R20

IV B.TECH I SEM

SUPPLEMENTARY EXAMINATIONS

MARCH 2025

IV B.Tech I Semester Supple. Examinations, March-2025

Sub Code: R20CE4104 **PRESTRESSED CONCRETE**

Time: 3 hours (CE) Max. Marks: 70

Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks (5 × 14 M= 70M)

Q.No			Question	KL	CO	M
			Unit-I			
1	a	i) Explain the general principles of prestressing.		1	1	6M
		ii) A prestressed concrete beam of span 6 m and cross-section 200 mm × 350 mm is prestressed by a cable with an eccentricity of 125 mm at the centre of the span. If the beam supports two concentrated loads of 25 kN each at one-third span points, determine the magnitude of the prestressing force in the cable for load balancing.	2	1	8M
			OR			
	b	i) Explain the necessity of high strength concrete and high strength steel in prestressed concrete.	2	1	6M
		ii) Explain the Magnel-Blaton system of pre-stressing.	2	1	8M
2			**Unit-II**			
	a	i) Explain the losses of prestress that occurs during tensioning process.	2	2	7M
		ii) A prestressed concrete beam of section 230 mm × 400 mm and span 8 m is subjected to an initial prestressing force of 400 kN applied at an eccentricity of 75 mm by tendons of area 100 mm². Determine the total percentage loss of stress in the tendons. Assume the shrinkage of concrete is 0.0002, creep coefficient of concrete is 1 and creep loss in steel is 3%. Adopt $E_s = 2 \times 10^5$ N/mm² and M 45 Grade Concrete.	3	2	7M
			OR			
	b	i) Explain the various factors influencing the loss of prestress.		2	7M
		ii) A post-tensioned concrete beam of section 200 mm × 300 mm has a parabolic cable with an eccentricity of 100 mm at mid-span and zero eccentricity at ends. The area of the cable is 225 mm² and initial stress in the cable is 1250 N/mm². If the ultimate creep strain is 30×10^{-6} mm/mm per N/mm² of stress, determine the loss of prestress in steel due to creep of concrete.	3	2	7M
3			**Unit-III**			
	a	i) Design a post-tensioned concrete beam of span 15 m has rectangular section 230 mm wide. The beam is subjected to an imposed load of 15 kN/m. The stress in the concrete must not exceed 25 N/mm² in compression and 1.5 N/mm² in tension. Assume the loss of prestress is to be 15%. Also, calculate the minimum prestressing force and the corresponding eccentricity for the section provided.	4	3	9M
		ii) Explain the various modes of failure of prestressed concrete flexural members.		3	5M
			OR			
	b	Design a simply supported pretensioned concrete beam of span 10 m having I-section to support uniformly distributed imposed load of 20 kN/m in addition to the self weight. The load factors are 1.4 and 1.6 for dead load	4	3	14M

		and live load, respectively. Use M 45 grade concrete and the cube strength of concrete at transfer is 27 N/mm². The tensile strength of concrete is 2 N/mm². Adopt the following permissible stresses: At transfer: The compressive stress is 15 N/mm² and the tensile stress is 1.5 N/mm². At Working load: The compressive stress is 20 N/mm² and the tensile stress is 0. 5 mm diameter high tensile steel wires of ultimate tensile strength of 1650 N/mm² and initially stressed to 1250 N/mm². Assume the loss of prestress due to elastic deformation, creep, shrinkage and other factors as 20%.			

Unit-IV

4	a	i)Explain the factors influencing deflections of prestressed concrete members.	3	3	5M
		ii) A concrete beam of span 10 m has rectangular section, 150 mm × 300 mm, is prestressed by a parabolic cable carrying an initial force of 250 kN. The cable has an eccentricity of 100 mm at the mid- span and is concentric at the supports. The beam is subjected to uniformly distributed live load of 5 kN/m. Determine the maximum short term deflection. Estimate the long term deflection at the mid-span if E_c is 40 kN/mm², the creep coefficient is 2.0 and the loss of prestress is 20% of the initial stress.	3	4	9M

OR

	b	i) Explain the concept of differential shrinkage of PSC composite members.	3	3	5M
		ii) Determine the flexural strength of a composite T-beam section consists of a pretensioned rectangular beam, 150 mm × 250 mm, with cast in-situ concrete slab 350 mm wide and 75 mm thickness. The beam contains 8 wires of 5 mm diameter located 50 mm from the soffit. The tensile strength of steel is 1250 N/mm² and the strength of concrete in the top slab is 30 N/mm².	3	4	9M

Unit-V

5	a	i) Explain the prediction of short-term and long-term deflections of PSC members.	2	3	6M
		ii) A post-tensioned beam of 12 m has rectangular cross-section 230 mm × 400 mm and subjected to uniformly distributed load of 20 kN/m. The effective prestressing force in the cable is 450 kN. The cable is parabolic with an eccentricity of 150 mm at the mid- span and is concentric at the supports. Calculate the principal stresses at the supports.	4	3	8M

OR

	b	i) Explain the various steps to be taken to control deflections of PSC flexural members.	2	3	6M
		ii)A prestressed concrete beam of rectangular section 300 mm × 600 mm, is subjected to a prestressing force of 200 kN at an eccentricity of 200 mm in addition to a bending moment of 150 kNm and twisting moment of 50 kNm. Calculate the principal stresses.	4	3	8M

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IV B.Tech I Semester Supple. Examinations, March-2025

| R20 |

Sub Code: R20CC4104/R20CC4OE16　　**E-COMMERCE**

Time: 3 hours　　(Common to CSE, IT CSE (AI))　　Max. Marks: 70

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks　(5 X 14 = 70M)

Q.No			Questions	KL	CO	M
			Unit-I			
1	a		i) Write and explain various functions of E-Commerce	2	1	7M
			ii)Discuss about E-Commerce and Media convergence	2	1	7M
			OR			
	b		i) Explain the Generic Frame work of the E-Commerce with diagram	2	1	14M
			Unit-II			
2	a		i) Explain Merchantile's model from the consumer perceptive	2	2	7M
			ii)Discuss about consumer oriented services.	2	2	7M
			OR			
	b		i) What is electronic cash? Explain its properties and advantages.	2	2	7M
			ii) Explain the basic categories of credit card payment on on-line networks	2	2	7M
			Unit-III			
3	a		i) Explain about intra-organizational electronic commerce	2	3	7M
			ii) Discuss about workflow automation in detail	2	3	7M
			OR			
	b		i) Discuss about Efficient Customer Response in supply chain management	2	3	7M
			ii) Explain the characteristics of supply chain management	2	3	7M
			Unit-IV			
4	a		i) Explain about different types of the digital documents.	2	4	7M
			Ii) Detail about corporate digital library with a neat sketch.	2	4	7M
			OR			
	b		i) What are the advantages and limitations of internet advertisement compared to Traditional media	2	4	7M
			ii) Discuss about market research	2	4	7M
			Unit-V			
5	a		i) Explain about Electronic Commerce Catalogs or Directories	2	5	7M
			ii) Explain Boolean Information Retrieval Model, Vector Space Information Retrieval Model and Probabilistic Information Retrieval Mode	2	5	7M
			OR			
	b		i) What are the challenges for information search? How business houses finds consumer information	2	5	14M

KL: Blooms Taxonomy Knowledge Level　CO: Course Outcome　M:Marks

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IV B.Tech I Semester Supple. Examinations, March-2025
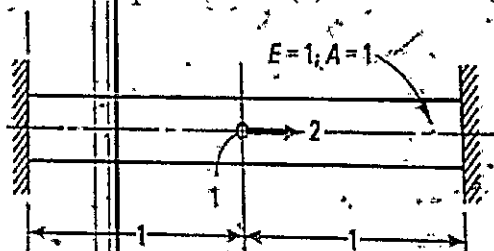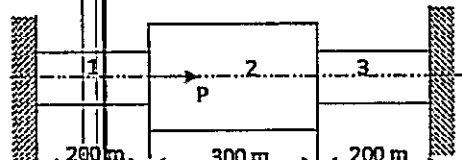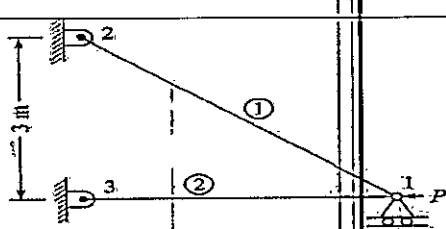
R20

