experiment $\overline{100} \le P_3 \le 225$ Table: Different Data for Experiment4510 $\overline{100} \le P_1 \le 80$ $C_2 = 180 + 6.3P_2 + 0.009 P_2^2$ $C_3 = 140 + 6.8P_3 + 0.007 P_3^2$ 4510Where P_1, P_2 and P_3 are in MW. Plant outputs are subjected to the following limits (MW) : $10 \le P_1 \le 85$ $10 \le P_1 \le 80$ $10 \le P_1 \le 80$ $10 \le P_1 \le 80$ 4510For this problem, assume the real power loss is given by the simplified expression: $P_L(pu) = 0.0218 P_1^2(pu) + 0.0228 P_2^2(pu) + 0.0179 P_3^2(pu)$ Where loss coefficients are specified in pu on a 100 MVA base. Determine the optimal dispatch of the generation and total fuel cost when the total system load is tabulated below using iteration methods.510 $\overline{10} \le \frac{10}{2} \le \frac{82}{2}$ 3 $\overline{112}$ 4 $\overline{12} \le \frac{82}{2}$ 3 $\overline{12} \le \frac{82}{2}$		$C_3 = 200 + 5.8P_3 + 0.009P_3^2$			
5. $200 \le P_1 \le 450$ $150 \le P_2 \le 350$ $100 \le P_3 \le 225$ Table: Different Data for Experiment4510 $\frac{1}{2}$ $\frac{805}{3}$ $\frac{3}{2}$ $\frac{815}{5}$ $\frac{820}{20}$ Reference: Power System Analysis by Hadi Saadat, TMH Pub.)4510The fuel cost in S/hr. of three power plants are given by: $C_1 = 200 + 7.0P_1 + 0.008P_1^2$ $C_2 = 180 + 6.3P_2 + 0.009P_2^2$ $C_3 = 140 + 6.8P_3 + 0.007P_3^2$ 4510Where P_1, P_2 and P_3 are in MW. Plant outputs are subjected to the following limits (MW): $10 \le P_1 \le 85$ $10 \le P_2 \le 80$ $10 \le P_2 \le 80$ $10 \le P_3 \le 70$ 4510For this problem, assume the real power loss is given by the simplified expression: $P_L(pu) = 0.0218P_1^2(pu) + 0.0228P_2^2(pu) + 0.0179P_3^2(pu)$ Where loss coefficients are specified in pu on a 100 MVA base. Determine the optimal dispatch of the generation and total fuel cost when the total system load is tabulated below using iteration methods.4510Table: Different Data for Experiment $\frac{1}{2}$ $\frac{82}{2}$ $\frac{3}{2}$ $\frac{11}{2}$ $\frac{4}{2}$ 510		Where P_1, P_2 and P_3 are in MW and total demand is tabulated below with following			
$\begin{array}{ c c c c c c } \hline 150 \leq P_2 \leq 330 \\ 100 \leq P_3 \leq 225 \\ \hline \textbf{Table: Different Data for Experiment} \\ \hline \hline & \hline &$		generation limits:			
$\begin{array}{ c c c c c } 100 \leq P_3 \leq 225 \\ \hline \textbf{Table: Different Data for Experiment} \\ \hline \hline \textbf{S}. No. & \hline \textbf{Power Demand} \\ \hline \hline \textbf{1}. & \hline \textbf{800} \\ \hline \hline \textbf{2}. & \hline \textbf{800} \\ \hline \textbf{2}. & \hline \textbf{800} \\ \hline \textbf{4}. & \hline \textbf{810} \\ \hline \textbf{4}. & \hline \textbf{815} \\ \hline \textbf{5}. & \hline \textbf{820} \\ \hline \textbf{Reference: Power System Analysis by Hadi Saadat, TMH Pub.} \\ \hline \textbf{Reference: Power System Analysis by Hadi Saadat, TMH Pub.} \\ \hline \textbf{The fuel cost in } \ \ \textbf{hr. of three power plants are given by:} \\ C_1 = 200 + 7.0P_1 + 0.008P_1^2 \\ C_2 = 180 + 6.3P_2 + 0.009P_2^2 \\ C_3 = 140 + 6.8P_3 + 0.007P_3^2 \\ \hline \textbf{Where } P_1, P_2 \text{ and } P_3 \text{ are in MW. Plant outputs are subjected to the following limits} \\ \textbf{(MW):} & 10 \leq P_1 \leq 85 \\ 10 \leq P_2 \leq 80 \\ 10 \leq P_3 \leq 70 \\ \hline \textbf{6}. & \ \textbf{For this problem, assume the real power loss is given by the simplified expression:} \\ P_L(pu) = 0.0218P_1^2(pu) + 0.0228P_2^2(pu) + 0.0179P_3^2(pu) \\ \hline \textbf{Where loss coefficients are specified in pu on a 100 MVA base. Determine the optimal dispatch of the generation and total fuel cost when the total system load is tabulated below using iteration methods. \\ \hline \textbf{Table: Different Data for Experiment} \\ \hline \hline \textbf{X}. No. & \hline \textbf{Total system load} \\ \hline \textbf{1}. & \hline \textbf{1}. \\ \hline \textbf{1}$	5.	$200 \le P_1 \le 450$	4	5	10
Table: Different Data for Experiment $$ No. Power Demand$ 1. 0 \\ $ 805 \\ $ 3. 810 \\ $ 3. 810 \\ $ 4. 815 \\ $ 5. 820 $ $ $ $ $ $ $ $ $ $ $ $ $ $ $ $ $ $ $$		$150 \le P_2 \le 350$			
$ \begin{array}{ c c c c c c c } \hline S. No. & Power Demand \\ \hline 1. & 800 \\ \hline 2. & 805 \\ \hline 3. & 810 \\ \hline 4. & 815 \\ \hline 5. & 820 \\ \hline \hline \hline & & & & & & & & \\ \hline \hline & & & & &$		$100 \le P_3 \le 225$			
I.8002.8053.8104.8155.820(Reference: Power System Analysis by Hadi Saadat, TMH Pub.)The fuel cost in \$/hr. of three power plants are given by: $C_1 = 200 + 7.0P_1 + 0.008P_1^2$ $C_2 = 180 + 6.3P_2 + 0.009P_2^2$ $C_2 = 180 + 6.3P_2 + 0.009P_2^2$ $C_3 = 140 + 6.8P_3 + 0.007P_3^2$ Where P_1, P_2 and P_3 are in MW. Plant outputs are subjected to the following limits(MW): $10 \le P_1 \le 85$ $10 \le P_2 \le 80$ $10 \le P_1 \le 0.018P_1^2(pu) + 0.0228P_2^2(pu) + 0.0179P_3^2(pu)$ Where loss coefficients are specified in pu on a 100 MVA base. Determine the optimal dispatch of the generation and total fuel cost when the total system load is tabulated below using iteration methods. $\frac{1}{2}$ $\frac{82}{3}$ $\frac{3}{3}$ $\frac{112}{4}$ $\frac{4}{4}$ $\frac{132}{152}$					
$2.$ 3. 805 3104. 815 5.5. 820 (Reference: Power System Analysis by Hadi Saadat, TMH Pub.)The fuel cost in \$/hr. of three power plants are given by: $C_1 = 200 + 7.0P_1 + 0.008P_1^2$ $C_2 = 180 + 6.3P_2 + 0.009P_2^2$ $C_3 = 140 + 6.8P_3 + 0.007P_3^2$ Where P_1, P_2 and P_3 are in MW. Plant outputs are subjected to the following limits (MW): $10 \le P_1 \le 85$ $10 \le P_2 \le 80$ $10 \le P_2 \le 80$ $10 \le P_3 \le 70$ 6. For this problem, assume the real power loss is given by the simplified expression: $P_L(pu) = 0.0218P_1^2(pu) + 0.0228P_2^2(pu) + 0.0179P_3^2(pu)$ Where loss coefficients are specified in pu on a 100 MVA base. Determine the optimal dispatch of the generation and total fuel cost when the total system load is tabulated below using iteration methods.Table: Different Data for Experiment $\boxed{\frac{S, No. Total system load}{1. 62}}$ $\frac{3. 112}{4. 132}$ $\frac{3. 112}{4. 132}$					
4.815 820 820(Reference: Power System Analysis by Hadi Saadat, TMH Pub.)The fuel cost in \$/hr. of three power plants are given by: $C_1 = 200 + 7.0P_1 + 0.008P_1^2$ $C_2 = 180 + 6.3P_2 + 0.009P_2^2$ $C_3 = 140 + 6.8P_3 + 0.007P_3^2$ Where P_1, P_2 and P_3 are in MW. Plant outputs are subjected to the following limits (MW): $10 \le P_1 \le 85$ $10 \le P_2 \le 80$ $10 \le P_2 \le 80$ $10 \le P_3 \le 70$ 6.For this problem, assume the real power loss is given by the simplified expression: $P_L(pu) = 0.0218P_1^2(pu) + 0.0228P_2^2(pu) + 0.0179P_3^2(pu)$ Where loss coefficients are specified in pu on a 100 MVA base. Determine the optimal dispatch of the generation and total fuel cost when the total system load is tabulated below using iteration methods.Table: Different Data for Experiment $\frac{5}{2}$ $\frac{82}{3}$ $\frac{3}{112}$ $\frac{4}{4}$ $\frac{132}{5}$					
5.820(Reference: Power System Analysis by Hadi Saadat, TMI Pub.)The fuel cost in \$/hr. of three power plants are given by: $C_1 = 200 + 7.0P_1 + 0.008P_1^2$ $C_2 = 180 + 6.3P_2 + 0.009P_2^2$ $C_2 = 180 + 6.3P_2 + 0.009P_2^2$ $C_3 = 140 + 6.8P_3 + 0.007P_3^2$ Where P_1, P_2 and P_3 are in MW. Plant outputs are subjected to the following limits(MW): $10 \le P_1 \le 85$ $10 \le P_2 \le 80$ $10 \le P_2 \le 80$ $10 \le P_3 \le 70$ $10 \le P_2 \le 80$ $P_L(pu) = 0.0218P_1^2(pu) + 0.0228P_2^2(pu) + 0.0179P_3^2(pu)$ Where loss coefficients are specified in pu on a 100 MVA base. Determine the optimal dispatch of the generation and total fuel cost when the total system load is tabulated below using iteration methods.Table: Different Data for Experiment $\frac{5. No. Total system load}{1. 62}$ $\frac{2. 82}{3. 112}$ $\frac{3. 112}{4. 132}$ $\frac{4. 132}{5. 152}$					
