R20

IV B.TECH I SEM

SUPPLEMENTARY EXAMINATIONS

MARCH / APRIL 2024

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

IV B.Tech I Semester Supple. Examinations, March-2024

Sub Code: R20CE4102 **WATERSHED MANAGEMENT** **R20**

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
1		Unit-I			
	a	Briefly explain the concept, need and objectives of watershed development.	K2	1	14M
		OR			
	b	Elaborate the integrated and multidisciplinary approaches for watershed management.	K2	1	14M
2		Unit-II			
	a	Explain the characteristics of watersheds based on Physiography, Hydrology and Hydrogeology.	K2	2	14M
		OR			
	b	Discuss briefly the characteristics of watersheds related with Climate, Land use, Vegetation, Geology and Soils.	K2	2	14M
3		Unit-III			
	a	Elucidate the types and causes of erosion. Write the various factors affecting erosion.	K2	3	14M
		OR			
	b	Write the types of measures to control erosion. Discuss any four methods in detail with neat sketches.	K2	3	14M
4		Unit-IV			
	a	Describe the following techniques of rain water harvesting: (i) Stop dams (ii) Farm ponds and dugout ponds (iii) Percolation tank	K2	4	14M
		OR			
	b	Elaborate the techniques of rain water harvesting for roof top, surface flow and subsurface flow.	K2	4	14M
5		Unit-V			
	a	Briefly describe the Land use and Land capability classification.	K2	5	14M
		OR			
	b	Illustrate the Reclamation of saline and alkaline soils.	K2	5	14M

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

***

NAKASARAOPETA
NEC ENGINEERING COLLEGE
(AUTONOMOUS)

IV B.Tech I Semester Supple. Examinations, March-2024

Sub Code: R20CE4104 **PRESTRESSED CONCRETE**

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
1		Unit-I			
	a	i) Discuss the advantages and applications of prestressed concrete.	2	1	7M
		ii) Explain the Hoyer Gifford –Udall system of pre stressing with sketch	2	1	7M
		OR			
	b	i) What are the factors influencing the creep and shrinkage of concrete?	2	1	7M
		ii) Explain the Magnel Blaton system of pre stressing	2	1	7M
2		Unit-II			
	a	i) Explain the Losses present in pre-tensioned members	2	2	7M
		ii) Derive the loss due to creep of concrete.	2	2	7M
		OR			
	b	A pre tensioned beam 400 mm wide and 600 mm deep is pre stressed by 12 wires each of 10 mm diameter initially stressed to 1200 N/mm^2 with their centroids located 120 mm from the soffit. Estimate the final percentage loss of stress due to elastic deformation, creep, shrinkage and relaxation using the following data: Relaxation of steel stress = 90 N/mm^2 ; Es =210 kN/mm^2, EC = 40 kN/mm^2 Creep coefficient = 1.5; Residual shrinkage strain = 2 x 10^{-4}	3	2	14M
3		Unit-III			
	a	i) Explain the Different types of flexure failures modes in PSC beams	2	3	7M
		ii) Explain with sketches the method of estimating the ultimate flexural strength of flanged prestressed concrete sections according to IS: 1343 code provisions.	2	3	7M
		OR			
	b	A pretensioned T section has a flange width of 1200mm and 150mm thick. The width and depth of the rib are 300mm and 1500mm respectively. The high tension steel has an area of 4700mm^2 and is located at an effective depth of 1600mm characteristic cube strength of the concrete and the tensile strength. If the of steel are 40 and 1600Mpa respectively; calculate the flexural strength of the section.	3	3	14M
4		Unit-IV			
	a	i) Discuss the various methods of predicting long term deflections	2	4	7M
		ii) What are the forces considered in the calculation of the deflection of prestressed concrete beams?	2	4	7M
		OR			
	b	A PSC beam of 120mm wide and 300mm deep is used over an span of 6m is prestressed by a straight cable carrying a force of 200kN & located at an eccentricity of 50mm. Ec=38 kN/mm^2. Estimate the deflection at centre span	3	4	14M

		a) Under prestress + self weight b) Find the magnitude of live load UDL which will nullify the deflection due to prestress & self weight			
5		Unit-V			
	a	i) What are the codal recommendations regarding the design of reinforcements in pre-stressed sections subjected to moment, shear and torsion?	2	5	7M
		ii) Write the steps involved in the design of beams for shear.	2	5	7M
		OR			
	b	The support section of prestressed concrete beam, 100 mm wide by 250 mm deep, is required to support an ultimate shear force of 80 KN. The compressive prestress at the centroidal axis is 5 N/mm^2 . The characteristic cube strength of concrete is 40 N/mm^2. The cover to the reinforcement is 50 mm. if the characteristic tensile strength stirrups is 415 N/mm^2, design suitable shear reinforcement in the section using IS code recommendations.	3	5	14M

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

***

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

IV B.Tech I Semester Supple. Examinations, March-2024 **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)