Sub Code: R20ME4107 **FINITE ELEMENT METHOD**

Time: 3 hours (ME) Max. Marks: 70
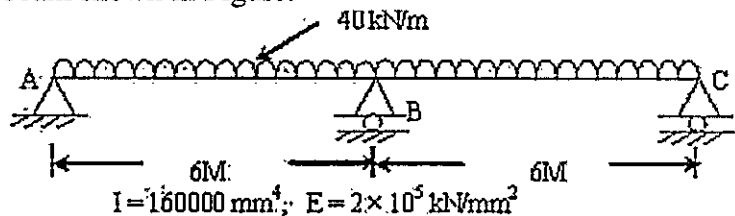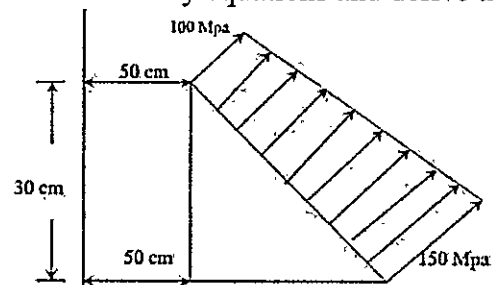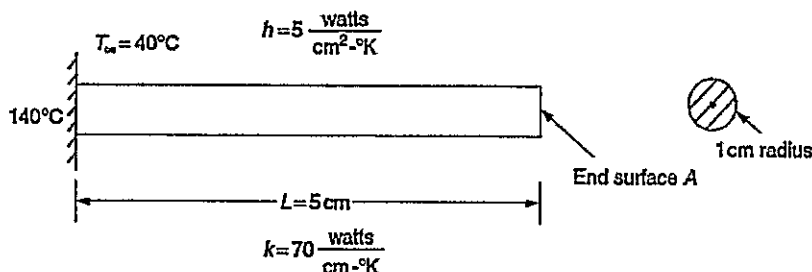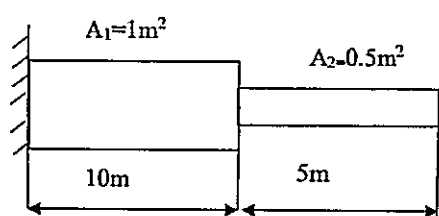
Note: Answer All **FIVE** Questions. All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
		Unit-I			
1	a	i) Describe advantages, disadvantages and applications of finite element analysis.	K2	CO1	7M
		ii) Describe the standard procedure to be followed for understanding the finite element method step by step with suitable example.	K3	CO1	7M
		OR			
	b	Write the strain stress relations based on generalized Hooke's law and derive the elasticity matrix for 3-D field problems.	K4	CO1	14M
		Unit-II			
2	a	i) A rod fixed at its ends is subjected to a varying body force as shown in Figure. Use the Rayleigh-ritz method with an assumed displacement field $u=a_0+a_1x+a_2x^2$ to determine displacement u(x) and stress $\sigma(x)$	K3	CO2	7M
		ii) Write the Potential function for a continuum under all possible loads and indicate all the variables involved. Also express the total potential of general finite element in terms of nodal displacements.	K4	CO2	7M
		OR			
	b	An axial load P = 200X10³ N is applied on a bar shown in figure, determine nodal displacements, stress in each material and reaction forces. If A_1= 2400 mm², A_2= 600 mm² , A_3= 2000 mm² ,E_1=70GPa,E_2=200GPa, E_3=67GPa	K3	CO2	14M
3		Unit-III			
	a	For the two-bar truss shown in Figure above, determine the nodal displacements, element stresses and support reactions. A force of P=1000kN is applied at node-1. Assume E=210GPa and A=600mm² for each element	K3	CO3	14M

			K3	CO3	14M

b

Determine the support reactions and maximum vertical deflection for the continuous beam shown in Figure.

40kN/m

A — B — C

6M 6M

$I = 160000 \, mm^4; \quad E = 2 \times 10^5 \, kN/mm^2$

Unit-IV

a	i) Explain the methodology to estimate the stiffness matrix of four noded quadrilateral element.		K4	CO4	7M
	ii) Evaluate $\int [e^{2x} + x^3 + 1 / (x^2 + 2)] \, dx$ over the limits -1 and +1 using one point and three point quadrature formula and compare with exact solution.		K4	CO4	7M

		K4	CO4	14M

4

b

An axisymmetric triangular element is subjected to the loading as shown in figure. The load is distributed throughout the circumference and normal to the boundary. Derive all the necessary equations and derive the nodal point loads.

100 Mpa

50 cm

30 cm

50 cm 150 Mpa

Unit-V

		K4	CO5	14M

5

a

i) Find the temperature distribution in the one-dimensional fin shown in Figure below using two finite elements.

$T_\infty = 40°C$ $h = 5 \, \frac{watts}{cm^2\text{-}°K}$

140°C

1 cm radius

End surface A

L = 5cm

$k = 70 \frac{watts}{cm\text{-}°K}$

b	i) Write short note on Eigen vectors for a stepped beam.	K2	CO5	4M
	ii) Determine the Eigen values and Eigen vectors for the beam shown in figure	K4	CO5	10M

$A_1 = 1m^2$

$A_2 = 0.5m^2$

$E = 30 \times 10^5 N/m^2$
$\rho = 0.283 kg/m^3$

10m 5m

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M:Marks

IV B.Tech I Semester Supple. Examinations, March-2025

Sub Code: R20EC4106

Time: 3 hours

RADAR SYSTEMS

(ECE)

Max. Marks: 70

R20

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks   (5 X 14 = 70M)

Q.No			Questions	KL	CO	M
			Unit-I			
1	a		i)Describe about minimum detectable signal.	K2	1	7M
			ii)Explain Radar frequencies and applications.	K1	1	7M
			OR			
	b		i) Describe radar cross section of targets.	K2	1	7M
			ii)Draw and explain radar block diagram and operation.	K1	1	7M
			Unit-II			
2	a		i)Explain Doppler effect in detail.	K1	2	7M
			ii) Explain applications of CW radar.	K1	2	7M
			OR			
	b		Describe FMCW Radar and Multiple frequency CM radar with related diagrams.	K2	2	14M
			Unit-III			
3	a		i)Explain delay line cancellers.	K2	3	7M
			ii)Explain MTI Radar parameters.	K3	3	7M
			OR			
	b		i)Explain limitations to MTI Radar performance.	K2	3	7M
			ii) Compare MTI and pulse Doppler radar.	K3	3	7M
			Unit-IV			
4	a		i)Explain types of tracking radar.	K2	4	7M
			ii) Explain target reflection characteristics and angular accuracy.	K3	4	7M
			OR			
	b		i)Explain angle fluctuations and servo noise.	K2	4	7M
			ii) Compare different tracking radars.	K2	4	7M
			Unit-V			
5	a		i)Explain polarization, aperture efficiency and power gain.	K2	5	7M
			ii)Explain architecture for phase arrays.	K3	5	7M
			OR			
	b		i)Explain matched filter receiver.	K2	5	7M
			ii)Explain series versus parallel feeds in phased array antennas.	K3	5	7M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome   M:Marks

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1

IV B.Tech I Semester Supple. Examinations, March-2025

Sub Code: R20CC4117   ENTREPRENEURSHIP AND INNOVATION

Time: 3 hours   (Common to All Branches)   Max. Marks: 70

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No			Questions	KL	CO	M
			Unit-I			
1	a		i) Outline the historical evolution of Entrepreneurship in India.	K 4	1	7M
			ii) Classify the various types of Entrepreneurs.	K 2	1	7M
			OR			
	b		i) Write about the ethical responsibilities of Entrepreneurs.	K 3	1	7M
			ii) Examine the various schemes of NIESBUD.	K 4	1	7M
			Unit-II			
2	a		i) Differentiate between Innovation and Creativity.	K 3	2	7M
			ii) Outline the process of Creativity.	K 4	2	7M
			OR			
	b		i) Write about the various types of Innovation.	K 3	2	7M
			ii) Debate the key characteristics of Creativity.	K 3	2	7M
			Unit-III			
3	a		i) Discuss the role of various training programmes encourage the Entrepreneurship.	K 2	3	7M
			ii) Illustrate the Objectives of Entrepreneurship Development Programmes.	K 4	3	7M
			OR			
	b		i) Elaborate the need and importance of Entrepreneurship Development Programmes.	K 3	3	7M
			ii) Illustrate the merits and demerits of Entrepreneurship Development Programmes.	K 4	3	7M
			Unit-IV			
4	a		i) Classify the various types of Projects.	K 2	4	7M
			ii) Examine the characteristics of Projects.	K 4	4	7M
			OR			
	b		i) Examine the various sources of Project Ideas.	K 4	4	7M
			ii) Discuss the various Project Evaluation techniques.	K 2	4	7M
5			**Unit-V**			
	a		i) Outline the key provisions of MSME Development Act, 2006.	K 4	5	7M
			ii) Examine the various External Growth Strategies.	K 4	5	7M
			OR			
	b		i) Debate the various types of Mergers.	K 3	5	7M
			ii) Explain the reasons for Sickness in Small Scale Industries.	K 2	5	7M

IV B.Tech I Semester Supple. Examinations, March-2025

Sub Code: R20CC4102
Time: 3 hours

HUMAN COMPUTER INTERACTION
(Common to CSE, IT CSE (AI))

Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks (5 X 14 = 70M)