The fuel cost in \$/hr. of three power plants are given by: $C_1 = 200 + 7.0P_1 + 0.008P_1^2$ $C_2 = 180 + 6.3P_2 + 0.009P_2^2$ $C_3 = 140 + 6.8P_3 + 0.007P_3^2$ Where P_1, P_2 and P_3 are in MW. Plant outputs are subjected to the following limits (MW): $10 \le P_1 \le 85$ $10 \le P_2 \le 80$ $10 \le P_3 \le 70$ 6.For this problem, assume the real power loss is given by the simplified expression: $P_L(pu) = 0.0218P_1^2(pu) + 0.0228P_2^2(pu) + 0.0179P_3^2(pu)$ Where loss coefficients are specified in pu on a 100 MVA base. Determine the optimal dispatch of the generation and total fuel cost when the total system load is tabulated below using iteration methods.Table: Different Data for Experiment $\frac{5. No. Total system load}{1. 62}$ $\frac{2. 82}{3. 112}$ $3. 112$ $\frac{4. 132}{5. 152}$		5. 820			
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$					
$\begin{array}{c} C_{2} = 180 + 6.3P_{2} + 0.009P_{2}^{2} \\ C_{3} = 140 + 6.8P_{3} + 0.007P_{3}^{2} \\ \text{Where } P_{1}, P_{2} \text{ and } P_{3} \text{ are in MW. Plant outputs are subjected to the following limits} \\ (MW): \\ 10 \leq P_{1} \leq 85 \\ 10 \leq P_{2} \leq 80 \\ 10 \leq P_{3} \leq 70 \\ \text{6. For this problem, assume the real power loss is given by the simplified expression:} \\ P_{L}(pu) = 0.0218P_{1}^{2}(pu) + 0.0228P_{2}^{2}(pu) + 0.0179P_{3}^{2}(pu) \\ \text{Where loss coefficients are specified in pu on a 100 MVA base. Determine the optimal dispatch of the generation and total fuel cost when the total system load is tabulated below using iteration methods. \\ \hline \begin{array}{c} \frac{\mathbf{S}.\mathbf{No}, \overline{\mathbf{Total system load}} \\ \frac{1}{2}, \frac{82}{3}, 112} \\ \frac{1}{3}, 112 \\ \frac{1}{5}, 152 \end{array} \end{array}$					
$C_{3} = 140 + 6.8P_{3} + 0.007P_{3}^{2}$ Where P_{1}, P_{2} and P_{3} are in MW. Plant outputs are subjected to the following limits (MW): $10 \le P_{1} \le 85$ $10 \le P_{2} \le 80$ $10 \le P_{3} \le 70$ 6. For this problem, assume the real power loss is given by the simplified expression: $P_{L}(pu) = 0.0218P_{1}^{2}(pu) + 0.0228P_{2}^{2}(pu) + 0.0179P_{3}^{2}(pu)$ Where loss coefficients are specified in pu on a 100 MVA base. Determine the optimal dispatch of the generation and total fuel cost when the total system load is tabulated below using iteration methods. $\frac{S. No. Total system load}{1. \frac{62}{2. \frac{82}{3. \frac{112}{4. \frac{132}{5. \frac{152}{5. 1$		$C_1 = 200 + 7.0P_1 + 0.008P_1^2$			
Where P_1, P_2 and P_3 are in MW. Plant outputs are subjected to the following limits (MW): $10 \le P_1 \le 85$ $10 \le P_2 \le 80$ $10 \le P_3 \le 70$ 4 5 6.For this problem, assume the real power loss is given by the simplified expression: $P_L(pu) = 0.0218 P_1^2(pu) + 0.0228 P_2^2(pu) + 0.0179 P_3^2(pu)$ 4 5 10 Mere loss coefficients are specified in pu on a 100 MVA base. Determine the optimal dispatch of the generation and total fuel cost when the total system load is tabulated below using iteration methods. $\mathbf{Table: Different Data for Experiment}$ S. No.Total system load $1.$ $\frac{62}{2.}$ 82 $3.$ 112 132 $5.$ 132 $5.$		$C_2 = 180 + 6.3P_2 + 0.009P_2^2$			
$(MW): \qquad 10 \le P_1 \le 85 \\ 10 \le P_2 \le 80 \\ 10 \le P_3 \le 70 \end{cases}$ 6. For this problem, assume the real power loss is given by the simplified expression: $P_L(pu) = 0.0218P_1^2(pu) + 0.0228P_2^2(pu) + 0.0179P_3^2(pu)$ Where loss coefficients are specified in pu on a 100 MVA base. Determine the optimal dispatch of the generation and total fuel cost when the total system load is tabulated below using iteration methods. $Table: Different Data for Experiment$ $\boxed{\frac{1. 62}{2. 82}}_{\frac{3. 112}{2. 82}}$		$C_3 = 140 + 6.8P_3 + 0.007P_3^2$			
6. $10 \le P_1 \le 85$ $10 \le P_2 \le 80$ $10 \le P_3 \le 70$ 45106.For this problem, assume the real power loss is given by the simplified expression: $P_L(pu) = 0.0218 P_1^2(pu) + 0.0228 P_2^2(pu) + 0.0179 P_3^2(pu)$ 4510Where loss coefficients are specified in pu on a 100 MVA base. Determine the optimal dispatch of the generation and total fuel cost when the total system load is tabulated below using iteration methods.510Image: S. No. Total system load 1.62 2.82 3.112 12 4.4.132 5.15212		Where P_1, P_2 and P_3 are in MW. Plant outputs are subjected to the following limits			
6. $10 \le P_2 \le 80$ $10 \le P_3 \le 70$ 45106.For this problem, assume the real power loss is given by the simplified expression: $P_L(pu) = 0.0218P_1^2(pu) + 0.0228P_2^2(pu) + 0.0179P_3^2(pu)$ 4510Where loss coefficients are specified in pu on a 100 MVA base. Determine the optimal dispatch of the generation and total fuel cost when the total system load is tabulated below using iteration methods.510Image: State of the generation and total fuel cost when the total system load is tabulated below using iteration methods.Table: Different Data for Experiment $\frac{S. No. Total system load}{1. 62}$ $\frac{2. 82}{3. 112}$ $\frac{4. 132}{5. 152}$ 10		(MW):			
6. For this problem, assume the real power loss is given by the simplified expression: $P_{L}(pu) = 0.0218P_{1}^{2}(pu) + 0.0228P_{2}^{2}(pu) + 0.0179P_{3}^{2}(pu)$ Where loss coefficients are specified in pu on a 100 MVA base. Determine the optimal dispatch of the generation and total fuel cost when the total system load is tabulated below using iteration methods. $Table: Different Data for Experiment$ $\boxed{\begin{array}{c} S. No. Total system load \\ 1. 62 \\ 2. 82 \\ 3. 112 \\ \hline 4. 132 \\ \hline 5. 152 \end{array}}$		$10 \le P_1 \le 85$			
6.For this problem, assume the real power loss is given by the simplified expression: $P_L(pu) = 0.0218P_1^2(pu) + 0.0228P_2^2(pu) + 0.0179P_3^2(pu)$ 4510 $P_L(pu) = 0.0218P_1^2(pu) + 0.0228P_2^2(pu) + 0.0179P_3^2(pu)$ Where loss coefficients are specified in pu on a 100 MVA base. Determine the optimal dispatch of the generation and total fuel cost when the total system load is tabulated below using iteration methods.Table: Different Data for Experiment $\frac{S. No. Total system load}{1. 62}$ $\frac{2. 822}{3. 112}$ $3. 112$ $\frac{4. 132}{5. 152}$		$10 \le P_2 \le 80$			
$P_{L}(pu) = 0.0218P_{1}^{2}(pu) + 0.0228P_{2}^{2}(pu) + 0.0179P_{3}^{2}(pu)$ Where loss coefficients are specified in pu on a 100 MVA base. Determine the optimal dispatch of the generation and total fuel cost when the total system load is tabulated below using iteration methods. Table: Different Data for Experiment $ \frac{\hline S. No. Total system load}{1. \qquad 62} $ $ \frac{S. No. Total system load}{1. \qquad 62} $ $ \frac{S. No. Total system load}{1. \qquad 62} $ $ \frac{S. No. Total system load}{1. \qquad 62} $		$10 \le P_3 \le 70$			
Where loss coefficients are specified in pu on a 100 MVA base. Determine the optimal dispatch of the generation and total fuel cost when the total system load is tabulated below using iteration methods.Table: Different Data for Experiment $\underline{S. No. Total system load}$ $\underline{1. 62}$ $\underline{2. 82}$ $\underline{3. 112}$ $\underline{4. 132}$ $\underline{5. 152}$	6.	For this problem, assume the real power loss is given by the simplified expression:	4	5	10
optimal dispatch of the generation and total fuel cost when the total system load is tabulated below using iteration methods. Table: Different Data for Experiment		$P_L(pu) = 0.0218P_1^2(pu) + 0.0228P_2^2(pu) + 0.0179P_3^2(pu)$			
tabulated below using iteration methods. Table: Different Data for Experiment S. No. Total system load 1. 62 2. 82 3. 112 4. 132 5. 152		Where loss coefficients are specified in pu on a 100 MVA base. Determine the			
Table: Different Data for Experiment S. No. Total system load 1. 62 2. 82 3. 112 4. 132 5. 152		optimal dispatch of the generation and total fuel cost when the total system load is			
S. No. Total system load 1. 62 2. 82 3. 112 4. 132 5. 152		tabulated below using iteration methods.			
1. 62 2. 82 3. 112 4. 132 5. 152					
2. 82 3. 112 4. 132 5. 152					
4. 132 5. 152		2. 82			
5. 152					
(Reference: Power System Analysis by Hadi Saadat, TMH Pub.)		5. 152			
		(Reference: Power System Analysis by Hadi Saadat, TMH Pub.)			