<table>
<tr><th>Q.No</th><th></th><th>Questions</th><th>KL</th><th>CO</th><th>M</th></tr>
<tr><td rowspan="4">1</td><td colspan="5">Unit-I</td></tr>
<tr><td>a</td><td>i) What are the objectives and functions of construction management?</td><td>2</td><td>1</td><td>7M</td></tr>
<tr><td>a</td><td>ii) Draw a PERT network for the following and find expected mean time, variance and SD of the project
<table>
<tr><th>Activity</th><th>Three-time estimates (days)</th></tr>
<tr><td>0-1</td><td>2-3-10</td></tr>
<tr><td>0-2</td><td>4-5-6</td></tr>
<tr><td>1-2</td><td>0-0-0</td></tr>
<tr><td>1-3</td><td>6-7-8</td></tr>
<tr><td>1-4</td><td>1-5-9</td></tr>
<tr><td>2-5</td><td>3-5-19</td></tr>
<tr><td>3-4</td><td>0-0-0</td></tr>
</table></td><td>3</td><td>1</td><td>7M</td></tr>
<tr><td colspan="5">OR</td></tr>
<tr><td></td><td>b</td><td>A building project consists of 10activities represented by the network shown The normal duration represented to perform various activities of the above project are given in table below Compute i) Event times ii) Activity times iii) total float Also determine the critical path.
<table>
<tr><th>Activity</th><th>Estimated Duration</th><th>Activity</th><th>Estimated Duration</th></tr>
<tr><td>A</td><td>5</td><td>F</td><td>2</td></tr>
<tr><td>B</td><td>2</td><td>G</td><td>3</td></tr>
<tr><td>C</td><td>6</td><td>H</td><td>8</td></tr>
<tr><td>D</td><td>4</td><td>I</td><td>7</td></tr>
<tr><td>E</td><td>4</td><td>J</td><td>2</td></tr>
</table></td><td>3</td><td>1</td><td>14M</td></tr>
<tr><td rowspan="5">2</td><td colspan="5">Unit-II</td></tr>
<tr><td rowspan="2">a</td><td>i) Draw a typical cost – duration curve and show on the optimum duration and minimum project Cost.</td><td>3</td><td>2</td><td>7M</td></tr>
<tr><td>ii) Defined ‘earliest event time’ and ‘latest occurrence event time’. How these can be determined? Explain the tabular form for determining these.</td><td>2</td><td>2</td><td>7M</td></tr>
<tr><td colspan="5">OR</td></tr>
<tr><td rowspan="2">b</td><td>i)Write the Steps involved in optimization of cost</td><td>2</td><td>2</td><td>7M</td></tr>
<tr><td>ii) Explain about a) Project scheduling, b) Critical and sub-critical path. C)Updating – Process of updating</td><td>2</td><td>2</td><td>7M</td></tr>
<tr><td rowspan="5">3</td><td colspan="5">Unit-III</td></tr>
<tr><td rowspan="2">a</td><td>i) Explain about Contract document</td><td>2</td><td>3</td><td>7M</td></tr>
<tr><td>ii) Write the Important conditions of contract</td><td>2</td><td>3</td><td>7M</td></tr>
<tr><td colspan="5">OR</td></tr>
<tr><td rowspan="2">b</td><td>i) Write the types of Contract? Explain any two types with example</td><td>2</td><td>3</td><td>7M</td></tr>
<tr><td>ii) Explain a)Programming b)Scheduling c)Project Organization</td><td>2</td><td>3</td><td>7M</td></tr>
</table>

4		Unit-IV			
	a	i) Write on ABC classification of Materials	2	4	7M
		ii) Discuss about the Objectives of material management	2	4	7M
		OR			
	b	i) Explain about Resource Leveling and Resource Allocation?	2	4	7M
		ii) Write the functions of material management department	2	4	7M
5		Unit-V			
	a	i) Explain about the importance of Total quality management	2	5	7M
		ii)Discuss the approaches to improve safety in construction-	2	5	7M
		OR			
	b	i) Write about the Prevention of fires in construction industries	2	5	7M
		ii) Explain the Quality assurance techniques	2	5	7M

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

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

IV B.Tech I Semester Supple. Examinations, March-2024

Sub Code: R20CC3OE14 **SERVICES MARKETING**

Time: 3 hours (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
1			**Unit-I**			
	a	i)	Discuss the characteristics of Services.	K1	1	7M
		i)	Outline the role of Service Sector in Indian Economy	K4	1	7M
			OR			
	b	i)	Explain the key differences between Marketing Services and Physical Services.	K5	1	7M
		ii)	Classify the various types of Services. Give suitable examples.	K2	1	7M
2			**Unit-II**			
	a	i)	Present the recent trends in Customer Relationship Marketing.	K3	2	7M
		ii)	Debate the concept of Relationship Marketing.	K3	2	7M
			OR			
	b	i)	Specify the various ways to forecast the customer needs	K3	2	7M
		ii)	Discuss the various methods to build Customer Loyalty.	K2	2	7M
3			**Unit-III**			
	a	i)	Outline the steps in Services Marketing Segmentation.	K4	3	7M
		ii)	Examine the various considerations in Services pricing.	K4	3	7M
			OR			
	b	i)	Discuss the need and importance of New Service Development.	K2	3	7M
		ii)	Write a short note on Value addition to the Service Product.	K3	3	7M
4			**Unit-IV**			
	a	i)	Demystify the role of advertising in Services Promotion.	K2	4	7M
		ii)	Outline the recent developments in Services delivery.	K4	4	7M
			OR			
	b	i)	Describe the Services Promotion Mix.	K6	4	7M
		ii)	Classify the various kinds of Intermediaries in Services Delivery.	K2	4	7M
5			**Unit-V**			
	a	i)	State merits and demerits of Word of Mouth Communication	K2	5	7M
		ii)	Trace the reasons for Services deficiency.	K4	5	7M
			OR			
	b	i)	Outline the reasons for Consumer Grievances.	K4	5	7M
		ii)	Explain the Interactive Marketing.	K5	5	7M