Max. Marks: 70

R20

Q.No			Questions	KL	CO	M
			Unit-I			
1	a		i) Illustrate Human interaction with computers.	K4	CO1	7M
			ii) Commenting about the benefits of good design.	K2	CO1	7M
			OR			
	b		i) Analyse the importance of user Interface.	K4	CO1	7M
			ii) Outlining the brief history of Screen design.	K1	CO1	7M
			Unit-II			
2	a		i) Explain about popularity of graphics.	K4	CO2	7M
			ii)Classify the characteristics of graphical user interface.	K4	CO2	7M
			OR			
	b		i) Explain the concept of direct manipulation.	K2	CO2	7M
			ii) List about the principles of user interface.	K1	CO2	7M
			Unit-III			
3	a		i) Illustrate Human interaction with computers.	K4	CO3	7M
			ii) Analyze the human considerations in design process.	K4	CO3	7M
			OR			
	b		i)Identify importance of hu man characteristics in design.	K1	CO3	7M
			ii)Interpreting about human interaction with computer with respective to reading, listening and typing.	K2	CO3	7M
			Unit-IV			
4	a		i)Illustrate screen design goals.	K4	CO4	7M
			ii)Identify the various types of Statistical Graphs.	K1	CO4	7M
			OR			
	b		i) Demonstrate on screen planning and purpose	K2	CO4	7M
			ii)Explain about information retrieval on Web.	K3	CO4	7M
			Unit-V			
5	a		i) Identify the characteristics and capabilities of device-based control.	K1	CO5	7M
			ii) Identify the significance of color contexts and its uses.	K1	CO5	7M
			OR			
	b		i) Summarize about screen-based controls.	K2	CO5	7M
			ii) Explain about characteristics of Icons and influence of its usability.	K4	CO5	7M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome   M:Marks*

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)
IV B.Tech I Semester Supple. Examinations, March-2025

R20

Sub Code: R20EC4102   CELLULAR AND MOBILE COMMUNICATION

Time: 3 hours   (ECE)   Max. Marks: 70

Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks   (5 X 14 = 70M)

Q.No			Questions	KL	CO	M
			Unit-I			
1	a	i)	Analyse the similarities and differences between a conventional cellular radio system and a space-based (satellite) cellular radio system. a) What are the advantages and disadvantages of each system? b) Which system could support a larger number of users for a given frequency allocation? Why? How would this impact the cost of service for each subscriber?	4	1	7M
		ii)	Discuss the concept of frequency reuse in cellular communication systems. How does frequency reuse enhance the efficiency and capacity of mobile networks?	4	1	7M
			OR			
	b	i)	Describe the basic cellular system with neat diagram	2	1	7M
		ii)	Compare the wireless communication standards given below. Classify the use of each of the wireless standards, their evolution and trends across the globe. a. High power, wide area systems (cellular) b. Low power, local area systems (cordless telephone and PCS) c. Low data rate, wide area systems (mobile data)	4	1	7M
			Unit-II			
2	a	i)	Discuss the different types of non-cochannel interference.	2	2	7M
		ii)	Compare and contrast various diversity techniques.	4	2	7M
			OR			
	b		How do the antenna height and power reduction affect the interference and coverage?	2	2	14M
			Unit-III			
3	a	i)	Describe the concept of space diversity in antennas used at cell sites. How do space diversity antennas improve signal reliability in cellular communication systems?	2	3	7M
		ii)	Illustrate the operating principle of broadband umbrella pattern antennas in cellular systems.	2	3	7M
			OR			
	b	i)	Discuss in detail about the omnidirectional antenna, with a neat diagram.	2	3	7M
		ii)	Differentiate the fixed channel assignment and non–fixed channel assignment.	2	3	7M
			Unit-IV			
4	a	i)	Illustrate Handoff strategies, with a handoff scenario at cell boundary.	4	4	7M
		ii)	Analyze the Two hand off level algorithm.	4	4	7M
			OR			
	b	i)	Which type of handoff is used when a call is initiated in one cellular system and enters another system before terminating? Explain how it	2	4	7M

			KL	CO	M
		works.			
		ii) Derive the relation between the radio capacity, voice quality and the dropped call rate.	3	4	7M
5		Unit-V			
	a	Explain GSM Architecture and different types of GSM channels.	2	5	14M
		OR			
	b	i) Compare the fundamental technological differences between GSM and CDMA	4	5	7M
		ii) Describe the basic principle of CDMA, by stating its merits and demerits.	2	5	7M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome   M:Marks

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NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

IV B.Tech I Semester Supple. Examinations, March-2025

R20

Sub Code: R20CE4102   **WATERSHED MANAGEMENT**

Time: 3 hours   (CE)   Max. Marks: 70

Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks   (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
		Unit-I			
1	a	i) What is a watershed? What are different categories of watersheds? Briefly explain about scope of watershed management in India.	K1	1	8M
		ii) Discuss watershed management as a part of sustainable development.	K2	1	6M
		OR			
	b	i) Define watershed development programme. Also Explain how integrated and multidisciplinary approach will help watershed management.	K1	1	10M
		ii) Explain the term 'power' w.r.t. watershed.	K2	1	4M
		Unit-II			
2	a	i) Explain about the most common channel characteristics important in estimating the watershed hydrological processes.	K2	2	7M
		ii) Give a brief explanation on hydrology and hydrogeology characteristics of watershed.	K2	2	7M
		OR			
	b	i) Explain shape characteristics of Watershed with diagrams.	K1	2	7M
		ii) List the important points need to be considered before a watershed is selected to study the impact of different interventions on the socio - economic conditions of the area.	K3	2	7M
		Unit-III			
3	a	i) Explain types of erosion in detail.	K1	3	7M
		ii) Briefly explain about different measures to be taken to control water induced soil erosion.	K2	3	7M
		OR			
	b	i) What is meant by term erosion? Explain the causes of erosion.	K1	3	7M
		ii) Discuss in detail about Erosion control methods: (1) Furrowing (2) ploughing (3) rock fill dams.	K2	3	7M
		Unit-IV			
4	a	Describe the role of check dam, farm ponds and percolation tanks in Rain Water Harvesting.	K3	4	14M
		OR			
	b	What are harvesting structures? Explain any three in detail with figures.	K3	4	14M
		Unit-V			
5	a	i) Define land grading. Explain any two land grading design methods.	K1	5	7M
		ii) Explain reclamation procedure for alkaline and salt affected soils?	K2	5	7M
		OR			
	b	i) Briefly explain about different land capability classes along with their characteristics.	K2	5	7M
		ii) How do you identify saline soils? What are different methods of reclaiming saline soils?	K3	5	7M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome   M:Marks

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1

IV B.Tech I Semester Supple. Examinations, March-2025

R20

Sub Code: R20CC3OE09 **CLOUD COMPUTING**

Time: 3 hours (AI) Max. Marks: 70

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No			Questions	KL	CO	M
1	a		Unit-I			
			i)Justify the necessity of Cloud computing with an example.	K5	CO1	7M
			ii)Explain the benefits and limitations of Cloud Computing	K2	CO1	7M
			OR			
	b		i)Determine the benefits of Cloud Computing.	K3	CO1	7M
			ii) Explain the process of developing cloud infrastructure.	K2	CO1	7M
2	a		Unit-II			
			i) Analyse server vitalization and client vitalization.	K4	CO2	7M
			ii) Identify the Key Design Aspects of Cloud Architecture.	K1	CO2	7M
			OR			
	b		i) Explain about virtual machines and virtualization middleware.	K3	CO2	7M
			ii) Compare Grid and Cloud computing.	K4	CO2	7M
3	a		Unit-III			
			i)Categorizing about Cloud Deployment Models.	K2	CO3	7M
			ii) Summarize the Cloud Stack importance in Cloud Computation.	K2	CO3	7M
			OR			
	b		i) Categorizing about Cloud Service Models.	K2	CO3	7M
			ii)Summarize the Cloud Storage approaches in Cloud Computation.	K2	CO3	7M
4	a		Unit-IV			
			i)Analyze Cloud Providers and Traditional IT Service Providers.	K4	CO4	7M
			ii)Illustrate Disaster Recovery Planning approaches.	K4	CO4	7M
			OR			
	b		i) Explain the Processes in Cloud Service Management.	K2	CO4	7M
			ii) Identify the Disasters in the Cloud.	K1	CO4	7M
5	a		Unit-V			
			i)Determine the Azure key Concepts and its domains.	K3	CO5	7M
			ii) Explain about Content Delivery Network.	K2	CO5	7M
			OR			
	b		i)Analyze the application of Azure.	K4	CO5	7M
			ii)Distinguish between Azure and AWS.	K4	CO5	7M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M:Marks

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NEC

Sub Code: R20CC3OE14

Time: 3 hours

SERVICES MARKETING

(common to CE, ME)

Max. Marks: 70

Note: Answer All FIVE Questions.
All Questions Carry Equal Marks   (5 X 14 = 70M)