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Subject: Power System-II (6EE4-02)

	(Set-II)			
Q.	Question	BL	CO	MM
1.	A three-phase transmission line has a resistance 25 ohm per phase and a reactance of 90 ohm per phase. The sending end voltage is 145 KV, while the load end voltage is maintained at 132 KV for all loads by an automatically controlled synchronous phase modifier. If the MVAR of the modifier has the same value for zero load as for a load mentioned in table. Find the rating of phase moodier and the power factor of this load. Table: Different Data for Experiment S. No. load 6. 50 MW 7. 60 MW 8. 70 MW 9. 80 MW 10. 90 MW	4	3	10
2.	(Reference: Electrical Power System by AShfaq Husain, CBS Pub.) A single area consists of two generating units the flowing characteristics: Unit-1, 400 MVA, 4% speed regulation Unit-2, 800 MVA, 5% speed regulation The units are operating in parallel, sharing 700 MW at the nominal frequency. Unit-1 supplies 200 MW and unit-2 supplies 500 MW at 60 Hz. The load is increased as tabulated below: c) Assume there is no frequency dependent load (D=0). Find the steady-state frequency deviation and new generation on each unit. d) Assume there is frequency dependent load (D=tabulated below). Find the steady-state frequency deviation and new generation on each unit. Table: Different Data for Experiment S. No. Increased load D 6. 90 MW 0.80 7. 100 MW 0.90 8. 110 MW 1.00 9. 120 MW 1.10 10. 130 MW 1.20 (Reference: Power System Analysis by Hadi Saadat, TMH Pub.) (Multi A)	4	3	10
3.	Explain preventive and emergency control in power system with suitable example. (Reference: https://archive.nptel.ac.in/courses/108/101/108101040/)	3	4	10
4.	Draw and explain energy control centre of India in detail. (Reference: https://www.youtube.com/watch?v=Trj33GHuEFI)	3	4	10

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Suł	bject: Power System-II (6EE4-02) Max Max	rks- 4	0	
	For the optimal dispatch and the total cost in \$/hr. for thermal power plant is given		-	
	by:			
	$C_1 = 500 + 5.3P_1 + 0.004P_1^2$			
	$C_2 = 400 + 5.5P_2 + 0.006P_2^2$			
	$C_3 = 200 + 5.8P_3 + 0.009P_3^2$			
	Where P_1, P_2 and P_3 are in MW and total demand is tabulated below with following			
	generation limits:			
5.	$200 \le P_1 \le 450$	4	5	10
	$150 \le P_2 \le 350$			
	$100 \le P_3 \le 225$			
	Table: Different Data for Experiment			
	S. No. Power Demand 6. 825			
	7. 830			
	8. 835 9. 840			
	10.845(Reference: Power System Analysis by Hadi Saadat, TMH Pub.)			
	The fuel cost in \$/hr. of three power plants are given by: $C = 200 \pm 7.0R \pm 0.008 R^2$			
	$C_1 = 200 + 7.0P_1 + 0.008P_1^2$ $C_2 = 180 + 6.2P_1 + 0.000P_1^2$			
	$C_2 = 180 + 6.3P_2 + 0.009P_2^2$ $C_3 = 140 + 6.8P_3 + 0.007P_3^2$			
	Where P_1, P_2 and P_3 are in MW. Plant outputs are subjected to the following limits			
	(MW):			
	$10 \le P_1 \le 85$			
	$10 \le P_2 \le 80$			
	$10 \le P_3 \le 70$	4	_	10
6.	For this problem, assume the real power loss is given by the simplified expression: $P_{(x,y)} = 0.0218 P_{(x,y)}^2 + 0.0228 P_{(x,y)}^2 + 0.0170 P_{(x,y)}^2$	4	5	10
	$P_L(pu) = 0.0218P_1^2(pu) + 0.0228P_2^2(pu) + 0.0179P_3^2(pu)$			
	Where loss coefficients are specified in pu on a 100 MVA base. Determine the			
	optimal dispatch of the generation and total fuel cost when the total system load is			
	tabulated below using iteration methods. Table: Different Data for Experiment			
	S. No. Total system load			
	6. 50 7. 55			
	8. 60			
	9. 65 10. 70			
	(Reference: Power System Analysis by Hadi Saadat, TMH Pub.)			
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Assignment Sheet-II Session 2023-24 (Even Semester)