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

***

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

IV B.Tech I Semester Supple. Examinations, March-2024

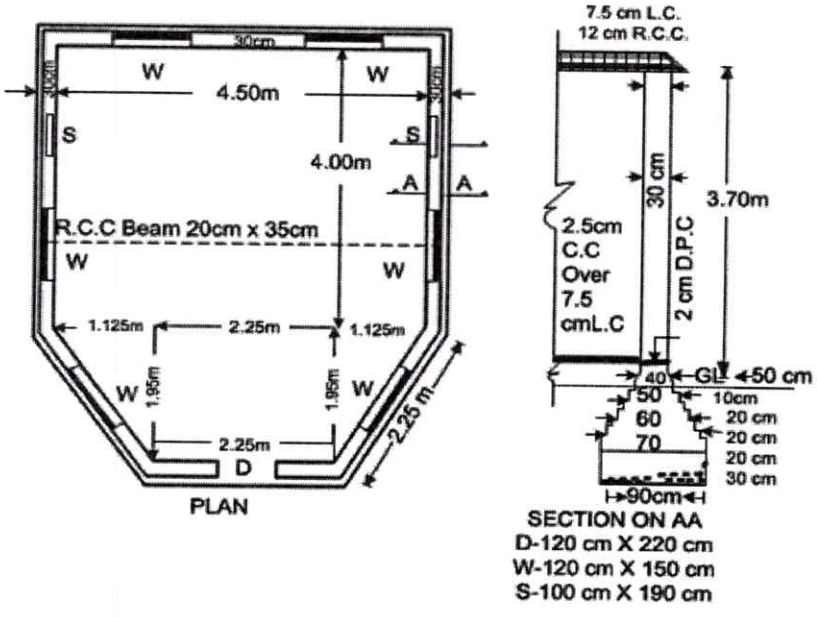
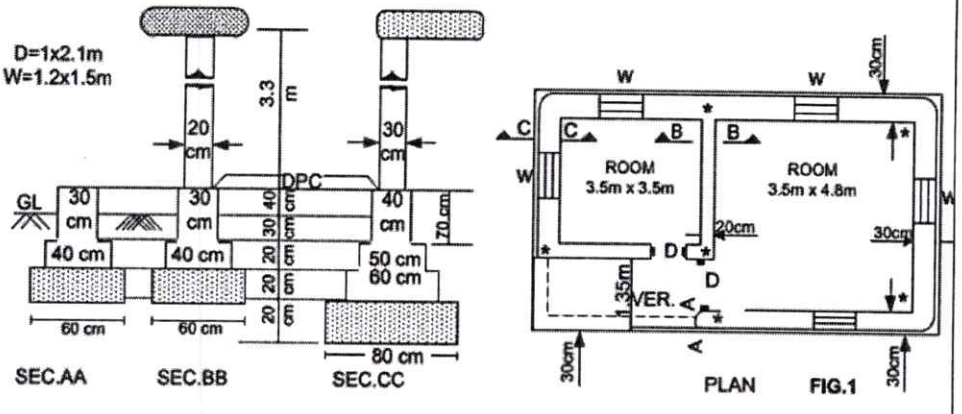
R20

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	Enumerate detailed estimates for the following items: (a) Random Rubble Masonry in Sub structures. (b) Plastering of walls. (c) Painting to wood works. (d) Painting to Iron Works. 	3	1	14M
		★★★★★			
		OR			
	b	Explain detailed specification for the following items: (a) Flooring with cement concrete. (b) Pointing to the sub structure. (c) Colour Wash to the Walls. (d) Damp proof course 	3	1	14M
2		Unit-II			
	a	A road is to be constructed in hill areas with formation widths of 10m in	3	2	14M

		banking and 8m in cutting. Side slope in banking is **2:1** and side slope in cutting is **1 ½: 1**. The height of filling or the depth of cutting at the centre's of the road and the cross slopes of the ground at intervals of 20m are as given below. Calculate the quantities of EW for the length of 140m?									
		Chain age (m)	0	20	40	60	80	100	120	140	
		Depth of cutting(cm)	60	70	50	40					
		Height of banking(cm)					70	60	80	90	
		Cross slope of ground	10:1	12:1	15:1	12:1	10:1	15:1	12:1	10:1	
		OR									
	b	Estimate the quantity of earthwork in cutting for a road of 10m formation width with the following data using mean sectional area method or trapezoidal method. Side slope is 2:1 (H: V) and no cross slope.									3 2 14M
		Chainage (m)	0	30	60	90	120	150			
		Ground level	80.50	79.30	81.40	84.00	8.10	83.0			
		Formation level	75.00	Rising gradient of 1 in 30							
3		Unit-III									
	a	i) Explain the necessity of specification and types of specification									2 3 7M
		ii) Explain the detailed specification for earthwork, cement, concrete, brickwork, flooring, D.P.C, R.C.C									2 3 7M
		OR									
	b	i) Explain about the estimation of pitching of slopes with suitable example									2 3 7M
		ii) Write the Detailed Specifications for Brick work									2 3 7M
4		Unit-IV									
	a	Explain the importance and requirements of rate analysis, and units of measurement preparation of rate analysis?									2 4 7M
		ii) Describe the procedure for the calculation of rate for the following a). C.C 1:5:10 in foundation with brick ballast 40mm thick unit 1cum b). R.C.C. brick work on slab etc 1:3mortar unit 1cum									3 4 7M
		OR									
	b	i)Write about a) Plinth area estimate; b)Revised Estimate; c)Supplementary estimate									2 4 7M
		ii) Explain about a) Earnest money; b)Security money; c)Measurement book									2 4 7M
5		Unit-V									
	a	i) Explain the different methods of depreciation ?									2 5 7M
		ii) Write about a)Scrap value; b)Salvage value									2 5 7M
		OR									
	b	i) What are the different types of valuations explain in detail?									2 5 7M
		ii) Define valuation? Explain the purpose of valuation and write about Sinking fund?									2 5 7M

