

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) Explain any five java features.	7	CO1	2
	b) Develop a Java program to calculate the sum of array elements.	7	CO1	3
(OR)				
2.	a) What is an Array? Explain about types of arrays in Java.	7	CO1	2
	b) Discuss String methods.	7	CO1	2
<u>UNIT-II</u>				
3.	a) Distinguish between instance variables and Static variables explain with an example.	7	CO2	2
	b) List and explain different types of constructors.	7	CO2	2
(OR)				
4.	a) Develop a Java program to implement i) this keyword ii) static method.	7	CO2	3
	b) Discuss the usage of i) final keyword ii) finalize keyword.	7	CO2	2
<u>UNIT-III</u>				
5.	a) Define Inheritance. Explain the concept of multilevel inheritance with an example.	7	CO3	2
	b) Distinguish between Method Overriding and Method Overloading.	7	CO3	2
(OR)				
6.	a) Explain the concept of interface with an example program.	7	CO3	2
	b) Write a Java program to demonstrate Abstract class.	7	CO3	3
<u>UNIT-IV</u>				
7.	a) Define package. Explain how to import a package in Java.	7	CO4	2
	b) Explain the concept of exception handling with suitable example.	7	CO5	2
(OR)				
8.	a) Explain about user defined exceptions with example.	7	CO5	2
	b) What are the differences between checked and unchecked exceptions in Java?	7	CO5	2
<u>UNIT-V</u>				
9.	a) Explain life cycle methods of Thread with a neat sketch.	7	CO5	2
	b) Write a Java program for passing parameters to Applet.	7	CO5	3
(OR)				
10.	a) Explain about the various methods of creating a Thread.	7	CO5	2
	b) Write a Java applet program to draw rectangle and oval.	7	CO5	3

Time: 3 Hours

Max Marks: 70

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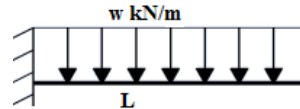
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UNIT-I

Marks	CO	Blooms Level
7 M	1	L3

1. a) Refer to the cantilever beam shown below; find the maximum slope and deflection in the beam using differential equation approach.

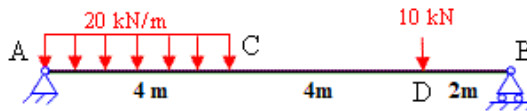


- b) Find the maximum slope and deflection in a simply supported beam of span 'L' carrying a uniformly distributed load of intensity 'w' kN/m over the entire span.

7 M	1	L3
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(OR)

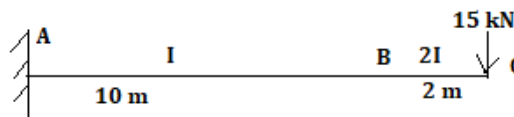
2. Determine the deflection and slope at 5 m from support A for the simple beam shown in figure.

Given $E = 210 \text{ GPa}$ and $I_{xx} = 320 \times 10^6 \text{ mm}^4$.**UNIT-II**

3. a) Derive an expression for strain energy for a beam AB of length 'L' due to axial force.

7 M	2	L2
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- b) Using the strain energy method find the deflection at the free end of the cantilever beam shown in figure. Given $E = 200 \text{ kN/mm}^2$, $I = 10 \times 10^6 \text{ mm}^4$.



7 M	2	L3
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(OR)

4. a) Define strain energy and find the strain energy stored in a cantilever beam of span 'L' subjected to a point load 'W' at free end.

7 M	2	L3
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- b) State Castigliano's second theorem and derive expression for strain energy due to bending moment in a simple of span 'L'.

7 M	2	L2
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UNIT-III

5. A uniform load of 30 kN/m , 5 m long, crosses a girder 20 m span. Calculate the i) Maximum +ve and -ve S.F at a section 8 m from the left support. ii) B.M at a section 8 m from the left support. Also calculate absolute maximum B.M in the beam. 14 M 3 L3

(OR)

6. How to find the absolute maximum shear force in a simply supported girder of span 'L' subjected series of point loads? Hence, determine the absolute maximum moment on the simply supported beam caused by the wheel loads. 14 M 3 L3



UNIT-IV

7. A propped cantilever beam of span 6 m supports a point load of 6 kN at the mid span. Determine the support reactions. and also sketch SFD and BMD. 14 M 4 L3

(OR)

8. A fixed beam of span 4 m is loaded a point load of 5 kN at distance of 1.5 m from the left support. Find the end moments and draw the SFD and BMD. 14 M 4 L3

UNIT-V

9. A three-hinged parabolic arch hinged at the supports and at the crown has a span of 24 m and a central rise of 4 m . It carries a concentrated load of 50 kN at 18 m from left support and a uniformly distributed load of 30 kN/m over the left half portion. Determine the support reactions. Also find the Moment and Thrust at a section 6 m from the left support. 14 M 5 L3