Subject: Power System-II (6EE4-02)

Sui		wark	19- T U	
	(Set-III)			
Q.	Question	BL	CO	MM
	A 320 km, 275 KV three-phase line has the following general parameters:			
	$\overrightarrow{A} = 0.94, \angle 1.0, \qquad \overrightarrow{B} = 107, \angle 78$			
	If the receiving end voltage is 275 KV, determine (a) the sending voltage			
	necessary if a load mentioned in table below is being delivered at the receiving			
	end.			
	Table: Different Data for Experiment			
	S. No. load 11. 260 MW			
	12. 270 MW			
	13. 280 MW			
	14. 200 MW 15. 300 MW			
1.	(b) the maximum power that can be transmitted if the sending end voltage is held	4	3	10
	at 290 KV, (c) the additional reactive MVA that will have to be provided at the			
	receiving end when delivering tabulated load below, the supply voltage being 290			
	KV.			
	Table: Different Data for Experiment			
	S. No. load			
	11. 410 MVA, 0.75 p. f. lagging			
	12. 420 MVA, 0.80p. f. lagging			
	13. 430 MVA, 0.85 p. f. lagging			
	14. 440 MVA, 0.90 p. f. lagging			
	15. 450 MVA, 0.95 p. f. lagging			
	(Reference: Electrical Power System by AShfaq Husain, CBS Pub.)			
	A single area consists of two generating units the flowing characteristics:			
	Unit-1, 400 MVA, 6% speed regulation			
	Unit-2, 300 MVA, 4% speed regulation			
	The units are operating in parallel, sharing 500 MW at the nominal frequency. Unit-1			
	supplies 300 MW and unit-2 supplies 200 MW at 60 Hz. The load is increased as			
	tabulated below:			
	e) Assume there is no frequency dependent load (D=0). Find the steady-state			
r	frequency deviation and new generation on each unit.	4	3	10
2.	f) Assume there is frequency dependent load (D=tabulated below). Find the steady-	4	3	10
	state frequency deviation and new generation on each unit.			
	Table: Different Data for Experiment			
	S. No. Increased load D 11. 60 MW 1.1			
	11. 00 MW 1.1 12. 70 MW 1.2			
	13. 80 MW 1.3			
	14. 90 MW 1.4 15. 100 MW 1.5			
	(Reference: Power System Analysis by Hadi Saadat, TMH Pub.)			
3.	Explain preventive and emergency control in power system with suitable example.	3	Λ	10
э.	(Reference: https://archive.nptel.ac.in/courses/108/101/108101040/)	3	4	10
4.	Draw and explain energy control centre of India in detail.	3	4	10
⊣.	(Reference: https://www.youtube.com/watch?v=Trj33GHuEFI)	5	+	10

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Sul		Mark	cs- 40	
	For the optimal dispatch and the total cost in \$/hr. for thermal power plant is			
	given by:			
	$C_1 = 500 + 5.3P_1 + 0.004P_1^2$			
	$C_2 = 400 + 5.5P_2 + 0.006P_2^2$			
	$C_3 = 200 + 5.8P_3 + 0.009P_3^2$			
	Where P_1, P_2 and P_3 are in MW and total demand is tabulated below with			
	following generation limits:			
5.	$200 \le P_1 \le 450$	4	5	10
	$150 \le P_2 \le 350$			
	$100 \le P_3 \le 225$			
	Table: Different Data for Experiment			
	S. No. Power Demand			
	11. 850 12. 855			
	13. 860			
	14. 865 15. 870			
	(Reference: Power System Analysis by Hadi Saadat, TMH Pub.)			
	The fuel cost in \$/hr. of three power plants are given by:			
	$C_1 = 200 + 7.0P_1 + 0.008P_1^2$			
	$C_2 = 180 + 6.3P_2 + 0.009P_2^2$			
	$C_3 = 140 + 6.8P_3 + 0.007P_3^2$			
	Where P_1, P_2 and P_3 are in MW. Plant outputs are subjected to the following			
	limits (MW):			
	$10 \le P_1 \le 85$			
	$10 \le P_2 \le 80$			
	$10 \le P_3 \le 70$			
6.	For this problem, assume the real power loss is given by the simplified	4	5	10
0.	expression:		5	10
	$P_L(pu) = 0.0218P_1^2(pu) + 0.0228P_2^2(pu) + 0.0179P_3^2(pu)$			
	Where loss coefficients are specified in pu on a 100 MVA base. Determine the			
	optimal dispatch of the generation and total fuel cost when the total system load is			
	tabulated below using iteration methods.			
	Table: Different Data for Experiment			
	S. No. Total system load 11. 75			
	11.			
	13. 85			
	14. 90 15. 95			
	(Reference: Power System Analysis by Hadi Saadat, TMH Pub.)			
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Assignment Sheet-II Session 2023-24 (Even Semester)

Subject: Power System-II (6EE4-02)

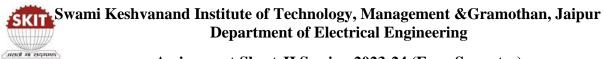
	oject: Power System-II (6EE4-02) Max N		••	
~	(Set-IV)		~~~	I
Q.	Question	BL	CO	MM
1.	A three-phase 50 Hz transmission line has a resistance 14 ohm per phase and a reactance of 48 ohm per phase. The capacitive sucepetance to neural is 4×10^{-4} Siemen. Find the MVAR rating at no-load and full-load of a synchronous phase modifier to maintain the sending end and receiving end voltages constant at 70 KV and 66 KV respectively when the line is delivering a tabulated load below. Table: Different Data for Experiment S. No. Ioad 16. 15 MVA, 0.9 p.f. lagging 17. 20 MVA, 0.85 p.f. lagging	4	3	10
	18.25 MVA, 0.80 p.f. lagging19.30 MVA, 0.75 p.f. lagging20.30 MVA, 0.70 p.f. laggingCarbon Control (Reference: Electrical Power System by AShfaq Husain, CBS Pub.)A single area consists of two generating units the flowing characteristics:			
2.	Unit-1, 500 MVA, 4% speed regulation Unit-1, 500 MVA, 5% speed regulation The units are operating in parallel, sharing 800 MW at the nominal frequency. Unit-1 supplies 300 MW and unit-2 supplies 500 MW at 60 Hz. The load is increased as tabulated below: g) Assume there is no frequency dependent load (D=0). Find the steady-state frequency deviation and new generation on each unit. h) Assume there is frequency dependent load (D=tabulated below). Find the steady-state frequency deviation and new generation on each unit. h) Assume there is frequency dependent load (D=tabulated below). Find the steady-state frequency deviation and new generation on each unit. Table: Different Data for Experiment S. No. Increased load D 16. 90 MW 0.80 17. 100 MW 0.90 18. 110 MW 1.00 19. 120 MW 1.10 20. 130 MW 1.20 (Reference: Power System Analysis by Hadi Saadat, TMH Pub.)	4	3	10
3.	Explain preventive and emergency control in power system with suitable example. (Reference: https://archive.nptel.ac.in/courses/108/101/108101040/)	3	4	10
4.	(Reference: https://archive.nptei.ac.m/courses/103/101/103/01040/) Draw and explain energy control centre of India in detail. (Reference: https://www.youtube.com/watch?v=Trj33GHuEFI)	3	4	10
5.	For the optimal dispatch and the total cost in \$/hr. for thermal power plant is given by: $C_1 = 500 + 5.3P_1 + 0.004P_1^2$ $C_2 = 400 + 5.5P_2 + 0.006P_2^2$ $C_3 = 200 + 5.8P_3 + 0.009P_3^2$ Where P_1, P_2 and P_3 are in MW and total demand is tabulated below with following generation limits: $200 \le P_1 \le 450$ $150 \le P_2 \le 350$ $100 \le P_3 \le 225$	4	5	10
Face			<u> </u>	
гаси	Ity Name Dr. Dhanraj Chitara			