Q.No			Questions	KL	CO	M
			Unit-I			
1	a	i)	Outline the key characteristics of Services. Discuss the Service Economy.	K4	1	7M
		i)	Describe the key differences between Service and Product.	K2	1	7M
			OR			
	b	i)	Elucidate the key elements in Service Strategy.	K4	1	7M
		ii)	Classify the various types of Services. Brief about Services Marketing.	K2	1	7M
			Unit-II			
2	a	i)	Distinguish between Customer Relationship Marketing and Customer Relationship Management.	K3	2	7M
		ii)	Write the various benefits of wining Customer Loyalty.	K3	2	7M
			OR			
	b	i)	Critically discuss the Service Consumption trends in India.	K3	2	7M
		ii)	Outline the various types of Customer Expectations.	K4	2	7M
			Unit-III			
3	a	i)	Present the steps in Market Segmentation and also discuss the bases of segmentation.	K3	3	7M
		ii)	Examine the various factors considering the service price fixation.	K4	3	7M
			OR			
	b	i)	Debate the steps in New Service Development.	K4	3	7M
		ii)	Illustrate the Services positioning strategies.	K3	3	7M
			Unit-IV			
4	a	i)	Elaborate the Integrated Service Promotion.	K4	4	7M
		ii)	Write about the Channels for Service Distribution.	K3	4	7M
			OR			
	b	i)	Present the various services offered by the Online Sellers.	K3	4	7M
		ii)	Examine the various challenges in Services Delivery.	K4	4	7M
			Unit-V			
5	a	i)	Discuss the merits and demerits of Word of Mouth Communication.	K2	5	7M
		ii)	Examine the reasons for Service Deficiencies.	K4	5	7M
			OR			
	b	i)	Illustrate the benefits of Service Recovery.	K3	5	7M
		ii)	Discuss the characteristics of Interactive Marketing.	K2	5	7M

KL: Blooms Taxonomy Knowledge Level   CO: Course Outcome   M: Marks

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IV B.Tech I Semester Supple. Examinations, March-2025

R20

Sub Code: R20CC3OE11   **DIGITAL MARKETING**

Time: 3 hours   (Common to CSE, IT)   Max. Marks: 70

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks   (5 X 14 = 70M)

Q.No			Questions	KL	CO	M
1			**Unit-I**			
	a		i) Define digital marketing and explain how it differs from traditional marketing.	KL2	CO1	7M
			ii) Develop a basic digital marketing plan for a small business, incorporating key elements like audience targeting and strategy.	KL4	CO1	7M
			OR			
	b		i) Explain the current trends in digital marketing and how they impact businesses and society.	KL4	CO1	7M
			ii) Illustrate the POEM framework with examples.	KL2	CO1	7M
2			**Unit-II**			
	a		i) Differentiate between various types of display ads and their impact on user engagement.	KL3	CO2	7M
			ii) Identify the key opportunities and challenges associated with internet marketing.	KL3	CO2	7M
			OR			
	b		i) Explain the concept of search engine advertising and its significance in digital marketing.	KL3	CO2	7M
			ii) Define internet marketing and explain its key characteristics	KL3	CO2	7M
3			**Unit-III**			
	a		i) Define social media marketing and list some of the most popular social media platforms.	KL2	CO3	7M
			ii) Differentiate between various Facebook marketing tools and explain how they support business growth.	KL4	CO3	7M
			OR			
	b		i) Describe the characteristics of social media platforms and their role in digital marketing.	KL4	CO3	7M
			ii) Explain the steps involved in building a successful social media marketing strategy.	KL2	CO3	7M
4			**Unit-IV**			
	a		i) Define Twitter marketing and explain its relevance in digital marketing today.	KL2	CO4	7M
			ii) Discuss the importance of mobile advertising in the modern digital marketing landscape.	KL4	CO4	7M
			OR			
	b		i) Identify the steps involved in framing an effective content strategy for Twitter.	KL2	CO4	7M
			ii) Differentiate between mobile campaign development and traditional advertising campaigns.	KL4	CO4	7M
5			**Unit-V**			
	a		i) Define SEO and explain the differences between on-page and off-page optimization in SEO.	KL2	CO5	7M
			ii) Explain how search engines work and the factors that influence search engine rankings.	KL3	CO5	7M
			OR			
	b		i) Explain the importance of SEO in in digital marketing.	KL2	CO5	7M
			ii) Discuss the main tactics used in SEO to improve a website's visibility on search engines.	KL5	CO5	7M

KL: Blooms Taxonomy Knowledge Level   CO: Course Outcome   M:Marks

IV B.Tech I Semester Supple. Examinations, March-2025

| R20 |

Sub Code: R20CC3OE08 **NANO ELECTRONICS**
Time: 3 hours (ECE) Max. Marks: 70

Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No			Questions	KL	CO	M
			Unit-I			
1	a		i) Why objects in the nanoscale cannot be seen by visible light (1.63–3.26 eV)? How do we see them? Explain with back-of-the-envelope calculations.	2	1	7M
			ii) Derive the expression for electrical conductivity (σ) in terms of the number density of electrons, their mobility, and charge. Justify, how the free electron model relates to Ohm's Law.	4	1	7M
			OR			
	b		i) Discuss the statement of Moore's law of scaling of transistors, and the fundamental quantum mechanical and practical limits encountered in scaling transistors below a few nm channel lengths.	2	1	7M
			ii) Given a nanowire with a diameter of 10 nm and electron concentration of 1×10^{21} cm^{-3}. Calculate the resistance of a 500 nm long section of this nanowire. Discuss the implications of your findings in the context of nanotechnology applications. Typical mobility value of metal can be taken as 40 cm^2 V^{-1} s^{-1}.	4	1	7M
			Unit-II			
2	a		i) Explain with neat diagram different types of specimen interactions taking place in a sample during SEM.	2	2	7M
			ii) A SEM operates at a resolution of 10 nm. If the electron beam current is 0.5nA, (i) calculate the number of electrons striking the sample per second. Further, these electrons were emitted from the surface of a tungsten filament due to photoelectric emission when illuminated by a laser with a wavelength of 532 nm. (ii) Calculate the energy of the photons emitted by the laser. (iii) If the work function of tungsten is 4.5 eV, determine the maximum kinetic energy of the emitted electrons.	3	2	7M
			OR			
	b		i) Starting from Schrodinger equation, show that the density of states in a 1D semiconductor material is directly proportional to $1/\sqrt{E}$.	3	2	7M
			ii) A semiconductor quantum dot has a diameter of 5nm. Given that the effective mass of the electron in the semiconductor is m* = 0.067 m$_0$ (where m$_0$ is the free electron mass, 9.11×10^{-31} kg), calculate the energy of the first excited state (E$_1$), of the quantum dot, assuming it behaves like a particle in a three-dimensional box. Take Plank's constant h = 6.6×10^{-31} Js.	3	2	7M
3			**Unit-III**			
	a		i) Discuss the Photolithography technique with a neat sketch.	2	3	7M
			ii) How to synthesize colloidal Quantum dots using e-beam lithography? Explain.	3	3	7M
			OR			
	b		i) Explain Quantum wells, wires & dots. Draw comparison between each other.	4	3	14M

		Unit-IV			
4	a	i) Classify different types of Carbon nano tubes and evaluate their properties.	2	4	7M
		ii) A researcher is investigating a single-walled carbon nanotube (SWCNT). The tube behaves as a semiconductor with a bandgap energy of Eg = 1.2 eV. If the tube is used in a photovoltaic cell of efficiency 10 %, estimate the current density produced by this cell if 2eV energy incident sunlight photon density is 10^{21} photons m^{-2} s^{-1}. Assume that each absorbed photon is converted into 1 electron-hole pair by the solar cell.	3	4	7M
		OR			
	b	i) Explain how to synthesize Carbon clusters using chemical methods?	2	4	7M
		ii) If fundamental vibrational frequency of the C60 (fullerene) molecule is approximately $1460 cm^{-1}$, then calculate the energy associated with this vibrational mode in electron volts (eV). Also calculate, minimum external force that will be required to deform this C60 molecule if its bond length is 0.14 nm.	3	4	7M
5		**Unit-V**			
	a	i) Give an example of Nano sensors based on Quantum size effects.	2	5	7M
		ii) Describe Electrochemical sensors with an example.	2	5	7M
		OR			
	b	i) Explain the concept of coulomb blockade. Obtain the conditions to be fulfilled to observe single electron effect.	3	5	7M
		ii) Explain the device structure and working of quantum cascade lasers.	2	5	7M

KL: Blooms Taxonomy Knowledge Level   CO: Course Outcome   M:Marks

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IV B.Tech I Semester Supple. Examinations, March-2025

Sub Code: R20CC3OE03   CONCEPT OF SMART GRID TECHNOLOGY
Time: 3 hours   (EEE)   Max. Marks: 70

Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks   (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
		Unit-I			
1	a	i) Define smart grid concept and explain its necessity.	K1	1	7M
		ii) Describe the Opportunities and Barriers of Smart Grid	K2	1	7M
		OR			
	b	i) Explain the concept of robust and self-healing grid.	K1	1	7M
		ii) **Outline** Present development and international policies on Smart Grid	K2	1	7M
		Unit-II			
2	a	i) Present the role of smart meters to make the system smart	K3	2	7M
		ii)Explain the concept of Automatic Meter Reading	K1	2	7M
		OR			
	b	i)Highlight the concept of Vehicle to Grid technology	K1	2	7M
		ii) Outline about Phase Shifting Transformers		2	7M
		Unit-III			
3	a	i) Examine how the reliability of smart grid can be enhanced by integrating intelligent electronic devices (IED) into it.	K3	3	7M
		ii) Explain IED application for monitoring and protection	K1	3	7M
		OR			
	b	i) Explain pumped hydro and compressed air energy storage	K1	3	7M
		ii) Explain about smart storage batteries.	K1	3	7M
		Unit-IV			
4	a	i) State and explain the issues of interconnecting the micro grid with the utility grid.	K2	4	7M
		ii) Compare plastic and organic solar cells	K2	4	7M
		OR			
	b	i) Explain variable speed wind generators	K1	4	7M
		ii) Explain about capacitive power plants.	K1	4	7M
		Unit-V			
5	a	i) Identify the importance of power quality in smart grid.	K3	5	7M
		ii) Explain about power quality Audit and its applications	K1	5	7M
		OR			
	b	i)Illustrate the Advanced Metering Infrastructure (AMI)I detail	K2	5	7M
		ii) Explain about Neighborhood area network.	K1	5	7M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome   M:Marks

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IV B.Tech I Semester Supple. Examinations, March-2025

R20

Sub Code: R20CC3OE05   **AUTOMOTIVE VEHICLES**

Time: 3 hours   (ME)   Max. Marks: 70

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks   (5 X 14 = 70M)

Q.No			Questions	KL	CO	M
			Unit-I			
1	a		Sketch a chassis of any four wheelers and mark various parts on it. Explain the functions of various components of automobile.	K2	CO1	14M
			OR			
	b		i) Explain the different types of drives with a neat sketches.	K2	CO1	7M
			ii) Explain the Vehicle interior system.	K2	CO1	7M
			Unit-II			
2	a		i) Classify the types of gear boxes. Explain any one with neat sketch.	K1	CO2	7M
			ii) Explain the Torque tube drive with neat sketch.	K2	CO2	7M
			OR			
	b		Summarize the functions of propeller shaft and its components of Universal & Slip Joints.	K4	CO2	14M
			Unit-III			
3	a		Explain in detail the construction and working of Ackermann steering gear mechanism with neat sketch.	K3	CO3	14M
			OR			
	b		i) Explain in short about the construction details of steering linkages.	K2	CO3	7M
			ii) Classify types of axle's. Explain any one with neat sketch.	K2	CO3	7M
			Unit-IV			
4	a		i) Classify the types of brakes and explain the principles of shoe brakes.	K2	CO4	7M
			ii) Explain coil springs suspension system used in automobile vehicles.	K2	CO4	7M
			OR			
	b		Explain in detail the Antilock Breaking System (ABS) with a neat sketch.	K3	CO4	14M
			Unit-V			
5	a		Write short notes on Mechanism of Solenoid Switch and Fuel gauge.	K2	CO5	14M
			OR			
	b		Explain in detail the working of lighting system with neat diagram.	K2	CO5	14M

KL: Blooms Taxonomy Knowledge Level   CO: Course Outcome   M:Marks

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IV B.Tech I Semester Supple. Examinations, March-2025

R20

Sub Code: R20CC4OE09

CYBER SECURITY

Time: 3 hours

(Common to CSE, CSE (AI))

Max. Marks: 70

Note: Answer All **FIVE** Questions.   All Questions Carry Equal Marks   (5 X 14 = 70M)

Q.No			Questions	KL	CO	M
1			**Unit-I**			
	a		i) What are its strengths and limitations in combating cyber offenses?	KL1	CO1	7M
			ii) Explain the relationship between cybercrime and information security.	KL2	CO1	7M
			OR			
	b		i) Discuss the role of social engineering in cybercrime.	KL3	CO1	7M
			ii) Define cybercrime and discuss its origins.	KL1	CO1	7M
2			**Unit-II**			
	a		i) What are the key characteristics that differentiate mobile and wireless devices from traditional computing devices?	KL1	CO2	7M
			ii) Explain the organizational measures needed to handle security implications associated with mobile devices	KL2	CO2	7M
			OR			
	b		i) Explain the security challenges posed by mobile devices in the context of cybercrime.	KL2	CO2	7M
			ii) Discuss the impact of credit card fraud in the mobile and wireless computing era.	KL3	CO2	7M
3			**Unit-III**			
	a		i) What are the main objectives of phishing attacks, and how do they exploit vulnerabilities in users' behaviours?	KL1	CO3	7M
			ii) Explain the concept of key loggers and spywares	KL2	CO3	7M
			OR			
	b		i) Discuss the mechanisms of DoS (Denial of Service) and DDoS (Distributed Denial of Service) attacks.	KL3	CO3	7M
			ii) Explain the relationship between SQL injection and buffer overflow attacks.	KL1	CO3	7M
4			**Unit-IV**			
	a		i) What are cyber laws, and why are they necessary in the context of cybercrime?	KL1	CO4	7M
			ii) Explain the challenges faced by Indian law in addressing cybercrime.	KL1	CO4	7M
			OR			
	b		i) Discuss the importance of digital signatures within the framework of the Indian IT Act	KL3	CO4	7M
			ii) Explain the consequences of not addressing the weaknesses in the Information Technology Act.	KL2	CO4	7M
5			**Unit-V**			
	a		i) What are the key milestones that have contributed to the development of cyber forensics as a discipline?	KL1	CO5	7M
			ii) What are the main phases involved, and how does each phase contribute to the overall process of digital evidence recovery and analysis?	KL2	CO5	7M
			OR			
	b		i) Discuss the concept of the chain of custody in computer forensics.	KL3	CO5	7M
			ii) Explain the challenges faced in computer forensics investigations, particularly concerning social networking sites	KL1	CO5	7M

IV B.Tech I Semester Supple. Examinations, March-2025

Sub Code: R20IT4107

BLOCK CHAIN TECHNOLOGIES

R20

Time: 3 hours

(IT)

Max. Marks: 70

Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks   (5 X 14 = 70M)

Q.No			Questions	KL	CO	M
			Unit-I			
1	a		i) What is Blockchain? Explain in detail about decentralized and distributed systems with a neat diagram?	K2	CO1	7M
			ii) Critically evaluate how blockchain builds trust in a business network.	K3	CO1	7M
			OR			
	b		i) List and explain the key features of Blockchain. Discuss the applications of blockchain.	K2	CO1	7M
			ii) Discuss the challenges of adopting blockchain in traditional businesses.	K3	CO1	7M
			Unit-II			
2	a		i) Discuss consensus mechanisms in blockchain with suitable examples.	K3	CO2	7M
			ii) Identify and explain the roles of key participants in a blockchain network.	K2	CO2	7M
			OR			
	b		i) Describe the concept of a shared ledger in blockchain with a diagram.	K2	CO2	7M
			ii) Analyze the role of smart contracts in blockchain. How do they enhance automation and trust in transactions? Support your answer with a suitable example.	K3	CO2	7M
			Unit-III			
3	a		i) What are interaction frictions, and how do they slow down business operations?	K2	CO3	7M
			ii) Explain how blockchain moves businesses closer to friction-free networks.	K4	CO3	7M
			OR			
	b		i) Discuss the impact of blockchain on transforming ecosystems through increased visibility.	K2	CO3	7M
			ii) Analyze how blockchain reduces interaction frictions in business networks.	K4	CO3	7M
4			Unit-IV			
	a		i) Analyze two use cases of blockchain in financial services with suitable examples, comparing their impact and highlighting key points	K4	CO4	7M
			ii) How does blockchain modernize supply chain management? Explain with an example.	KL3	CO4	7M

		OR			
	b	i) Compare traditional cross-border transactions with blockchain-based methods.	KL4	CO4	7M
		ii) Demonstrate how blockchain is applied in the insurance and healthcare sectors with relevant examples, highlighting its impact.	KL3	CO4	7M
5		Unit-V			
	a	i) What are ·the projects under the Hyperledger? Explain in detail about Hyperledger Fabric.	KL3	CO5	7M
		ii) What are the reasons for the failure of some blockchain projects? Provide suitable examples.	KL3	CO5	7M
		OR			
	b	i) List the main components of Hyperledger Fabric and explain the role IBM plays in the Hyperledger project.	KL3	CO5	7M
		ii) Evaluate the effectiveness of current safeguards against blockchain attacks.	KL4	CO5	7M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome   M:Marks

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IV B.Tech I Semester Supple. Examinations, March-2025   **R20**

Sub Code: R20CC4OE08   **EMBEDDED AND REAL TIME OPERATING SYSTEM**

Time: 3 hours   (ECE)   Max. Marks: 70

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks   (5 X 14 = 70M)