(OR)

10. A two hinged parabolic arch of span 36 m and central rise 8 m carries a uniformly distributed load of 32 kN/m over the left half of the span. Determine the position and value of maximum bending moment. Also find the normal thrust and radial shear at the section. Assume that the moment of inertia at a section varies as secant of the slope at the section. 14 M 5 L3

**Software Engineering
(COMPUTER SCIENCE AND ENGINEERING)****Time: 3 Hours****Max Marks: 70**

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		Marks	CO	Blooms Level
<u>UNIT-I</u>				
1.	a) Define Software Engineering. Explain the evolving role of software.	7M	CO1	K1
	b) What are software myths? Explain their impact on software development.	7M	CO1	K2
(OR)				
2.	a) Discuss the different types of software requirements with examples.	7M	CO1	K2
	b) What is the importance of requirements validation? Describe the techniques used.	7M	CO1	K3
<u>UNIT-II</u>				
3.	a) Explain the Waterfall model and its advantages and disadvantages.	7M	CO2	K2
	b) Compare and contrast the Prototyping model and the Spiral model.	7M	CO2	K2
(OR)				
4.	a) What is the Agile software development process? Explain the Agile principles.	7M	CO2	K3
	b) Describe the Scrum software development process and its benefits.	7M	CO2	K2
<u>UNIT-III</u>				
5.	a) What are the characteristics of a good software design? Explain in detail.	7M	CO3	K3
	b) Discuss the role of design patterns in software development.	7M	CO3	K2
(OR)				
6.	a) Explain various architectural styles used in software engineering.	7M	CO3	K2
	b) Describe the key principles of user interface design.	7M	CO3	K2
<u>UNIT-IV</u>				
7.	a) Differentiate between verification and validation. Why are both necessary?	7M	CO4	K2
	b) Explain the process of debugging and its significance.	7M	CO4	K2
(OR)				
8.	a) What is boundary-value analysis? Illustrate with an example	7M	CO4	K3
	b) Describe control structure testing and its importance in software testing.	7M	CO4	K2
<u>UNIT-V</u>				
9.	a) Explain the COCOMO II Model for software estimation.	7M	CO5	K2
	b) What is Statistical Software Quality Assurance (SSQA)? Discuss its role in software quality.	7M	CO5	K3
(OR)				
10.	a) Describe the importance of software quality assurance (SQA) in software development.	7M	CO5	K2
	b) What are Formal Technical Reviews (FTR)? How do they contribute to software quality?	7M	CO5	K3

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		<u>UNIT-I</u>	Marks	CO	Blooms Level
1.	a)	Derive the Expression for electric potential due to finite line charge?	7	CO1	L2
	b)	Explain Poisson's and Laplace's Equations.	7	CO1	L2
		(OR)			
2.	a)	State and explain Coulomb's law. Obtain an expression in vector form.	7	CO1	L1
	b)	State Gauss's law and derive an expression for E due to line of charge and sheet of charge.	7	CO1	L3
		<u>UNIT-II</u>			
3.	a)	Explain Magnetic Flux Density	7	CO2	L2
	b)	Define Ampere's circuit law and prove it with the help of suitable diagram.	7	CO2	L1
		(OR)			
4.	a)	State and Explain about Biot-Savarts law.	7	CO2	L1
	b)	Find the force on a moving point charge and differential current element.	7	CO2	L3
		<u>UNIT-III</u>			
5.	a)	Discuss the Maxwell's equations for static fields.	7	CO3	L2
	b)	Discuss the modified Ampere's circuit law in detail.	7	CO3	L2
		(OR)			
6.	a)	Discuss the Faraday's law in detail.	7	CO3	L2
	b)	State and explain the boundary conditions of the electric fields.	7	CO3	L1
		<u>UNIT-IV</u>			
7.	a)	Find the relations between E and H in a uniform plane wave.	7	CO4	L2
	b)	State and prove Poynting Theorem.	7	CO4	L2
		(OR)			
8.	a)	Explain the different types of polarization.	7	CO4	L2
	b)	Discuss the characteristics of uniform plane wave in good conductor.	7	CO4	L3
		<u>UNIT-V</u>			
9.	a)	Define the reflection coefficient and derive the expression for it and also derive the relation between reflection coefficient and VSWR.	7	CO5	L1
	b)	Discuss the single stub matching in detail with a suitable diagram.	7	CO5	L2
		(OR)			
10.	a)	Derive the relation between γ & S in 2-wire Transmission line?	7	CO5	L2
	b)	Using a slotted line, the following results were obtained: distance of first minimum from the load = 4 cm; distance of second minimum from the load = 14 cm; voltage standing-wave ratio = 1.5. If the line is lossless and $Z_0 = 50 \Omega$, find the load impedance.	7	CO5	L3