Sub	ject: Power System-II (6EE4-02) Max N	Aarks	- 40	
	Table: Different Data for ExperimentS. No.Power Demand16.87517.88018.88519.89020.895(Reference: Power System Analysis by Hadi Saadat, TMH Pub.)			
6.	The fuel cost in \$/hr. of three power plants are given by: $C_{1} = 200 + 7.0P_{1} + 0.008P_{1}^{2}$ $C_{2} = 180 + 6.3P_{2} + 0.009P_{2}^{2}$ $C_{3} = 140 + 6.8P_{3} + 0.007P_{3}^{2}$ Where P_{1}, P_{2} and P_{3} are in MW. Plant outputs are subjected to the following limits (MW): $10 \le P_{1} \le 85$ $10 \le P_{2} \le 80$ $10 \le P_{3} \le 70$ For this problem, assume the real power loss is given by the simplified expression: $P_{L}(pu) = 0.0218P_{1}^{2}(pu) + 0.0228P_{2}^{2}(pu) + 0.0179P_{3}^{2}(pu)$ Where loss coefficients are specified in pu on a 100 MVA base. Determine the optimal dispatch of the generation and total fuel cost when the total system load is tabulated below using iteration methods. $\frac{\mathbf{S}. \mathbf{No.} \frac{\mathbf{Total system Ioad}}{16. \qquad 100}$	4	5	10

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Subject: Power System-II (6EE4-02)