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

***

NAKASARAOPETA
NEC ENGINEERING COLLEGE
(AUTONOMOUS)

IV B.Tech I Semester Supple. Examinations, March-2024

Sub Code: R20EE4104 **FLEXIBLE AC TRANSMISSION SYSTEMS**

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)	What are power flow controllers? Explain their importance?	L-2	CO-1	7M
		ii)	Draw and analyze the characteristic of high power devices?	L-4	CO-1	7M
			OR			
	b	i)	List out and explain the basic types of FACTS controllers?	L-1	CO-1	7M
		ii)	Discuss in detail about various losses of FACTS controllers?	L-2	CO-1	7M
			Unit-II			
2	a	i)	Describe the operational aspects of voltage source converters with relevant equations?	L-1	CO-2	7M
		ii)	Derive and analyze the output expression of single phase bridge converter with waveforms?	L-4	CO-2	7M
			OR			
	b	i)	Analyze the voltage harmonics of single phase bridge converter with waveforms?	L-4	CO-2	7M
		ii)	Describe the characteristic features of three phase current source converter?	L-1	CO-2	7M
			Unit-III			
3	a	i)	Discuss in detail about the need and outcomes of shunt compensation?	L-2	CO-3	7M
		ii)	Derive and explain the midpoint voltage regulation for line segmentation?	L-3	CO-3	7M
			OR			
	b	i)	Justify the role of shunt compensation with relevant to the transient stability improvement?	L-5	CO-3	7M
		ii)	Explain in detail about the outcomes of power oscillation damping with shunt compensation?	L-3	CO-3	7M
			Unit-IV			
4	a	i)	Draw the diagram and explain the operation and design aspects of thyristor switched capacitor?	L-6	CO-4	7M

		ii) Explain in detail about the operational applications of STATCOM with outcomes?	L-3	CO-4	7
		OR			
	b	i) Draw the diagram and explain the design aspects of thyristor controlled reactor?	L-6	CO-4	7
		ii) Describe the design aspects of static VAr compensator?	L-1	CO-4	7
5		Unit-V			
	a	i) Discuss about the functional requirements of series compensators?	L-2	CO-5	7M
		ii) Explain the thyristor switched series capacitor operation and conclude with drawbacks?	L-5	CO-5	7M
		OR			
	b	i) Draw the diagram and explain the operation of unified power flow controller?	L-2	CO-5	7M
		ii) Describe the thyristor controlled series capacitor operation with drawbacks?	L-1	CO-5	7M

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

***

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

IV B.Tech I Semester Supple. **Examinations,** March-2024

R20

Sub Code: R20EE4109 **POWER SYSTEM OPERATION AND CONTROL**

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
1		Unit-I			
	a	Define Economic Load Dispatch. Explain the use of Lagrange multiplier technique to solve load dispatch problem in case of including generator limit and without including transmission line loss	K2	1	7M
	a	The cost curve of three thermal units in Rs/hr, are given as follows; C_1= 0.004XP_1^2+ 5.3X P_1+ 500;C_2= 0.006X P_2^2+ 5.5X P_2+ 400 C_3= 0.009X P_3^2+ 5.8X P_3+ 200;Neglect the transmission loss and generator limits. Find the optimum dispatch of 800 MW and 975 MW using coordination equation	K3	1	7M
		OR			
	b	Discuss the use of Lagrange multiplier technique to solve economic load dispatch problem including transmission loss and with generator limits	K4	1	7M
	b	The fuel cost of two units are given by F_1=F_1 (PG_1) = 1.5+20PG_1+0.1PG_1^2 Rs\hr; F_2=F_2 (PG_2) = 1.9+30PG2+0.1PG_2^2Rs\hr If the total demand on the generator is 200 MW. calculate the economic load scheduling of the two units	K3	1	7M
2		Unit-II			
	a	Explain Short Term Hydro Thermal Scheduling	K2	2	7M
	a	Explain the dynamic programming method used for unit commitment	K2	2	7M
		OR			
	b	Define Unit Commitment. Enlist the methods to solve Unit Commitment. Explain the recursive function used in dynamic programming of UC task.	K3	2	7M
	b	Discuss briefly hydrothermal scheduling	K3	2	7M
3		Unit-III			
	a	Explain following concepts with reference to Automatic Generation Control (AGC) i) Single Control Area ii) Free Governor Mode of operation iii) Area Control Error in single area case iv) Area Control Error in two area case	K3	3	7M
	a	A generator has a primary ALFC loop characterized by R=4 percent. The secondary loop is open. It is feeding a load consisting of three equal resistors 'R' connected in a star network. The frequency is 50 Hz. The resistances are decreased until the frequency drops to 49 Hz. Find by how many percent the resistance 'R' has to be decreased. Assume that the AVR loop keeps the terminal voltage constant.	K3	3	7M
		OR			
	b	Draw and explain the working of speed governor system of turbo generator.		3	7M
	b	Obtain the dynamic response of an uncontrolled isolated power system with the following loop parameters R=2 Hz/p.u MW, kp=75 Hz/ p.u MW, Tp=20 sec, ΔPD=0.02 p.u.	K3	3	7M
4		Unit-IV			
	a	Explain the power frequency characteristics of an interconnected power system.		4	7M
		Two power stations A, B are interconnected by a tie-line and an increase in load of 250 MW on system B causes a power transfer of 150 MW from A to B. When the tie-line is open, the frequency of System A is 50 c/s and that of system B is 49.5 c/s. Determine the value of KA and KB, which are the power frequency constants of the two generators.	K3	4	7M