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		Marks	CO	Blooms Level
<u>UNIT-I</u>				
1.	a) Draw a typical layout of a Thermal power plant. Explain the main features of the layout.	10	1	3
	b) Write short notes on: (i) Super heater. (ii) Economizer.	4	1	2
(OR)				
2.	a) Draw a neat schematic diagram of a hydro-electric plant and write the functions of various components.	10	1	2
	b) What are the factors considered for the selection of site for hydro-electric power plants.	4	1	2
<u>UNIT-II</u>				
3.	a) Explain the principle of solar photovoltaic power generation.	6	2	2
	b) Discuss about the horizontal and vertical axis windmill. Explain its advantages and disadvantages.	8	2	3
(OR)				
4.	a) Explain the importance of fast breeder reactor in nuclear power station.	4	2	2
	b) With a neat schematic diagram, explain the operation of a nuclear power plant. Also discuss the advantages and disadvantages.	10	2	3
<u>UNIT-III</u>				
5.	a) What is a distribution system? How is it subdivided to cater the needs of the customers.	6	3	2
	b) What are the various factors that are to be considered in selecting primary feeder rating. Draw typical primary distribution feeder.	8	3	3
(OR)				
6.	a) The length of the feeders are AD = 50 m, DE = 150m, EB = 400m, BC = 100m and CA = 200 m and let the 220 V dc supply is connected to points A and B. The resistance per Km is 0.25 Ω . Determine the minimum voltage point.	10	3	3
	b) Classify different types of primary feeders and give their merits and demerits.	4	3	2
<u>UNIT-IV</u>				
7.	a) Explain the classification of substations.	4	4	2
	b) Draw the 33/11 kV substation line diagram.	10	4	3
(OR)				
8.	a) List out the advantages and disadvantages of Gas Insulated Substations.	10	4	3
	b) Discuss the various types of gas insulated substations.	4	4	2

UNIT-V

9. a) A generating station has the following daily load cycle : 10 5 3
Draw the load curve and find

Time (Hours)	0-6	6-10	10-12	12-16	16-20	20-24
Load(MW)	40	50	60	50	70	40

(i) Maximum demand (ii) units generated per day (iii) average load and (iv) load factor.

- b) Classify various tariffs. 4 5 2

(OR)

10. a) Explain briefly about the costs of generation and their classification. 7 5 2
- b) Define the following terms: i) Connected load ii) maximum demand iii) demand factor iv) load factor vi) Diversity factor vii) Load duration curve. 7 5 2

[6M]

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	<u>UNIT-I</u>	Marks	CO	Blooms Level
1. a)	Draw the internal organization of CPU and explain its functionalities.	7	1	2
b)	Convert the following binary number into decimal & octal number: i) 10110.11 ii) 111.10	7	1	3
	(OR)			
2. a)	Explain the bus structure in detail with a neat diagram.	7	1	2
b)	What are the functions of ALU? How does it perform arithmetic operations?	7	1	2
	<u>UNIT-II</u>			
3. a)	Draw and explain 4-bit binary adder circuit.	7	2	2
b)	Describe the functionality of logic gates with suitable examples.	7	2	2
	(OR)			
4. a)	Draw and explain 4-bit binary subtractor circuit.	7	2	2
b)	What are BCD numbers? Explain the process involved in the addition of two BCD numbers.	7	2	2
	<u>UNIT-III</u>			
5. a)	What is meant by addressing mode? Explain Direct and indirect addressing modes with examples and corresponding applications.	7	3	2
b)	List and explain about the registers in a basic computer.	7	3	2
	(OR)			
6. a)	Draw the instruction execution cycle and explain.	7	3	2
b)	Describe the instruction set architecture of a basic computer.	7	3	2
	<u>UNIT-IV</u>			
7. a)	Describe memory hierarchy and explain its significance.	7	4	2
b)	What is ROM? Explain about various types of ROMs.	7	4	2
	(OR)			
8. a)	What is virtual memory? How it is implemented?	7	4	2
b)	Discuss about cache memory organizations.	7	4	2
	<u>UNIT-V</u>			
9. a)	Differentiate between tightly coupled and loosely coupled multiprocessors.	7	5	2
b)	Write about Time shared common bus and multiport memory.	7	5	2
	(OR)			
10. a)	Explain inter processor communication and synchronization in a shared multiprocessor environment.	7	5	2
b)	Draw the circuit of a DMA and explain.	7	5	2