Sun	jett. rower	System-11 (6EE4-02) IVIAX IV	arks	- 40	
		(Set-V)			
Q.	A .1 -	Question	BL	CO	MM
1.	of 40 ohn transmitted difference power trans to supply fo	ase transmission line has a resistance 12 ohm per phase and a reactance n per phase. (a) Determine the maximum power which may be if 132 KV were maintained at each end. (b) What is the phase between the receiving end and sending end voltages for maximum smitted? (c) Also, determine the rating of synchronous phase modifier ollowing load the receiving end. Table: Different Data for Experiment $\frac{S. No. \qquad load}{21. \qquad 100 \text{ MW}, 0.90 \text{ p.f. lagging}} \\ 22. \qquad 1100 \text{ MW}, 0.85 \text{ p.f. lagging}} \\ 23. \qquad 120 \text{ MW}, 0.80 \text{ p.f. lagging}} \\ 24. \qquad 130 \text{ MW}, 0.75 \text{ p.f. lagging}} \\ 25. \qquad 140 \text{ MW}, 0.70 \text{ p.f. lagging}} \\ Electrical Power System by AShfaq Husain, CBS Pub.)$	4	3	10
2.	An isolated Turbine tim Governor ti Generator t Governor sy The load va a) Use b) The outp incr	power station has the LFC system with the following parameters: the constant = 0.5 sec time constant = 0.25 sec time constant = 8 sec peed regulation = R pu tried as 'D' tabulated below: Routh stability criterion to determine the range of 'R' governor speed regulation is set to R = 0.04 pu. The turbine rated but is 200 MW at a nominal frequency of 60 Hz. A sudden load tease as tabulated below: Table: Different Data for Experiment $\frac{$. No. D & Sudden Increased load}{21. 0.80 & 30 MW}$ 22. 0.90 40 MW 23. 1.00 50 MW 24. 1.10 60 MW	4	3	10
3.	Explain prev	Power System Analysis by Hadi Saadat, TMH Pub.) /entive and emergency control in power system with suitable example. https://archive.nptel.ac.in/courses/108/101/108101040/)	3	4	10
4.	Draw and e	explain energy control centre of India in detail. https://www.youtube.com/watch?v=Trj33GHuEFI)	3	4	10
5.	For the optiby: Where P_1 ,	imal dispatch and the total cost in \$/hr. for thermal power plant is given $C_1 = 500 + 5.3P_1 + 0.004P_1^2$ $C_2 = 400 + 5.5P_2 + 0.006P_2^2$ $C_3 = 200 + 5.8P_3 + 0.009P_3^2$ $P_2 \text{ and } P_3 \text{ are in MW and total demand is tabulated below with generation limits:}$	4	5	10
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		Mr. Ajay Bhardwaj			
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$100 \le P_{i}^{2} \le 225$ Table: Different Data for Experiment $ \frac{5. No. Power Demand}{\frac{21. 9005}{22. 905}} $ (Reference: Power System Analysis by Hadi Saadat, TMH Pub.) (Reference: Power System Analysis by Hadi Saadat, TMH Pub.) The fuel cost in \$/hr. of three power plants are given by: $ C_{1} = 200 + 7.0P_{1} + 0.008P_{1}^{2} $ $ C_{2} = 180 + 6.3P_{2} + 0.009P_{2}^{2} $ $ C_{3} = 140 + 6.8P_{3} + 0.007P_{3}^{2} $ Where P_{1}, P_{2} and P_{3} are in MW. Plant outputs are subjected to the following limits (MW): $ 10 \le P_{1} \le 85 $ $ 10 \le P_{2} \le 80 $ $ 10 \le P_{3} \le 70 $ 6. For this problem, assume the real power loss is given by the simplified expression: $ P_{L}(pu) = 0.0218P_{1}^{2}(pu) + 0.0228P_{2}^{2}(pu) + 0.0179P_{3}^{2}(pu) $ Where loss coefficients are specified in pu on a 100 MVA base. Determine the optimal dispatch of the generation and total fuel cost when the total system load is tabulated below using iteration methods. $ Table: Different Data for Experiment $ $ \frac{5. No. Total system load}{21. 125} $ $ \frac{21. 125}{23. 135} $ $ \frac{24. 4140}{25. 145} $		$200 \le P_1 \le 450$			
Table: Different Data for Experiment $$ No. $ Power Demand$21. $ 905$23. $ 910$24. $ 915$25. $ 920$(Reference: Power System Analysis by Hadi Saadat, TMH Pub.)The fuel cost in $/hr. of three power plants are given by:C_1 = 200 + 7.0P_1 + 0.008P_1^2C_2 = 180 + 6.3P_2 + 0.009P_2^2C_3 = 140 + 6.8P_3 + 0.007P_3^2Where P_1, P_2 and P_3 are in MW. Plant outputs are subjected to the following limits(MW):10 \leq P_1 \leq 8510 \leq P_2 \leq 8010 \leq P_2 \leq 8010 \leq P_2 \leq 706.For this problem, assume the real power loss is given by the simplified expression:P_L(pu) = 0.0218P_1^2(pu) + 0.0228P_2^2(pu) + 0.0179P_3^2(pu)Where loss coefficients are specified in pu on a 100 MVA base. Determine theoptimal dispatch of the generation and total fuel cost when the total system load istabulated below using iteration methods.Table: Different Data for Experiment\overline{22, 130}22, 145$		$150 \le P_2 \le 350$			
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$		$100 \le P_3 \le 225$			
21.90022.90523.91024.91525.920(Reference: Power System Analysis by Hadi Saadat, TMH Pub.)The fuel cost in \$/hr. of three power plants are given by: $C_1 = 200 + 7.0P_1 + 0.008P_1^2$ $C_2 = 180 + 6.3P_2 + 0.009P_2^2$ $C_3 = 140 + 6.8P_3 + 0.007P_3^2$ Where P_1, P_2 and P_3 are in MW. Plant outputs are subjected to the following limits (MW): $10 \le P_1 \le 85$ $10 \le P_2 \le 80$ $10 \le P_3 \le 70$ 6.For this problem, assume the real power loss is given by the simplified expression: $P_L(pu) = 0.0218P_1^2(pu) + 0.0228P_2^2(pu) + 0.0179P_3^2(pu)$ Where loss coefficients are specified in pu on a 100 MVA base. Determine the optimal dispatch of the generation and total fuel cost when the total system load is tabulated below using iteration methods. Table: Different Data for Experiment $\boxed{\frac{8.No. Total system load}{23. 135}}$ $24. 1445}$		—			
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$					
$24.$ 915 25. 920 (Reference: Power System Analysis by Hadi Saadat, TMH Pub.)The fuel cost in \$/hr. of three power plants are given by: $C_1 = 200 + 7.0P_1 + 0.008P_1^2$ $C_2 = 180 + 6.3P_2 + 0.009P_2^2$ $C_3 = 140 + 6.8P_3 + 0.007P_3^2$ Where P_1, P_2 and P_3 are in MW. Plant outputs are subjected to the following limits (MW): $10 \le P_1 \le 85$ $10 \le P_2 \le 80$ $10 \le P_3 \le 70$ 6.For this problem, assume the real power loss is given by the simplified expression: $P_L(pu) = 0.0218P_1^2(pu) + 0.0228P_2^2(pu) + 0.0179P_3^2(pu)$ Where loss coefficients are specified in pu on a 100 MVA base. Determine the optimal dispatch of the generation and total fuel cost when the total system load is tabulated below using iteration methods.Table: Different Data for Experiment $\frac{5. No. Total system Ioad}{23. 135}$ $24. 145$		22. 905			
25. 920(Reference: Power System Analysis by Hadi Saadat, TMH Pub.)The fuel cost in \$/hr. of three power plants are given by: $C_1 = 200 + 7.0P_1 + 0.008P_1^2$ $C_2 = 180 + 6.3P_2 + 0.009P_2^2$ $C_2 = 180 + 6.3P_2 + 0.009P_2^2$ $C_3 = 140 + 6.8P_3 + 0.007P_3^2$ Where P_1, P_2 and P_3 are in MW. Plant outputs are subjected to the following limits(MW): $10 \le P_1 \le 85$ $10 \le P_2 \le 80$ $10 \le P_3 \le 70$ 6.For this problem, assume the real power loss is given by the simplified expression: $P_L(pu) = 0.0218P_1^2(pu) + 0.0228P_2^2(pu) + 0.0179P_3^2(pu)$ Where loss coefficients are specified in pu on a 100 MVA base. Determine the optimal dispatch of the generation and total fuel cost when the total system load is tabulated below using iteration methods.Table: Different Data for Experiment $\frac{\underline{S. No. Total system load}}{21. 125 \\ 22. 1300 \\ 23. 1350 \\ 24. 1440 \\ 25. 1445 \\ \hline \end{array}$					
The fuel cost in \$/hr. of three power plants are given by: $C_1 = 200 + 7.0P_1 + 0.008P_1^2$ $C_2 = 180 + 6.3P_2 + 0.009P_2^2$ $C_3 = 140 + 6.8P_3 + 0.007P_3^2$ 4Where P_1, P_2 and P_3 are in MW. Plant outputs are subjected to the following limits (MW): $10 \le P_1 \le 85$ $10 \le P_2 \le 80$ $10 \le P_3 \le 70$ 46.For this problem, assume the real power loss is given by the simplified expression: $P_L(pu) = 0.0218P_1^2(pu) + 0.0228P_2^2(pu) + 0.0179P_3^2(pu)$ Where loss coefficients are specified in pu on a 100 MVA base. Determine the optimal dispatch of the generation and total fuel cost when the total system load is tabulated below using iteration methods.5Table: Different Data for Experiment $\frac{10}{22}$ 23 135 24 145		25. 920			
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6. For this problem, assume the real power loss is given by the simplified expression: $P_{L}(pu) = 0.0218P_{1}^{2}(pu) + 0.0228P_{2}^{2}(pu) + 0.0179P_{3}^{2}(pu)$ Where loss coefficients are specified in pu on a 100 MVA base. Determine the optimal dispatch of the generation and total fuel cost when the total system load is tabulated below using iteration methods. $\frac{S.No. Total system load}{21. 125 \\ 22. 130 \\ 23. 135 \\ 24. 140 \\ 25. 145 \end{bmatrix}$ $h = 100000000000000000000000000000000000$					
$C_3 = 140 + 6.8P_3 + 0.007P_3^2$ Where P_1, P_2 and P_3 are in MW. Plant outputs are subjected to the following limits (MW): $10 \le P_1 \le 85$ $10 \le P_2 \le 80$ $10 \le P_3 \le 70$ 6.For this problem, assume the real power loss is given by the simplified expression: $P_L(pu) = 0.0218P_1^2(pu) + 0.0228P_2^2(pu) + 0.0179P_3^2(pu)$ Where loss coefficients are specified in pu on a 100 MVA base. Determine the optimal dispatch of the generation and total fuel cost when the total system load is tabulated below using iteration methods. $\mathbf{Table: Different Data for Experiment}$ $\underline{S. No. Total system load}$ 					
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6. [MW): $10 \le P_1 \le 85$ $10 \le P_2 \le 80$ $10 \le P_3 \le 70$ 6. For this problem, assume the real power loss is given by the simplified expression: $P_L(pu) = 0.0218P_1^2(pu) + 0.0228P_2^2(pu) + 0.0179P_3^2(pu)$ Where loss coefficients are specified in pu on a 100 MVA base. Determine the optimal dispatch of the generation and total fuel cost when the total system load is tabulated below using iteration methods. Table: Different Data for Experiment $\frac{10 \le P_2 \le 80}{2(pu) + 0.0179P_3^2(pu)}$		$C_3 = 140 + 6.8P_3 + 0.007P_3^2$			
$10 \le P_1 \le 85$ $10 \le P_2 \le 80$ $10 \le P_3 \le 70$ 6. For this problem, assume the real power loss is given by the simplified expression: $P_L(pu) = 0.0218P_1^2(pu) + 0.0228P_2^2(pu) + 0.0179P_3^2(pu)$ Where loss coefficients are specified in pu on a 100 MVA base. Determine the optimal dispatch of the generation and total fuel cost when the total system load is tabulated below using iteration methods. $Table: Different Data for Experiment$ $\frac{10 \le P_2 \le 80}{P_2 \le 2(pu) + 0.0179P_3^2(pu)}$ Where loss coefficients are specified in pu on a 100 MVA base. Determine the optimal dispatch of the generation and total fuel cost when the total system load is tabulated below using iteration methods. $Table: Different Data for Experiment$ $\frac{10 \le P_2 \le 80}{P_2 \le 2(pu) + 0.0179P_3^2(pu)}$		Where P_1, P_2 and P_3 are in MW. Plant outputs are subjected to the following limits			
6. For this problem, assume the real power loss is given by the simplified expression: $P_{L}(pu) = 0.0218P_{1}^{2}(pu) + 0.0228P_{2}^{2}(pu) + 0.0179P_{3}^{2}(pu)$ Where loss coefficients are specified in pu on a 100 MVA base. Determine the optimal dispatch of the generation and total fuel cost when the total system load is tabulated below using iteration methods. $\frac{S. No. Total system load}{21. 125}$ $\frac{S. No. Total system load}{23. 135}$ $\frac{24. 140}{25. 145}$		(MW):			
6. $10 \le P_3 \le 70$ 4510 $P_L(pu) = 0.0218P_1^2(pu) + 0.0228P_2^2(pu) + 0.0179P_3^2(pu)$ 4510Where loss coefficients are specified in pu on a 100 MVA base. Determine the optimal dispatch of the generation and total fuel cost when the total system load is tabulated below using iteration methods.510Table: Different Data for Experiment $\frac{S. No. Total system load}{21. 125}$ $22. 130$ $23. 135$ $24. 1440$ $25. 145$		$10 \le P_1 \le 85$			
6.For this problem, assume the real power loss is given by the simplified expression:4510 $P_L(pu) = 0.0218P_1^2(pu) + 0.0228P_2^2(pu) + 0.0179P_3^2(pu)$ Where loss coefficients are specified in pu on a 100 MVA base. Determine the optimal dispatch of the generation and total fuel cost when the total system load is tabulated below using iteration methods.10Table: Different Data for Experiment $\frac{S. No. Total system load}{21. 125}$ $22. 130$ $23. 135$ $24. 1440$ $25. 145$		$10 \le P_2 \le 80$			
$P_{L}(pu) = 0.0218P_{1}^{2}(pu) + 0.0228P_{2}^{2}(pu) + 0.0179P_{3}^{2}(pu)$ Where loss coefficients are specified in pu on a 100 MVA base. Determine the optimal dispatch of the generation and total fuel cost when the total system load is tabulated below using iteration methods. Table: Different Data for Experiment $\frac{\underline{S. No. Total system load}}{\underline{21. 125}}$ $\underline{22. 130}$ $\underline{23. 135}$ $\underline{24. 140}$ $\underline{25. 145}$		$10 \le P_3 \le 70$			
Where loss coefficients are specified in pu on a 100 MVA base. Determine the optimal dispatch of the generation and total fuel cost when the total system load is tabulated below using iteration methods.Table: Different Data for ExperimentS. No.Total system load 21.22.13023.13524.14025.145	6.	For this problem, assume the real power loss is given by the simplified expression:	4	5	10
optimal dispatch of the generation and total fuel cost when the total system load is tabulated below using iteration methods. Table: Different Data for Experiment S. No. Total system load 21. 125 22. 130 23. 135 24. 140 25. 145		$P_L(pu) = 0.0218P_1^2(pu) + 0.0228P_2^2(pu) + 0.0179P_3^2(pu)$			
optimal dispatch of the generation and total fuel cost when the total system load is tabulated below using iteration methods. Table: Different Data for Experiment S. No. Total system load 21. 125 22. 130 23. 135 24. 140 25. 145		Where loss coefficients are specified in pu on a 100 MVA base. Determine the			
Table: Different Data for Experiment S. No. Total system load 21. 125 22. 130 23. 135 24. 140 25. 145					
S. No. Total system load 21. 125 22. 130 23. 135 24. 140 25. 145		tabulated below using iteration methods.			
21. 125 22. 130 23. 135 24. 140 25. 145					
22. 130 23. 135 24. 140 25. 145					
24. 140 25. 145					
25. 145					
		(Reference: Power System Analysis by Hadi Saadat, TMH Pub.)			