		OR			
	b	Derive an expression for steady state change of frequency and tie-line power transfer of a two-area power system.	K4	4	7M
		Two interconnected Area-1 and Area-2 have the capacity of 2,000 and 500 MW, respectively. The incremental regulation and damping torque coefficient for each area on its own base are 0.2 p.u. and 0.8 p.u., respectively. Find the steady-state change in system frequency from a nominal frequency of 50 Hz and the change in steady state tie-line power following a 750 MW change in the load of Area-1.	K3	4	7M
5		Unit-V			
	a	Explain the circuit, VI characteristics, advantages and limitations of TCSC		5	7M
		A three phase overhead line has resistance and reactance per phase of 5Ω and 25 Ω, respectively. The load at the receiving-end is 15 MW, 33kV,0.8 p.f. lagging. Find the capacity of the compensation equipment needed to deliver this load with a sending-end voltage of 33 kV.	K3	5	7M
		OR			
	b	Explain the importance of FACTS controllers in power system	K2	5	7M
		Explain the working principle and circuit diagram of SSSC.	K2	5	7M

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

***

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

IV B.Tech I Semester Supple. Examinations, March-2024

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
1		Unit-I			
	a	Explain various methods of arc extinction in circuit breaker. Also explain the recovery rate theory and energy balance theory.	K3	1	7M
		For a 132kv system, the reactance and capacitance up to the location of a C.B is 3 Ω. And 0.015μFrespectively. Calculate the fallowing a) The frequency of transient oscillations. b) The Maximum value of restriking voltage. C)The max value of RRRV	K4	1	7M
		OR			
	b	Draw & describe the construction, working principle of air blast circuit breaker.	K3	1	7M
		Discuss the operating principle of SF6 circuit breaker, what are its advantages over other types of circuit breakers and for what voltage range it is recommended.	K1	1	7M
2		Unit-II			
	a	With the help of neat and labeld diagram explain the working principle of induction type over current relay.	K3	2	7M
		Compare the characteristics of impedance, mho and reactance relay also mention the applications.	K4	2	7M
		OR			
	b	What are advantages and disadvantages of static relays?	K4	2	7M
		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.	K4	2	7M

PSM	2	4	5	8	10	20	20
Operating time in sec.	10	5	4	3	2.8	2.4	2.1

3		Unit-III			
	a	Discuss the percentage differential protection scheme of a transformer?	K2	3	7M
		An 11kv,1000 MVA generator is provided with differential scheme of protection. The percentage of generator winding to be protected against phase to ground fault is 80%,the relay is set to be operate when there is a 15% out of balance current determine the value of resistance to be placed in neutral to ground connection?	K4	3	7M
		OR			
	b	Describe the protection of the stator windings of 3-phase alternator against turn-to-turn faults.	K1	3	7M
		A 3-phase transformer rated for 33kV/6.6kV is connected star-delta and the Protecting current transformer on the low voltage side have a ratio of 400/5.Determine the ratio of the current transformer on the HV side.	K4	3	7M

<table>
<tr><td rowspan="5">4</td><td colspan="5">Unit-IV</td></tr>
<tr><td rowspan="2">a</td><td>Draw the schematic diagram of the carrier current protection scheme of lines. Also explain its working principle.</td><td>K2</td><td>4</td><td>7M</td></tr>
<tr><td>With neat Diagram Explain the Three zone distance protection in 3-Phase transmission line.</td><td>K2</td><td>4</td><td>7M</td></tr>
<tr><td colspan="5">OR</td></tr>
<tr><td rowspan="2">b</td><td>Explain about the over current protection of bus bars with relevant connection diagram</td><td>K3</td><td>4</td><td>7M</td></tr>
<tr><td>Write short notes on the following: (i) Fault bus protection (ii) Translay scheme.</td><td>K2</td><td>4</td><td>7M</td></tr>
<tr><td rowspan="5">5</td><td colspan="5">Unit-V</td></tr>
<tr><td rowspan="2">a</td><td>What are advantages and disadvantages of static relays?</td><td></td><td>5</td><td>7M</td></tr>
<tr><td>Explain with neat schematic diagram of micro processed based overvoltage protection relay.</td><td>K3</td><td>5</td><td>7M</td></tr>
<tr><td colspan="5">OR</td></tr>
<tr><td>b</td><td>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.
<table>
<tr><td>PSM</td><td>2</td><td>3.6</td><td>5</td><td>8</td><td>10</td><td>15</td><td>20</td></tr>
<tr><td>Operating time in sec.</td><td>10</td><td>6</td><td>3.9</td><td>3.15</td><td>2.8</td><td>2.2</td><td>2.1</td></tr>
</table>
</td><td>K4</td><td>5</td><td>7M</td></tr>
<tr><td></td><td>Derive a generalized mathematical model of distance relays for digital protection.</td><td>K4</td><td>5</td><td>7M</td></tr>
</table>

