

Time: 3 Hours**Max Marks: 60**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

		Marks	CO	Blooms Level
<u>UNIT-I</u>				
1.	a) Discuss the role of graphics in enhancing user interaction.	5	CO1	BTL-2
	b) Analyse the reasons behind the popularity of GUIs over command-line interfaces.	5	CO1	BTL-4
(OR)				
2.	a) Differentiate between Web UI and GUI with examples.	5	CO1	BTL-2
	b) Evaluate the impact of poor UI design on user satisfaction and productivity.	5	CO1	BTL-5
<u>UNIT-II</u>				
3.	a) Write the differences between functional and non-functional requirements in UI design.	5	CO1	BTL-4
	b) Analyse the effect of ignoring human considerations in interface design.	5	CO1	BTL-4
(OR)				
4.	a) Develop a simple requirement specification document for a university course registration system.	5	CO1	BTL-6
	b) Evaluate the effectiveness of including end-user feedback in requirement analysis.	5	CO1	BTL-5
<u>UNIT-III</u>				
5.	a) Compare different kinds of graphical menus with advantages and disadvantages.	5	CO1	BTL-4
	b) Analyse the impact of poor navigation design on user experience.	5	CO1	BTL-4
(OR)				
6.	a) Design a hierarchical menu structure for an online food delivery application.	5	CO1	BTL-6
	b) Evaluate flat vs. tree menu design approaches for e-commerce websites.	5	CO1	BTL-5
<u>UNIT-IV</u>				
7.	a) Compare SDI and MDI with their advantages.	5	CO1	BTL-4
	b) Analyse window management issues in multitasking systems.	5	CO1	BTL-4
(OR)				
8.	a) Design a window layout for an online learning system.	5	CO1	BTL-6
	b) Evaluate different window organization strategies	5	CO1	BTL-5
<u>UNIT-V</u>				
9.	a) Compare system messages in desktop vs. web applications.	5	CO1	BTL-4
	b) Analyze the impact of poor error messages.	5	CO1	BTL-4
(OR)				
10.	a) Design icons for a mobile banking application.	5	CO1	BTL-6
	b) Evaluate text vs. icon-based communication in UI.	5	CO1	BTL-5
<u>UNIT-VI</u>				
11.	a) Define color and its uses in UI design.	5	CO1	BTL-1
	b) Explain human vision considerations in color selection.	5	CO1	BTL-2
(OR)				
12.	a) Discuss possible problems with color in UI design.	5	CO1	BTL-2
	b) Illustrate guidelines for color usage in textual and graphical screens.	5	CO1	BTL-3

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	<u>UNIT-I</u>	Marks	CO	Blooms Level
1. a)	Expound the various frequency band allocations used for satellite services	5M	CO1	BL3
b)	A satellite in an elliptical orbit around the earth has an apogee of 39,152km and a perigee of 500 km. What is the orbital period of this satellite. Assume radius of earth is 6378.137km and Kepler's constant has the value $3.98 \times 10^5 \text{ km}^3/\text{s}^2$.	5M	CO1	BL4
	(OR)			
2. a)	Discuss the orbital effects on communication system performance.	5M	CO1	BL3
b)	Write about orbit determination methods and their role in maintaining communication links.	5M	CO1	BL2
	<u>UNIT-II</u>			
3. a)	Describe the process of telemetry data collection and transmission from the satellite to the earth station.	5M	CO2	BL3
b)	With a neat diagram, analyze the operation of a 14/11 GHz transponder.	5M	CO2	BL4
	(OR)			
4. a)	Discuss in detail Altitude and orbit control system for a spacecraft.	5M	CO2	BL3
b)	What are the various subsystems in the satellite? Explain the power system.	5M	CO2	BL2
	<u>UNIT-III</u>			
5. a)	How does the system noise temperature effect the performance?	5M	CO3	BL2
b)	Discuss about design of satellite links for specified C/N in detail.	5M	CO3	BL3
	(OR)			
6. a)	Illustrate Rain attenuations and all factors related to it.	5M	CO3	BL3
b)	Derive the overall carrier to noise ratio in FDMA.	5M	CO3	BL3

UNIT-IV

7. a) Discuss the key elements involved in the design and operation of earth stations. 5M CO4 BL3
- b) Examine the significance of antenna gain and beamwidth in determining earth station performance. 5M CO4 BL4

(OR)

- 8 a) Write short notes on the Low noise amplifier used in the receiver of an earth station 5M CO4 BL3
- b) Explain the role of VSAT earth stations in modern satellite communication networks. 5M CO4 BL2

UNIT-V

9. a) Describe the evolution of GPS from its early concepts to the modern-day satellite navigation systems used worldwide. 5M CO5 BL3
- b) Analyze the procedure for determining a receiver's position in three dimensions (3D) and justify the need for a minimum of four satellites in 3D positioning. 5M CO5 BL4

(OR)

- 10 a) Illustrate the working principle of the Global Positioning System (GPS) with the help of a neat diagram. 5M CO5 BL3
- b) Discuss the sources of error in GPS-based position determination and explain how these errors can be minimized. 5M CO5 BL2

UNIT-VI

- 11 a) Discuss the architecture and functions of the Space Segment of GPS, emphasizing the satellite constellation, orbital characteristics, and satellite payloads. 5M CO6 BL3
- b) Explain the Navigation data message transmitted by GPS satellites. What information does it contain and how is it used by GPS receivers? 5M CO6 BL2

(OR)

- 12 a) Explain the structure and characteristics of GPS signals, mentioning the carrier frequencies used and their significance. 5M CO6 BL3
- b) Define Pseudorandom Noise (PRN) code and explain its importance in satellite identification and signal correlation. 5M CO6 BL2