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Assignment Sheet-II Session 2023-24 (Even Semester)

Subject: Power System-II (6EE4-02)

Sub	ject: Power System-II (6EE4-02) Max	arks- 4	ŧV	
6	(Set-VI)			3
Q.	Question	BL	CO	MM
	A three-phase transmission line has a resistance per phase of 5 ohm and inductive			
	reactance per phase of 12 ohm and line voltage at the receiving end is 33 KV. a)			
	Determine voltage at the sending end when the load at the receiving end is tabulated			
	below:			
	Different Data for Experiment			
	S. No. load			
	26. 10 MVA, 0.90 p.f. lagging			
	27. 15 MVA, 0.85 p.f. lagging			
	28. 20 MVA, 0.80 p.f. lagging			
	29. 25 MVA, 0.75 p.f. lagging 30. 30 MVA, 0.70 p.f. lagging			
	30. 30 MVA, 0.70 p.f. lagging			
1.	b) The voltage at the sending end is maintained constant at 36 KV by means of a	4	3	10
1.	synchronous phase modifier at the receiving end, which has the same rating at zero	-	5	10
	load at the receiving end as for the load tabulated below:			
	Different Data for Experiment S. No.			
	26. 10 MW			
	27. 15 MW			
	28. 20 MW			
	29. 25 MW			
	30. 30 MW			
	Determine the power factor of the full-load output and the rating of the synchronous			
	phase modifier.			
	(Reference: Electrical Power System by AShfaq Husain, CBS Pub.)			
	An isolated power station has the LFC system with the following parameters:			
	Turbine time constant = 0.5 sec			
	Governor time constant = 0.25 sec			
	Generator time constant $= 8 \text{ sec}$			
	Governor speed regulation = R pu			
	The load varied as 'D' tabulated below:			
	c) Use Routh stability criterion to determine the range of 'R'			
2.	d) The governor speed regulation is set to $R = 0.05$ pu. The turbine rated output	4	3	10
	is 200 MW at a nominal frequency of 60 Hz. A sudden load increase as			
	tabulated below:			
	Table: Different Data for Experiment			
	S. No. D Sudden Increased load 26. 1.20 30 MW			
	20. 1.20 50 MW 27. 1.30 40 MW			
		1		
	28. 1.40 50 MW			
	29. 1.50 60 MW			
	29. 1.50 60 MW 30. 1.60 70 MW	2	A	10
3.	29. 1.50 60 MW 30. 1.60 70 MW (Reference: Power System Analysis by Hadi Saadat, TMH Pub.)	3	4	10

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Sub	oject: Power System-II (6EE4-02) Max Ma	rks- 4	40	
	(Reference: https://www.youtube.com/watch?v=Trj33GHuEFI)			
	For the optimal dispatch and the total cost in \$/hr. for thermal power plant is given by:			
	$C_1 = 500 + 5.3P_1 + 0.004P_1^2$			
	$C_2 = 400 + 5.5P_2 + 0.006P_2^2$			
	$C_3 = 200 + 5.8P_3 + 0.009P_3^2$			
	Where P_1, P_2 and P_3 are in MW and total demand is tabulated below with following			
	generation limits:			
5.	$200 \le P_1 \le 450$	4	5	10
	$150 \le P_2 \le 350$		5	10
	$100 \le P_3 \le 225$			
	Table: Different Data for Experiment			
	S. No. Power Demand			
	26. 925 27. 930			
	28. 935			
	29. 940 30. 945			
	(Reference: Power System Analysis by Hadi Saadat, TMH Pub.)			
	The fuel cost in \$/hr. of three power plants are given by:			
	$C_1 = 200 + 7.0P_1 + 0.008P_1^2$			
	$C_2 = 180 + 6.3P_2 + 0.009P_2^2$			
	$C_3 = 140 + 6.8P_3 + 0.007P_3^2$			
	Where P_1, P_2 and P_3 are in MW. Plant outputs are subjected to the following limits			
	(MW):			
	$10 \le P_1 \le 85$			
	$10 \le P_2 \le 80$			
	$10 \le P_3 \le 70$			
б.	For this problem, assume the real power loss is given by the simplified expression:	4	5	10
	$P_L(pu) = 0.0218P_1^2(pu) + 0.0228P_2^2(pu) + 0.0179P_3^2(pu)$			
	Where loss coefficients are specified in pu on a 100 MVA base. Determine the			
	optimal dispatch of the generation and total fuel cost when the total system load is			
	tabulated below using iteration methods.			
	Table: Different Data for Experiment			
	S. No. Total system load 26. 150			
	27. 155			
	28. 160 29. 165			
	30. 170			
	(Reference: Power System Analysis by Hadi Saadat, TMH Pub.)			