NOTE: HMT DATA BOOK MUST BE SUPPLIED IN THE EXAM HALL

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UNIT-I

- | | | Marks | CO | BTL |
|-------------|--|-------|----|-----|
| 1. | a) Explain briefly different modes of heat transfer and their governing laws. | 8M | 1 | 2 |
| | b) Develop an expression for a steady state heat transfer rate through a composite wall consisting of two layers of insulation with convective atmospheres on both sides at different temperatures. Use the standard notation. | 6M | 1 | 6 |
| (OR) | | | | |
| 2. | a) Derive general differential equation of heat conduction in Cartesian coordinates. | 10M | 1 | 6 |
| | b) Consider a 2.5 m high and 3.6 m wide glass window whose thickness is 7 mm and thermal conductivity is 0.69 W/m K. Determine the steady rate of heat transfer through this glass window and temperature of its inner surface for a day during which the room is maintained at 28 °C while the temperature of the outdoors is -3°C. Take the convective heat transfer coefficients on the inner and outer surfaces of the window to be 15 W/m²K and 38 W/m²K. | 4M | 1 | 3 |

UNIT-II

- | | | | | |
|-------------|--|-----|---|---|
| 3. | a) Explain the importance of fins and show different profiles used as fins | 4M | 2 | 2 |
| | b) Three identical straight fins 12 mm in diameter and 140 mm long are exposed to an environment with a heat transfer coefficient is 32 W/m²K. Compare their efficiencies and relative heat flow performance concerning the copper fin. The three fin materials and their conductivities are (i) k for copper = 380 W/m K (ii) k for aluminium = 210 W/m K (iii) k for steel = 45 W/m K. | 10M | 2 | 3 |
| (OR) | | | | |
| 4. | a) For a transient heat conduction with negligible internal resistance, prove that $(\theta/\theta_i) = e^{(-Bi^2 Fo)}$ where $\theta = (T - T_\infty)$ & $\theta_i = (T_i - T_\infty)$ | 7M | 2 | 5 |
| | b) An egg with a mean diameter of 4 cm is initially at 30 °C. It is placed in boiling water for 4 minutes and found to satisfy consumer taste. How long should a similar egg for the same consumer be boiled when taken from the refrigerator at 2 °C. Use lumped system analysis and take the thermo-physical properties of egg as k = 12 W/m K, h = 125 W/m²K, C = 2000 J/kg K, $\rho = 1250 \text{ kg/m}^3$. | 7M | 2 | 3 |

UNIT-III

5. a) Explain the growth of velocity and thermal boundary layers over a flat plate when fluid flows over it and discuss their relative growths with respect to Prandtl number. 7M 3 2
- b) Air at 20 °C flows over a plate 60 cm x 30 cm with a velocity of 20m/s. The critical Reynolds number is 5×10^5 . Calculate the rate of heat transfer from the plate, assuming the flow to be parallel to the 60cm side. The plate temperature is maintained at 100 °C. Properties of air at 60°C are $\rho=1.06 \text{ kg/m}^3$, $C_p=1.005 \text{ kJ/kg K}$, $\nu= 18.97 \times 10^{-6} \text{ m}^2/\text{s}$ and $k = 0.0291 \text{ W/m K}$. 7M 3 3

(OR)

6. a) Explain the mechanism of natural convection over a vertical hot plate with the help of velocity and temperature profiles. 7M 3 2
- b) A vertical plate 6m high and 1.25m wide is maintained at a constant temperature of 57°C and exposed to atmospheric air at 13°C. Calculate the heat lost by the plate. 7M 3 3

UNIT-IV

7. a) Explain briefly about the following (i) Nucleate boiling and (ii) Film boiling. 10M 4 2
- b) Write a short note on (i) Film condensation and (ii) Dropwise condensation. 4M 4 1

(OR)

8. a) Develop an expression for LMTD for parallel flow heat exchanger by stating the assumptions made. 10M 4 6
- b) A heat exchanger heats 25,000 kg/h of water entering at 30°C while cooling 20,000 kg/h of water from 100°C to 80°C. Determine the area necessary for (i) parallel flow mode (ii) counter flow mode. Overall heat transfer coefficient may be assumed as $1,600 \text{ W/m}^2\text{K}$. 4M 4 2

UNIT-V

9. a) Develop an expression of Stefan Boltzmann's Law of radiation. 4M 5 6
- b) Emissivities of two large parallel plates maintained 800°C and 300°C are 0.3 and 0.5 respectively. Find the net radiant heat exchange per square meter of plates. Also find the net radiant heat exchange when a polished aluminium shield of emissivity 0.05 is placed between them. Given $\sigma = 5.67 \times 10^{-8} \text{ W/m}^2\text{K}^4$. 10M 5 3

(OR)

10. a) Explain the importance of the following non-dimensional numbers in mass transfer (i) Schmidt number (ii) Sherwood number, and (iii) Lewis number 7M 5 2
- b) The composition of dry standard atmosphere is given on a molar basis to be 78.1 % N_2 , 20.9% O_2 and 1.0 % Ar and small amounts of other constituents. Treating other constituents as Ar, determine the mass fractions of the constituents of air. 7M 5 3