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

***

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

R20

IV B.Tech I Semester Supple. Examinations, March-2024

Sub Code: R20CC4OE03 NON-CONVENTIONAL ENERGY RESOURCES

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
1		Unit-I			
	a	Explain the depletion process of solar radiation as it passes through the atmosphere to reach the surface of the earth.	K2	1	7M
		calculate the angle made by beam radiation with the normal to a flat plate collector, tilted by 30^0 from the horizontal, pointing due south, located at New Delhi, at 11:00 hr(IST), on 1 june. The latitude and longitude of New Delhi are 28^0 35' N and 77^0 12' E respectively. The Standard IST longitude is 81^0 44' E.	K3	1	7M
		OR			
	b	Define solar thermo-mechanical systems and Explain about solar pond electric plant.	K3	1	7M
		Discuss the different renewable sources of energy with special reference to Indian context.	K3	1	7M
2		Unit-II			
	a	With the help of block diagram explain the functions of various blocks of a WECS.	K4	2	7M
		Explain briefly different biomass energy conversion technologies.	K3	2	7M
		OR			
	b	Discuss the various advantages and disadvantages of biomass energy.	K3	2	7M
		The following data were measured for a HAWT.speed of wind is 20m/sec at 1 atm and 27^0 C. diameter of rotor is 80m, speed of rotor is 40 rpm calculate the maximum torque produced at the shaft.	K3	2	7M
3		Unit-III			
	a	Explain open cycle and closed cycle OTEC with neat diagram.	K2	3	14M
		OR			
	b	A deep ocean wave of 2.5 m peak to peak appears at a period of 10s. find the wave length ,phase velocity and power associated with the wave.at this power rate what is the average annual wave energy in MWh/m.	K3	3	7M
		Derive the average tidal power developed equation in power generation from tides.	K2	3	7M
4		Unit-IV			
	a	Explain principle operation of thermionic power conversion.	K2	4	7M
		Discuss and comment on type of materials require in thermionic converter.	K4	4	7M
		OR			
	b	Explain the principle operation of thermos electric power conversion. Also derive the maximum out power.	K2	4	7M
		List the different potential applications of thermionic converter.	K4	4	7M
5		Unit-V			
	a	With neat diagram explain closed cycle MHD power generation.	K4	5	7M
		What are the major advantages and limitations of an MHD generating Systems?	K4	5	7M

		OR			
	b	Describe the basic principle of operation of an MHD generator. Derive expressions for maximum power generation per unit volume of a generator.	K4	5	7M
		Calculate the open circuit voltage and maximum output for an MHD generator having following data plate area is 0.25 m2, distance between the electrodes is 0.50 m, flux density is 2 wb/m^2, average gas velocity is 1000 m/s, gaseous conductivity is 10 mho/m.	K3	5	7M

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

***

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

IV B.Tech I Semester Supple. Examinations, March-2024

R20

Sub Code: R20ME4102 **DIGITAL MANUFACTURING**

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
1		**Unit-I**			
	a	i) Distinguish between smart manufacturing and conventional manufacturing.	K2	CO1	7M
		ii) List the advantages and application of digital manufacturing.	K2	CO1	7M
		OR			
	b	Explain the role of followings w.r.t. smart manufacturing. i) Internet of things ii) Cyber security	K2	CO1	14M
2		**Unit-II**			
	a	Describe in brief about Agile Manufacturing and enlist the major differences between Lean Manufacturing and Agile Manufacturing.	K2	CO2	14M
		OR			
	b	i) What is Smart Factory? Explain the benefits of Smart Factory Implementation.	K2	CO2	7M
		ii) Explain in brief about Industrial internet of things (IIoT).	K2	CO2	7M
3		**Unit-III**			
	a	Write a note on the followings i) Big Data analytics. ii) Cloud computing.	K3	CO3	14M
		OR			
	b	Classify the communication technologies for Smart Manufacturing systems.	K4	CO3	14M
4		**Unit-IV**			
	a	i) Differentiate between NC and CNC.	K2	CO4	7M
		ii) What are the basic components of NC system and explain function of each component?	K3	CO4	7M
		OR			
	b	List and explain the Smart Manufacturing enabled technologies.	K3	CO4	14M
5		**Unit-V**			
	a	Describe in detail on Sizing the Gaps, Man, Machines and Product Flow.	K4	CO5	14M
		OR			
	b	Define productivity and explain in detail the classification of types of productivity measures.	K3	CO5	14M

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

***

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

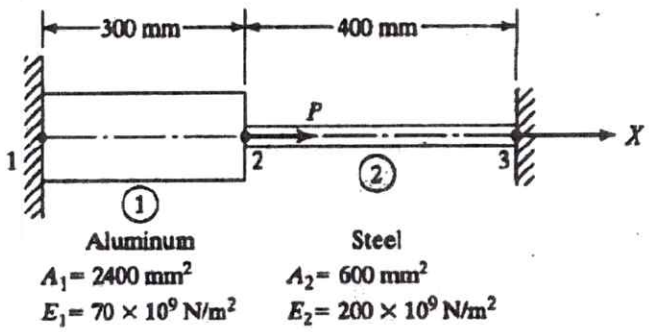
IV B.Tech I Semester Supple. Examinations, March-2024