Q.No			Questions	KL	CO	M
			Unit-I			
1	a	i)	Differentiate the operation of Embedded Systems and General Computing Systems	2	1	7M
		ii)	Explain different types of memories used in embedded system	2	1	7M
			OR			
	b	i)	Discuss the important characteristics and quality attributes of embedded Systems	2	1	7M
		ii)	Develop an intruder alarm system as an embedded system	2	1	7M
			Unit-II			
2	a	i)	With neat sketch explain the importance of system clock and real time clocks	2	2	7M
		ii)	Explain in details about interrupt service routines (ISR) in real time operating systems	2	2	7M
			OR			
	b	i)	Explain the various characteristics of RTOS	2	2	7M
		ii)	Explain how a kernel operates. What could be the external kernel functions be?	2	2	7M
			Unit-III			
3	a	i)	Discuss about Multiple tasks and their synchronization model using semaphores and mailbox messages	2	3	7M
		ii)	Explain various MUCOS Task service functions and their Exemplary uses	2	3	7M
			OR			
	b	i)	Explain the comparison between multitasking, multiprogramming, multi processing?	2	3	7M
		ii)	Describe the function calls used for the message queues and shared memory.	2	3	7M
			Unit-IV			
4	a	i)	Explain the use of several tasks and their synchronisation model utilising semaphores and mailbox messages.	2	4	7M
		ii)	How the dining philosopher's problem can be solved using Semaphores	2	4	7M
			OR			
	b	i)	Explain the circumstances that could result in a deadlock and provide remedies to prevent a deadlock.	2	4	7M
		ii)	Discuss a short note on operating system software	2	4	7M
5			**Unit-V**			
	a	i)	Explain the role of Brown out protection circuit in embedded systems	2	5	4M
		ii)	Draw and explain basic system of a Digital camera Hardware/ Software Co- Design	2	5	10M

			OR			
	b	i)	Clearly define the following terms: (i) Logic Synthesis (ii) RT Synthesis (iii) Behavioral Synthesis	2	5	6M
		ii) Explain the Case Study of Orchestra Robots for Hardware/ Software Co- Design		2	5	8M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome   M:Marks

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IV B.Tech I Semester Supple. Examinations, March-2025

R20

Sub Code: R20CC4OE06   **MECHATRONICS**

Time: 3 hours   (ME)   Max. Marks: 70

Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks   (5 X 14 = 70M)

Q.No			Questions	KL	CO	M
			Unit-I			
1	a		i) How has Mechatronics discipline been evolved? Briefly explain various evolution stages	2	1	7M
			ii) Briefly explain the key elements of Mechatronics.	2	1	7M
			OR			
	b		i) What do you mean by modeling? Enlist the procedure to be followed in the context of modeling a system.	2	1	7M
			ii) Explain basic modeling elements in fluid systems.	2	1	7M
			Unit-II			
2	a		i) Explain how p-n junction behaves as a diode.	2	2	7M
			ii) Write down equation of the semiconductor diode. Define each term	2	2	7M
			OR			
	b		i) Draw and explain the characteristics of forward biased and reversed biased junction diode.	2	2	7M
			ii) Explain various types of semiconductor diodes. Mention their application areas.	2	2	7M
			Unit-III			
3	a		i) Explain the principle of operation of the following transducers. • Photoelectric transducers • Inductive transducers	2	3	7M
			ii) Explain the principle of operation of Hall-effect transducers.	2	3	7M
			OR			
	b		i) Write notes on the following. • Thermodevices • Thermocouple	2	3	7M
			ii) Explain the principle of operation of a LVDT.	2	3	7M
			Unit-IV			
4	a		i) Explain the representation, truth table of the following logic gates NAND, NOR, Ex-OR, EX-NOR	2	4	7M
			ii) Write short notes on Least Significant Bit (LSB) and Most Significant Bit (MSB)	2	4	7M
			OR			
	b		i) State and explain laws of boolean algebra • commutative law, • associative law, • distributive law and • identity law.	2	4	7M
			ii) What are the advantages of digital technology over analog?	2	4	7M

5		Unit-V			
		i) Explain different sensors in condition monitoring.	2	5	7M
	a	ii) What is a microsensor? Give their significance in mechatronic systems, particularly in applications where space and weight are critical factors.	2	5	7M
		OR			
	b	i) Explain briefly how mechatronic control system play a crucial role in automated manufacturing.	2	5	7M
		ii) Explain the role of AI in mechatronics	2	5	7M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome   M: Marks

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IV B.Tech I Semester Supple. Examinations, March-2025 | R20

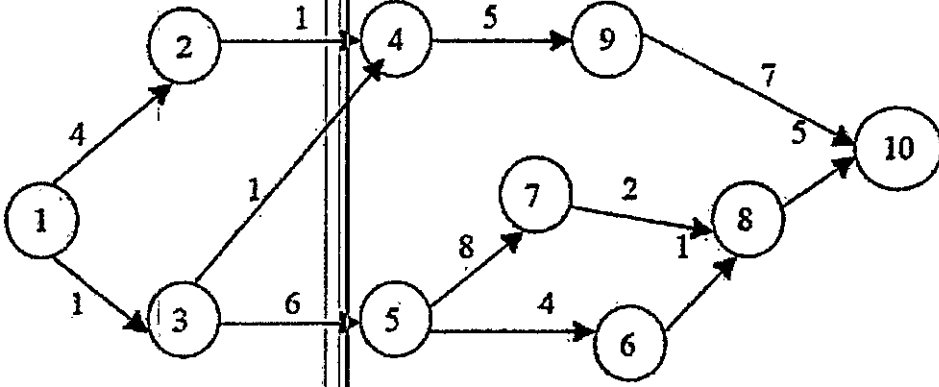**Sub Code: R20CC4OE02   CONSTRUCTION TECHNOLOGY AND MANAGEMENT**

Time: 3 hours   (CE)   Max. Marks: 70

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks   (5 X 14 = 70M)

Q.No			Questions	KL	CO	M
			Unit-I			
1	a	i)	Explain in brief about the differences between PERT and CPM.	K2	CO1	7M
		ii)	What is the Significance of development of bar chart and mile stone chart?	K2	CO1	7M
			OR			
	b	i)	Calculate the earliest and latest activity times and total floats for each activity for the given network and also determine the critical path and total duration of the project.	K3	CO1	7M
		ii)	What are different elements present in PERT network and explain with an example	K2	CO1	7M
			Unit-II			
2	a	i)	Explain the Steps involved in cost duration analysis	K2	CO2	7M
		ii)	Distinguish between Direct cost and indirect cost	K2	CO2	7M
			OR			
	b	i)	Explain the method of time–cost optimization of project network.	K2	CO2	7M
		ii)	Draw a typical cost – duration curve and show on the optimum duration and minimum project Cost.	K2	CO2	7M
			Unit-III			
3	a	i)	What is Contract? Write the conditions of Contracts?	K2	CO3	7M
		ii)	Explain about a) programming b) scheduling c) project organization	K2	CO3	7M
			OR			
	b	i)	Define Tender and explain about tender document.	K2	CO3	7M
		ii)	Explain about project budget flow statement	K2	CO3	7M
4			**Unit-IV**			
	a	i)	Explain in detail Resources smoothing method of resources allocation?	K2	CO4	7M
		ii)	Write about the functions of material management department	K2	CO4	7M

		OR			
	b	i) Write short notes on the following: a) Resource smoothing b) Resource levelling	K2	CO4	7M
		ii) Discuss the purpose of NBC code book-2016	K2	CO4	7M
5		Unit-V			
	a	i) Discuss importance of safety in construction sites?	K2	CO5	7M
		ii)Explain about the Prevention of fires in construction Industry?	K2	CO5	7M
		OR			
	b	i)Discuss the approaches to improve safety in construction	K2	CO5	7M
		ii)Describe the quality control and safety engineering in construction?	K2	CO5	7M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome   M:Marks

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NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

IV B.Tech I Semester Supple. Examinations, March-2025

Sub Code: R20ME4116

Time: 3 hours

ELECTRIC AND HYBRID VEHICLES

(ME)

Max. Marks: 70

R20

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks   (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
		Unit-I			
1	a	i) Compare conventional vehicle with Hybrid electric vehicle.	K2	CO1	7M
		ii) Write a short note on basics of vehicle performance.	K2	CO1	7M
		OR			
	b	Explain rolling resistance and aerodynamic drag in vehicles.	K3	CO1	14M
		Unit-II			
2	a	i) Discuss the history of hybrid electric vehicles.	K3	CO2	7M
		ii) Discuss the environmental importance of hybrid electric vehicles and their social impacts.	K3	CO2	7M
		OR			
	b	With a neat sketch, explain the configuration of Series hybrid electric drive train.	K4	CO2	14M
		Unit-III			
3	a	Explain the different power flow control modes of a typical parallel hybrid system with the help of block diagrams.	K3	CO3	14M
		OR			
	b	Explain the two-quadrant operation of chopper DC motor drive with suitable waveforms for electric vehicle.	K4	CO3	14M
		Unit-IV			
4	a	Explain fuel cell and flywheel as energy source elements in electric and hybrid electric vehicle.	K4	CO4	14M
		OR			
	b	i) What are factors affecting the performance of batteries used in EVs?	K4	CO4	7M
		ii) What are different modes of charging batteries? Compare them in detail.	K4	CO4	7M
		Unit-V			
5	a	i) Why a gear system is needed for an ICE? Explain with relevant characteristic curves	K3	CO5	7M
		ii) Explain the working principle of Solar Powered Vehicles.	K4	CO5	7M
		OR			
	b	Explain the working principle of a fuel-cell and its analysis.	K4	CO5	14M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome   M:Marks

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IV B.Tech I Semester Supple. Examinations, March-2025