POWER SYSTEM OPERATION AND CONTROL
(ELECTRICAL AND ELECTRONICS ENGINEERING)

Time: 3 Hours

Max Marks: 60

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<u>UNIT-I</u>		Marks	CO	Blooms Level
1.	a) Obtain the condition for optimum operation of a power system with 'n' plants.	5	1	2
	b) Explain in detail input and output characteristics of thermal plant.	5	1	2
(OR)				
2.	If two plants having cost characteristics as given	10	1	3
$C_1 = 0.1 P_{G_1}^2 + 60 P_{G_1} + 135 \text{ Rs./hr}$ $C_2 = 0.15 P_{G_2}^2 + 40 P_{G_2} + 100 \text{ Rs./hr}$ <p>have to meet the following daily load cycle: 0 to 6 hrs – 7 MW 18 to 24 hrs – 70 MW find the economic schedule for the different load conditions. If a cost of Rs. 450 is involved in taking either plant out of services or to return to service, find whether it is more economical to keep both plants in service for the whole day or to remove one of them during light-load service.</p>				
<u>UNIT-II</u>				
3.	Derive the transmission loss formula	10	2	2
(OR)				
4.	a) What is the penalty factor. Derive the expression for the penalty factor.	5	2	2
	b) A power system is supplied by only two plants, both of which operate on economical dispatch. At the bus of Plant-1, the incremental cost is 55 Rs/MWh and at Plant-2 is 50 Rs/MWh. Which plant has the higher penalty factor? What is the penalty factor of Plant-1 if the cost per hour of increasing the load on system by 1 MW is 75 Rs/hr?	5	2	3
<u>UNIT-III</u>				
5.	Derive the condition for optimality of short term hydro thermal scheduling problem	10	3	2
(OR)				
6.	a) Compare an optimal UC problem with an economical load dispatch problem.	5	3	2
	b) Explain the need of an optimal UC problem	5	3	2
<u>UNIT-IV</u>				
7.	Derive the expression for change in frequency under steady state condition for single area LFC system with controlled case.	10	4	3
(OR)				

8. Given a single area with two generating units as shown 10 4 3

Unit	Rating (MVA) Speed	droop R (per unit on unit base)
1	400	0.04
2	800	0.05

The units share a load of $P = 200$ MW; $P = 500$ MW. The units are operating in parallel, sharing 700 MW at 1.0 (50 Hz) frequency. The load is increased by 130 MW.

With $B = 0$, Find the steady-state frequency deviation and the new generation on each unit.

With $B = 0.804$, Find the steady-state frequency deviation and the new generation on each unit.

UNIT-V

9. Obtain the mathematical modelling of the line power in an interconnected system and its block diagram. 10 5 2

(OR)

10. a) Two generators of rating 100 and 200 MW are operated with a droop characteristic of 6% from no load to full load. Determine the load shared by each generator, if a load of 270 MW is connected across the parallel combination of those generators 5 5 3
- b) Explain dynamic response of two-area control system 5 5 2

UNIT-VI

11. a) Explain Why reactive power control is required in transmission line? 5 6 2
- b) Compare the different types of compensating equipment for transmission systems. 5 6 2

(OR)

12. a) What are the specifications of load compensation? 5 6 2
- b) A 3- ϕ 500 HP, 50 Hz, 11 kV star connected induction motor has a full load efficiency of 85% at lagging p.f. of 0.75 and is connected to a feeder. If the p.f. of load is desired to be corrected to 0.9 lagging, determine the following: 5 6 3
1. size of the capacitor bank in kVAR and
 2. capacitance of each unit if the capacitors are connected in Δ as well as in Y.

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<u>UNIT-I</u>				
1.	State the pump theory. With a suitable diagram, describe the construction and operation of a piston-type hydraulic pump.	10	1	L2
(OR)				
2. a)	List and elaborate on various applications of fluid power in industry.	5	1	L2
b)	Compare the working principles of gear, vane, and piston hydraulic motors.	5	1	L2
<u>UNIT-II</u>				
3. a)	Enumerate the Applications of Intensifiers.	5	2	L2
b)	Explain the functions and applications of shuttle valve in hydraulic circuits.	5	2	L2
(OR)				
4.	Distinguish between a two-way and four-way direction control valves with examples. Elaborate any one.	10	2	L2
<u>UNIT-III</u>				
5. a)	Draw and explain a hydraulic clamping circuit used in machine tools.	5	3	L2
b)	Discuss the functions and applications of a regenerative circuit in hydraulic systems.	5	3	L3
(OR)				
6. a)	Describe meter-in and meter-out speed control circuits with neat diagrams.	5	3	L2
b)	Explain the standard manifold arrangement for dual speed application in hydraulics.	5	3	L2
<u>UNIT-IV</u>				
7.	List any five pneumatic symbols and explain their importance in pneumatic circuit design.	10	4	L2
(OR)				
8.	List and describe types of pneumatic actuators with diagrams.	10	4	L2
<u>UNIT-V</u>				
9. a)	Illustrate a basic pneumatic speed control circuit and explain its operation.	5	5	L2
b)	Discuss the working of time delay valve in pneumatic logic circuits.	5	5	L2
(OR)				
10. a)	Describe the AND and OR logic gates as applied in pneumatic control systems.	5	5	L2
b)	Explain position and pressure sensing techniques in pneumatic systems.	5	5	L2
<u>UNIT-VI</u>				
11.	Write short notes on Installation, Selection, Maintenance.	10	6	L2
(OR)				
12. a)	Outline the steps for troubleshooting a hydraulic circuit for a shaping machine.	5	6	L2
b)	What are the remedies for common pneumatic system failures?	5	6	L2