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
1		**Unit-I**			
	a	i) Explain the step involved in FEM to solve engineering problem.	**K3**	CO1	7M
		ii) Derive the strain-displacement relation for a two (2) dimensional element.	**K5**	CO1	7M
		OR			
	b	i) Explain with sketches, plain stress and plain strain.	**K3**	CO1	7M
		ii) Write the advantages, disadvantages and applications of FEM.	**K2**	CO1	7M
2		**Unit-II**			
	a	i) Discuss about different weighted residual methods with the help of an example.	**K3**	CO2	7M
		ii) Explain the importance of node numbering and element numbering with suitable example.	**K3**	CO2	7M
		OR			
	b	Consider the following **Fig.1.** An axial load P=250 KN is applied as shown. Using penalty approach for handling boundary conditions, do the following a) Determine the nodal displacements. b) Determine the stress in each material. c) Determine the reaction forces.  *Fig.1.*	**K5**	CO2	14 M
3		**Unit-III**			
	a	Derive the stiffness matrix of a beam element. Also derive the load vector for uniformly distributed loading condition.	**K4**	CO3	14 M
		OR			
	b	For the two-bar truss shown in **Fig.2**. determine the displacements of node 1 and stress in elements 1-3. Take A_1 & A_2 =500mm^2, E=2x10^5 N/mm^2 for both members.	**K5**	CO3	14 M

P.T.O

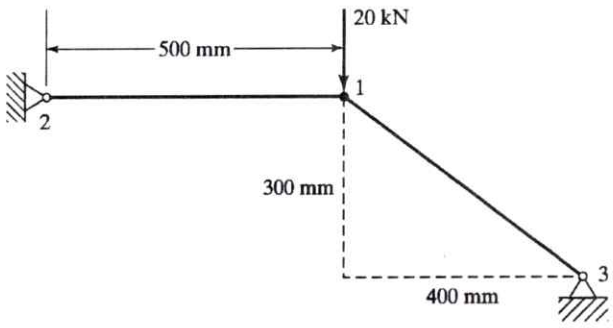
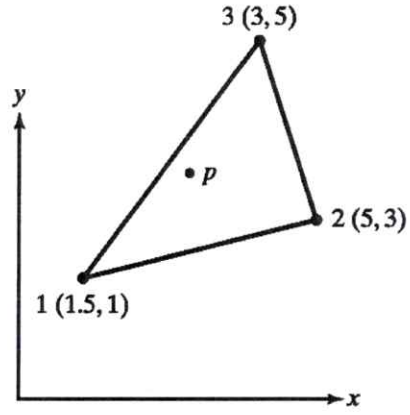
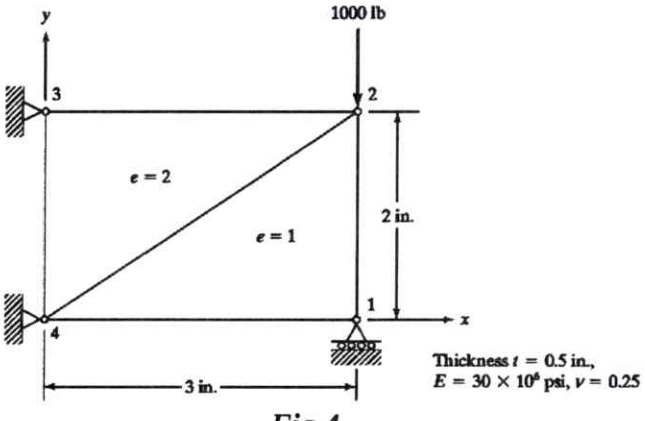


Fig. 2

Unit-IV

4	a	i) Derive the strain displacement matrix of a constant strain triangle element	**K4**	CO4	7M
		ii) The nodal coordinates of the triangular element are shown in **Fig.3.** At the interior point P, the x-coordinate is 3.5 and N1 = 0.25. Determine N_2, N_3, and the y-coordinate at point P.  *Fig. 3.*	**K5**	CO4	7M
		OR			
	b	For the two-dimensional loaded plate shown in **Fig.4**, determine the displacements of nodes 1 and 2 and the element stresses using plane stress conditions. Body force may be neglected in comparison with the external forces.  *Fig.4.*	**K5**	CO4	14 M
5		**Unit-V**			
	a	A composite wall consists of three materials, as shown in **Fig. 5**. The outer temperature is T0 20°C. Convection heat transfer takes place on the inner surface of the wall with T q 800°C and h 25 W/m^2 · °C. Determine the temperature distribution in the wall.	**K5**	CO5	14 M