R20

Sub Code: R20EC4111

EDGE COMPUTING

Time: 3 hours

(ECE) Max. Marks: 70

Note: Answer All **FIVE** Questions. All Questions Carry Equal Marks   (5 X 14 = 70M)

Q.No			Questions	KL	CO	M
			Unit-I			
1	a	i)	Illustrate the purpose of Edge computing in IoT ecosystems with examples.	K3	1	7M
		ii)	Analyze the key differences between Edge and Fog computing architectures.	K4	1	7M
			OR			
	b	i)	Discuss the role of hardware architecture in Edge Computing.	K3	1	7M
		ii)	Compare M2M communication models with IoT and Edge computing models.	K4	1	7M
			Unit-II			
2	a		Design an IoT architecture for a smart city use case, explaining each layer and its function.	K4	2	14M
			OR			
	b	i)	Explain the concept of Metcalfe's law and Beckstrom's law in the context of IoT networks.	K4	2	7M
		ii)	Identify the core components of a connected IoT ecosystem and their significance.	K4	2	7M
			Unit-III			
3	a	i)	Illustrate how Raspberry Pi can be configured as a web server for IoT applications.	K3	3	7M
		ii)	Write a Python program to interface a temperature sensor with Raspberry Pi and display the output.	K4	3	7M
			OR			
	b	i)	Draw and explain the Raspberry Pi GPIO pin layout and its applications in IoT.	K4	3	7M
		ii)	Describe the procedure for connecting a Raspberry Pi to a cloud service for remote monitoring and control.	K4	3	7M
			Unit-IV			
4	a		Discuss the architecture of the MQTT protocol and how it facilitates communication in IoT systems.	K4	3	14M
			OR			
	b		Discuss how to secure MQTT communication on Raspberry Pi and the importance of security in IoT applications.	K4	3	14M
			Unit-V			
5	a	i)	Explain the role of data analytics in edge computing and how Raspberry Pi can be utilized for this purpose.	K4	4	7M
		ii)	Discuss how machine learning can be implemented on Raspberry Pi for edge computing applications.	K4	4	7M
			OR			
	b		Compare different edge computing frameworks compatible with Raspberry Pi and discuss their applications.	K3	4	14M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome   M:Marks

NEC NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

IV B.Tech I Semester Supple. Examinations, March-2025

Sub Code: R20CS4108   MOBILE AD HOC AND SENSOR NETWORKS

Time: 3 hours   (CSE)   Max. Marks: 70

Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks   (5 X 14 = 70M)

Q.No			Questions	KL	CO	M
			Unit-I			
1	a		i) Compare and contrast infrastructure networks and Adhoc networks.	5	1	7M
			ii) What are the characterstics of MANETs.	2	1	7M
			OR			
	b		i) Discuss topology based versus position based routing in Adhoc networks.	2	1	14M
			Unit-II			
2	a		i) What is the significance of TCP protocol in Conventional routing.	2	2	7M
			ii) Discuss TCP protocol overview.	2	2	7M
			OR			
	b		i) What are the issues and challenges of TCP protocol in Adhoc routing. Explain	2	2	14M
			Unit-III			
3			I) Explain the design issues of WSN.	2	3	14M
			OR			
	b		i) Discuss in detail applications of Wireless sensor networks with example.	2	3	14M
			Unit-IV			
4	a		i) Explain the MAC layer in wireless sensor networks and its significance in data retrieval.	2	4	14M
			OR			
	b		i) Discuss the need and use of routing layer and higher level application layer in WSN.	2	4	14M
			Unit-V			
5	a		i) Discuss the need of integrated architecture for MANETs, WLAN and cellular networks.	2	5	14M
			OR			
	b		i) Compare and contrast WLANs and cellular networks.	4	5	14M

KL: Blooms Taxonomy Knowledge Level   CO: Course Outcome   M:Marks

NEC NAKASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

IV B.Tech I Semester Supple. Examinations, March-2025 | **R20**

Sub Code: R20CC4106   **NATURAL LANGUAGE PROCESSING**

Time: 3 hours   (IT)   Max. Marks: 70

Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks   (5 X 14 = 70M)

Q.No			Questions	KL	CO	M
			Unit-I			
1	a		i) Define NLP and explain its applications	L2	I	7M
			ii) Explain what are the difficulties and ambiguity of NLP?	L4	I	7M
			OR			
	b		i)Discuss the concept of parts-of-speech	L2	I	7M
			ii) Illustrate Formal Grammar of English.	L4	I	7M
			Unit-II			
2	a		i) Discuss about simple N-Gram models	L2	II	7M
			ii)Illustrate smoothing techniques	L4	II	7M
			OR			
	b		i) Discuss Neural Language Model in NLP	L2	II	7M
			ii) Explain about application of neural language model in NLP system development.	L4	II	7M
			Unit-III			
3	a		i) Explain POS tagging using HMM	L4	III	14M
			OR			
	b		i)Discuss about rule based model for POS tagging	L2	III	7M
			ii) Explain briefly about POS Tagging using Neural Model	L2	III	7M
			Unit-IV			
4	a		i) Discuss about top down and bottom up parsing	L2	IV	7M
			ii) explain briefly about CKY parsing	L2	IV	7M
			OR			
	b		i)Summarize Probabilistic Context Free Grammar (PCFG)	L2	IV	7M
			ii) Outline the Probabilistic CKY Parsing of PCFGs	L1	IV	7M
			Unit-V			
5	a		i) Discuss the following concepts a) Words and vector b) Measuring similarity	L2	V	7M
			ii) Discuss SVD and Latent Semantic Analysis	L2	V	7M
			OR			
	b		Explain about Skip-gram and CBOW	L4	V	14M

KL: Blooms Taxonomy Knowledge Leve   CO: Course Outcome   M:Marks

IV B.Tech I Semester Supple. Examinations, March-2025

R20

Sub Code: R20AI4107   **ARTIFICIAL NEURAL NETWORKS**

Time: 3 hours   CSE (AI)   Max. Marks: 70

Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks   (5 X 14 = 70M)

Q.No			Questions	KL	CO	M
1			**Unit-I**			
	a		i) Examine the models of NN and activation functions	L3	I	7M
			ii) Illustrate AI and Neural networks	L4	I	7M
			OR			
	b		i) Outlining the Statistical Nature of the Learning Process	L1	I	7M
			ii) Summarizing Hebbian learning	L2	I	7M
2			**Unit-II**			
	a		i) Categorizing and briefly explain Unconstrained Organization Techniques.	L2	II	7M
			ii) Illustrate Least-mean-Square Algorithm	L4	II	7M
			OR			
	b		i) Summarizing Perceptron –Convergence Theorem	L2	II	7M
			ii) Illustrate Back Propagation Algorithm XOR Problem	L2	II	7M
3			**Unit-III**			
	a		i) Explain briefly about Jacobian and Hessian matrix	L2	III	7M
			ii) Explain about cross-validation	L4	III	7M
			OR			
	b		i) Outlining the Virtues and Limitations of Back Propagation Learning	L2	III	7M
			ii) Discuss about Supervised Learning.	L2	III	7M
4			**Unit-IV**			
	a		i)Explain about Self-Organizing Maps	L4	IV	14M
			OR			
	b		i) Summary of SOM Algorithm	L2	IV	7M
			ii) Discuss Adaptive Patter Classification.	L2	IV	7M
5			**Unit-V**			
	a		I)Explain about Dynamical Systems	L2	V	7M
			II) Discuss briefly restricted boltzmen machine	L2	V	7M
			OR			
	b		i) Explain about Hopfield Models	L4	V	14M

KL: Blooms Taxonomy Knowledge Level   CO: Course Outcome   M:Marks

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IV B.Tech I Semester Supple. Examinations, March-2025

| R20 |

Sub Code: R20EE4111   SWITCHGEAR AND PROTECTION

Time: 3 hours   (EEE)   Max. Marks: 70

Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks   (5 X 14 = 70M)

Q.No			Questions	KL	CO	M
			Unit-I			
1	a	i)	In a 132kV system, reactance and capacitance up to the location of the circuit breaker is 5Ω and 0.02µF, respectively. A resistance of 500Ω is connected across the breaker of the circuit breaker Determine: a. Natural frequency of oscillation b. Damped frequency of oscillation c. Critical value of resistance	K3	1	7M
		ii)	Draw & describe the construction, working principle of air blast circuit breaker.	K1	1	7M
			OR			
	b	i)	In a 132 kV system, the reactance per phase up to the location the circuit breaker is 5Ω and capacitance to earth is 0.03µF. Calculate: (a) The maximum value of the re-striking voltage across the contacts of the circuit breaker (b) Frequency of transient oscillation (c) Maximum value of RRRV	K3	1	7M
		ii)	Draw & describe the construction, working principle of vacuum circuit breaker	K2	1	7M
			Unit-II			
2	a	i)	Fault current = 2000A, Relay 1 set on 100%, CT ratio =200/1; Relay 2 set on 125%, CT ratio =200/1. For discrimination the time grading margin between relays in 0.5 second Determine the time of operation of the two relays assuming that both the relays have the characteristics as shown in the following table & the Relay 1 has a TMS=0.2. Also determine the TMS of Relay 2. Time current characteristics of relay is given below	K3	2	7M