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Assignment Sheet-II Session 2023-24 (Even Semester)

Subject: Power System-II (6EE4-02)

Dud	jett. I ower System-in (0EE4-02)	lai no	- 40	
	(Set-VII)			
Q.	Question	BL	CO	MM
	A three-phase, 50 Hz transmission line has the following values per phase per km:			
	R = 0.25 ohm, $L = 2$ mH, $C = 0.014$ µF. The line is 50 km long, the voltage at the			
	receiving end is 132 KV and the power delivered is tabulated below:			
	Table: Different Data for Experiment			
	S. No. load			
	31. 60 MVA, 0.90 p.f. lagging			
1.	32. 65 MVA, 0.85 p.f. lagging	4	3	10
1.	33. 70 MVA, 0.80 p.f. lagging	-	5	10
	34. 75 MVA, 0.75 p.f. lagging			
	35. 80 MVA, 0.70 p.f. lagging			
	If the voltage at the sending end is maintained at 140 KV by a synchronous phase			
	modifier at the receiving end, determine the KVAR of this machine a) with no			
	load b) with full load at the receiving end.			
	(Reference: Electrical Power System by AShfaq Husain, CBS Pub.)			
	An isolated power station has the LFC system with the following parameters:			
	Turbine time constant = 0.5 sec			
	Governor time constant = 0.2 sec			
	Generator time constant = 5 sec			
	Governor speed regulation $= R pu$			
	The load varied as 'D' tabulated below:			
	e) Use Routh stability criterion to determine the range of 'R'			
	f) The governor speed regulation is set to $R = 0.04$ pu. The turbine rated			
2.	output is 250 MW at a nominal frequency of 60 Hz. A sudden load	4	3	10
	increase as tabulated below:			
	Table: Different Data for Experiment			
	S. No. D Sudden Increased load			
	36. 1.20 30 MW			
	37. 1.30 40 MW 38. 1.40 50 MW			
	39. 1.50 60 MW			
	40. 1.60 70 MW			
	(Reference: Power System Analysis by Hadi Saadat, TMH Pub.)			
3.	Explain preventive and emergency control in power system with suitable example.	3	4	10
	(Reference: https://archive.nptel.ac.in/courses/108/101/108101040/)	5		10
4.	Draw and explain energy control centre of India in detail.	3	4	10
••	(Reference: https://www.youtube.com/watch?v=Trj33GHuEFI)			10

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Assignment Sheet-II Session 2025-24 (Even Semester)	<i>п</i> . ч	40	
Subject: Power System-II (6EE4-02) Max N	<u>/larks</u>	- 40	
For the optimal dispatch and the total cost in \$/hr. for thermal power plant is given			
by: $C_1 = 500 + 5.3P_1 + 0.004P_1^2$			
$C_2 = 400 + 5.5P_2 + 0.006P_2^2$			
$C_3 = 200 + 5.8P_3 + 0.009P_3^2$			
Where P_1, P_2 and P_3 are in MW and total demand is tabulated below with			
following generation limits:			
5. $200 \le P_1 \le 450$	4	5	10
$150 \le P_2 \le 350$			
$100 \le P_3 \le 225$			
Table: Different Data for Experiment			
S. No. Power Demand			
31. 950 32. 955			
33. 960			
34. 965			
35.970(Reference: Power System Analysis by Hadi Saadat, TMH Pub.)			
The fuel cost in \$/hr. of three power plants are given by:			
$C_1 = 200 + 7.0P_1 + 0.008P_1^2$			
$C_2 = 180 + 6.3P_2 + 0.009P_2^2$			
$C_3 = 140 + 6.8P_3 + 0.007P_3^2$			
Where P_1, P_2 and P_3 are in MW. Plant outputs are subjected to the following limits			
(MW):			
$10 \le P_1 \le 85$			
$10 \le P_2 \le 80$			
$10 \le P_3 \le 70$ 6. For this problem, assume the real power loss is given by the simplified expression:	4	5	10
$P_{L}(pu) = 0.0218P_{1}^{2}(pu) + 0.0228P_{2}^{2}(pu) + 0.0179P_{3}^{2}(pu)$	-	5	10
Where loss coefficients are specified in pu on a 100 MVA base. Determine the			
optimal dispatch of the generation and total fuel cost when the total system load is			
tabulated below using iteration methods.			
Table: Different Data for Experiment			
S. No. Total system load			
31. 175			
32. 180 33. 185			
33. 185 34. 190			
(Deference Berry Sector Andrew Heilights Heilights 195			
(Reference: Power System Analysis by Hadi Saadat, TMH Pub.)			

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Assignment Sheet-II Session 2023-24 (Even Semester)

Subject: Power System-II (6EE4-02)

Sui	jett. I ower System-H (OEE4-02)	ai 11,5-	τv	
	(Set-VIII)			
Q.	Question	BL	CO	MM
	A three-phase overhead line has the following general parameters:			
	\overrightarrow{A} = 0.8705, $\angle 2.3$, \overrightarrow{B} = 187, $\angle 75.1$			
	Find the MVAR rating on on-load and full-load of a synchronous phase modifier to			
	maintain the voltages constant at 154 KV at both ends.			
	The load at the receiving end is tabulated below. Also, determine the maximum load			
	that can be transmitted.			
۱.	Table: Different Data for Experiment S. No.	4	3	10
	36. 40 MVA, 0.70 p. f. lagging			
	37. 50 MVA, 0.75 p. f. lagging			
	38. 60 MVA, 0.80 p. f. lagging			
	39. 70 MVA, 0.85 p. f. lagging			
	40. 80 MVA, 0.90 p. f. lagging			
	41. 90 MVA, 0.95 p. f. lagging			
	(Reference: Electrical Power System by AShfaq Husain, CBS Pub.)			
2.	 Generator time constant = 5 sec Governor speed regulation = R pu The load varied as 'D' tabulated below: g) Use Routh stability criterion to determine the range of 'R' h) The governor speed regulation is set to R = 0.05 pu. The turbine rated output is 250 MW at a nominal frequency of 60 Hz. A sudden load increase as tabulated below: 	4	3	10
	S. No. D Sudden Increased load			
	41. 0.80 30 MW 42. 0.90 40 MW			
	43. 1.00 50 MW			
	44. 1.10 60 MW 45. 1.20 70 MW			
	45. 1.20 70 MW 46. 1.30 80 MW			
	(Reference: Power System Analysis by Hadi Saadat, TMH Pub.)			
3.	Explain preventive and emergency control in power system with suitable example.	3	4	10
•	(Reference: https://archive.nptel.ac.in/courses/108/101/108101040/)	5	т	10
1.	Draw and explain energy control centre of India in detail.	3	4	10
- -	(Reference: https://www.youtube.com/watch?v=Trj33GHuEFI)	5		10

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Sul	bject: Power System-II (6EE4-02) Max M	arks-	40	
	For the optimal dispatch and the total cost in \$/hr. for thermal power plant is given		-	
	by:			
	$C_1 = 500 + 5.3P_1 + 0.004P_1^2$			
	$C_2 = 400 + 5.5P_2 + 0.006P_2^2$			
	$C_3 = 200 + 5.8P_3 + 0.009P_3^2$			
	Where P_1, P_2 and P_3 are in MW and total demand is tabulated below with following			
	generation limits:			
5.	$200 \le P_1 \le 450$	4	5	10
5.	$150 \le P_2 \le 350$		5	10
	$100 \le P_3 \le 225$			
	Table: Different Data for Experiment			
	S. No. Power Demand 36. 975			
	37. 980			
	38. 985 39. 990			
	40. 995			
	(Reference: Power System Analysis by Hadi Saadat, TMH Pub.)			
	The fuel cost in \$/hr. of three power plants are given by:			
	$C_1 = 200 + 7.0P_1 + 0.008P_1^2$			
	$C_2 = 180 + 6.3P_2 + 0.009P_2^2$			
	$C_3 = 140 + 6.8P_3 + 0.007P_3^2$			
	Where P_1, P_2 and P_3 are in MW. Plant outputs are subjected to the following limits			
	(MW):			
	$10 \le P_1 \le 85$			
	$10 \le P_2 \le 80$			
	$10 \le P_3 \le 70$			
6.	For this problem, assume the real power loss is given by the simplified expression:	4	5	10
	$P_L(pu) = 0.0218P_1^2(pu) + 0.0228P_2^2(pu) + 0.0179P_3^2(pu)$			
	Where loss coefficients are specified in pu on a 100 MVA base. Determine the			
	optimal dispatch of the generation and total fuel cost when the total system load is			
	tabulated below using iteration methods.			
	Table: Different Data for ExperimentS. No.Total system load			
	S. No. Total system load 36. 200			
	37. 205 38. 210			
	38. 210 39. 215			
	40. 220			
	41. 225 (Reference: Power System Analysis by Hadi Saadat, TMH Pub.)			
	1	1	1	

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