PSM	2	3.6	5	8	10	15	20
Operating time (in seconds)	10	6	3.9	3.15	2.8	2.2	2.1

Q.No			Questions	KL	CO	M
		ii)	Explain the operation of directional relay.	K2	2	7M
			OR			
	b	i)	The current rating of an overcurrent relay is 5A. The relay has a plug setting of 150% & time multiplier setting (TMS) of 0.4. The CT ratio is 400/5. Determine the operating time of the relay for a fault current of 6000A. At TMS=1, operating time at various PSM are as given below.	K3	2	7M

PSM	2	4	5	8	10	20
Operating time (in seconds)	10	5	4	3	2.8	2.4

Q.No			Questions	KL	CO	M
		ii)	Draw and explain the characteristics of impedance relay, reactance relay and Mho relay	K3	2	7M
3			Unit-III			
	a	i)	What do you mean by over-fluxing or over excitation of transformer? What is the significance of V/f ratio? What is the principle of over-fluxing protection?	K2	3	7M
		ii)	Explain the protection of alternator against Unbalanced loading and Rotor field fault	K2	3	7M

			KL	CO	M
		OR			
	b	i) Draw the circuit diagram of a „Restricted Earth Fault" protection scheme of a generator? Why it is named as „Restricted"?	K2	3	7M
		ii) With neat sketch show the circuit connection diagram of biased differential relay along with the primary/ secondary winding connections for a 66/220 KV 3-Phase 100 MVA transformer connected in yd11 phasor group. Moreover choose suitable ratings of both end C.T.s and interposing C.T.s if required.	K3	3	7M
4		Unit-IV			
	a	i) Explain about the over current protection of bus bars with relevant connection diagram	K2	4	7M
		ii) Explain in detail about the Merz price voltage balanced system with a neat single line diagram.	K2	4	7M
		OR			
	b	i) Explain over-current protection of feeders. How is the protection system graded with respect to the time of operation of relays for a radial feeder	K2	4	7M
		ii) What is the importance of bus-bar protection? What are the requirements of protection of lines?	K2	4	7M
5		Unit-V			
	a	i) What are advantages and disadvantages of static relays?	K1	5	7M
		ii) Explain least square method for estimation of phasor.	K1	5	7M
		OR			
	b	i)Explain micrpprocessor based relay with neat sketch	K1	5	14M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome   M:Marks

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IV B.Tech I Semester Supple. Examinations, March-2025

| R20 |

Sub Code: R20CE4107   ESTIMATION COSTING AND VALUATION

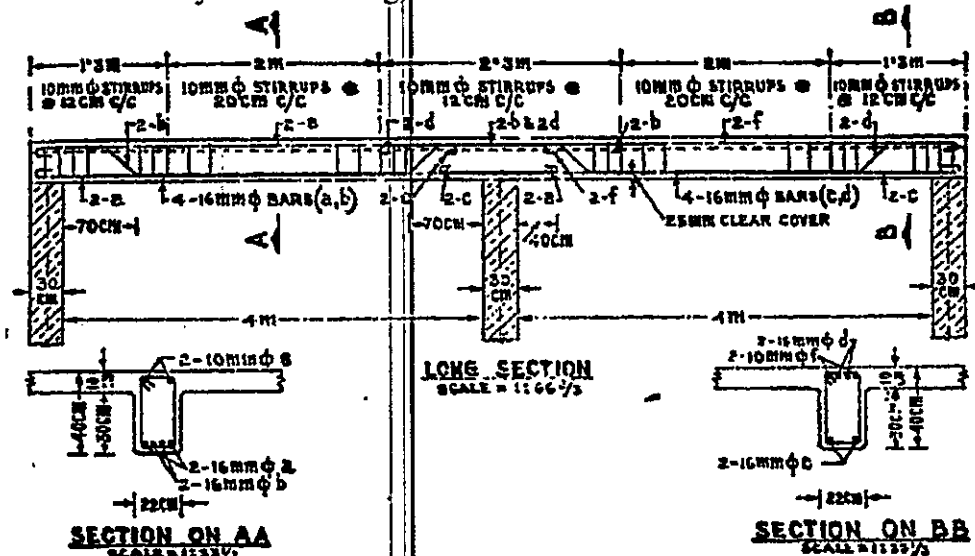Time: 3 hours   (CE)   Max. Marks: 70

Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks   (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
		Unit-I			
1	a	i) Describe the different types of estimate.	K2	1	7M
		ii) Summarize the general rules of Measurement & also explain the deductions and additions to be applied in the case of estimation of plastering.	K1	1	7M
		OR			
	b	i) Explain the methods used to find approximate cost of the building.	K2	1	10M
		ii) Estimate the quantity of brickwork and plastering required in a wall 3.5 m long, 2.5 m high and 30 cm thick. Calculate also the cost if the rate of brickwork is Rs. 300.00 per cu. m. and of plastering is Rs. 10.00 per sq. m.	K3	1	4M
2		Unit-II			
	a	i) Fig. 1 shows longitudinal and cross-sections at mid-span and support of RC T-beam 22 cm by 40 cm overall including the slab thickness 10 cm. The beam of which particulars are shown in figure is continuous over to equal spans 4 m clear and supported on 30 cm walls. Allow clear cover 25 mm all round. If weight of 16 mm and 10 mm dia bars are 1.58 kg and 0.62 kg per r m respectively. Prepare a bill for payment adopting the following market rates (a) Shuttering at Rs. 15.00 per sq.m. (b) MS bars Rs. 300.00 per quintal and (c) concreting is Rs. 350 per cum (consider web only for concreting). Fig. 1	K3	2	7M
		ii) Explain the different cases of earthwork estimation of canals.	K2	2	7M
		OR			
	b	Calculate the quantity of earthwork of a portion of a channel with the following data: Bed width = 3 m; Free board = 44 cm; Slope of digging = 1:1; Side slope of banking = 1.5:1; Full supply depth = 1 m; width of both the banks =1 1.5 m.	K3	2	14M

Rd.	Ground level	Proposed bed level
0m	225.24m	224.00m
30m	224.80m	223.94m
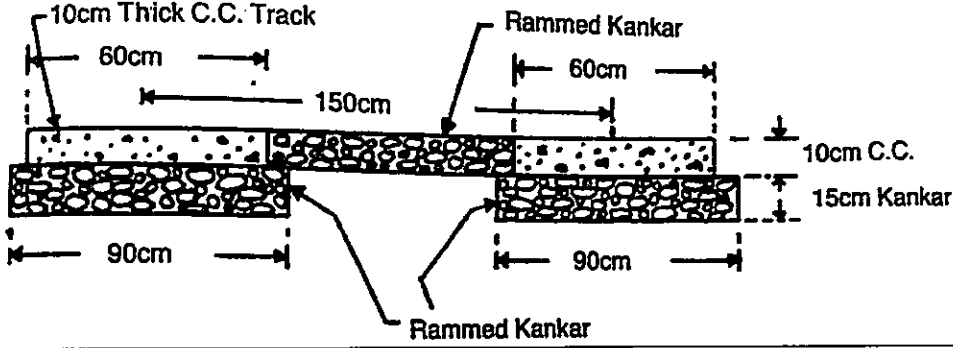
60m	224.43m	223.88m		—
90m	224.12m	223.82m		
120m	224.50m	223.76m		
150m	224.98m	223.70m		

			KL	CO	M
	Unit-III				
3	a	Prepare a detailed estimate for the 'cement concrete road' given in fig.2.	K3	3	14M
		OR			
	b	Describe the detailed specification of various items of works for the following (i) RCC (ii) Color washing (iii) Brick I Class (iv) Plastering cement Mortar or lime mortar	K2	3	14M
		Unit-IV			
4	a	i) Prepare the analysis of rate of R.C.C. work 1:1.5:3 for 5 columns of size 250mm x 350 mm. Assume the required data.	K4	4	7M
		ii) List and explain the different forms of contracts with respect to suitability advantage and disadvantages.	K2	4	7M
		OR			
	b	i) Describe in detail about the Rate Analysis of Civil Works – its Elements and Requirements.	K2	4	7M
		ii) Illustrate the following in brief (1) Piecework agreement (2) Work order (3) Labour Report	K2	4	7M
		Unit-V			
5	a	Explain the following: (1) Type of lease (2) Mortgage (3) Escalation (4) Methods of Depreciation	K2	5	14M
		OR			
	b	i) In a plot of land costing Rs. 20,00,000 a building has been newly constructed at a local cost of Rs. 80,00,000 including sanitary and water supply works, electrical installation, etc. The building consists of four flats of four tenants. The owner expects 8 % return on the cost of construction and 5 % of return on the land. Calculate the standard rent for each flat of the building assuming. (1) The life of the building is 60 yrs and the sinking fund will be created on 4% interest basis (2) Annual repair cost 1% of the cost of construction (3) Other outgoings including taxes at 30% of the net return on the building?	K3	5	14M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome   M:Marks

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