P.T.O

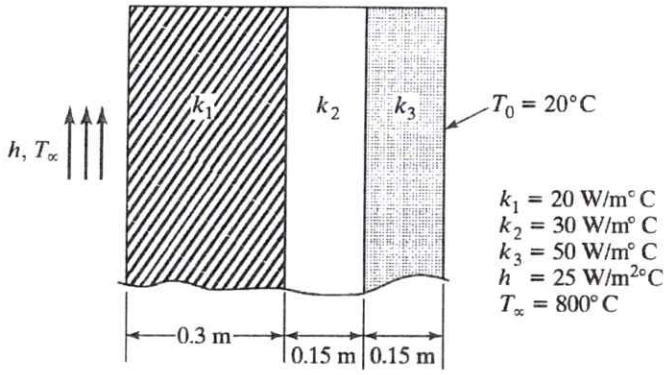
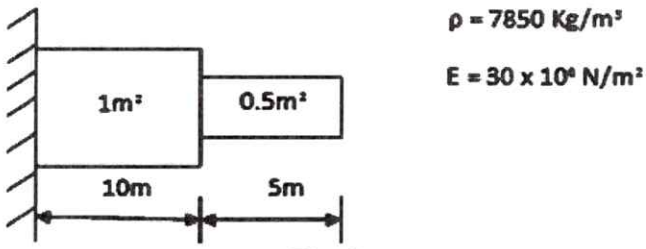


Fig.5.

OR

b	Determine the Eigen values and Eigen Vectors for the stepped bar as shown in Fig. 6.  *Fig.6.*	**K5**	CO5	14 M

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

* * *

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

IV B.Tech I Semester Supple. Examinations, March-2024

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
1		Unit-I			
	a	Explain in detail about the Emerging areas of mechatronics.	K2	1	14M
		OR			
	b	Explain the components and working of hydraulic system with applications	K2	1	14M
2		Unit-II			
	a	i) Illustrate about PN junction diode in detail?	K2	2	7M
		ii) Describe the construction and operation of TRIAC with suitable diagram.	K2	2	7M
		OR			
	b	i) What are the different types of FETs? Explain them with their specification.	K2	2	7M
		ii) Outline the applications of LEDs.	K3	2	7M
3		Unit-III			
	a	i) How do you measure the temparature with thermistors?	K3	3	7M
		ii) Explain the working principle of transducer	K2	3	7M
		OR			
	b	i) Write about pyroelectric transducer	K2	3	7M
		ii) Explain the principles and working of Hall Effect transducer.	K2	3	7M
4		Unit-IV			
	a	i)Draw the ladder logic diagram of OR, NOR, NAND and XOR logic.	K2	4	6M
		ii) Explain in detail about types of number systems.	K2	4	8M
		OR			
	b	Analyze the working of programmable logic controllers in detail.	K4	4	14M
5		Unit-V			
	a	What do you mean by condition monitoring and Explain the different types of sensors used in condition monitoring with their functions?	K3	5	14M
		OR			
	b	**Explain** Fuzzy logic applications on mechatronics with suitable examples	K3	5	14M

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

***

NAKASAKAUPETA
NEC ENGINEERING COLLEGE
(AUTONOMOUS)

IV B.Tech I Semester Supple. Examinations, March-2024

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
1		Unit-I			
	a	i)Describe basic cellular mobile system.	K1	1	7M
		ii) Explain the concept of frequency reuse and co-channel interference.	K2	1	7M
		OR			
	b	i)Explain desired C/I from a normal case in a Omni directional antenna system.	K2	1	7M
		ii)Describe cell splitting and sectoring.	K2	1	7M
2		Unit-II			
	a	i) Describe any two phase diversity techniques.	K1	2	7M
		ii) Describe phase difference between direct and reflected paths.	K2	2	7M
		OR			
	b	i) Describe near end far end difference.	K1	2	7M
		ii) Describe effect of human made structures on cell coverage.	K2	2	7M
3		Unit-III			
	a	i) Describe space diversity antennas.	K1	3	7M
		ii) Describe channel assignments to cell sites and mobile units.	K2	3	7M
		OR			
	b	i) Describe Umbrella pattern antennas.	K1	3	7M
		ii) Describe non fixed channel assignment.	K2	3	7M
4		Unit-IV			
	a	i) Describe dropped cell rates and their evaluation.	K2	4	7M
		ii) Describe power difference handoff.	K2	4	7M
		OR			
	b	i) Describe forced handoff.	K2	4	7M
		ii) Describe handoff initiation and advantages of handoff.	K2	4	7M
5		Unit-V			
	a	Demonstrate the architecture of GSM with neat diagram.	K3	5	14M
		OR			
	b	Demonstrate the architecture of CDMA with neat diagram.	K3	5	14M

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

***

NAKASAKAUPETA
NEC ENGINEERING COLLEGE
(AUTONOMOUS)

IV B.Tech I Semester Supple. Examinations, March-2024

R20

Sub Code: R20EC4106 **RADAR SYSTEMS**

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
1		Unit-I			
	a	i) Describe various radar applications.	K1	1	2M
		ii) Describe the operation of radar block diagram.	K1	1	5M
		iii)what is minimum detectable signal? Calculate minimum receivable signal in a radar receiver that has an IF bandwidth of 1.5 MHz and a 9-dB noise figure.	K4	1	7M
		OR			
	b	i) For the specifications of a radar listed below, compute the power received at 50 Km distance from the radar antenna operating wavelength= 3.0 cm, peak pulse transmitted power= 320 kW, transmitting gain G of the antenna= 9.6 x 104, effective aperture area of receiving antenna= 5 sq.m, radar cross-sectional area of the target σ= 12 sq.m.	K2	1	7M
		ii)Find the pulse repetition frequency of a radar in order to achieve a maximum unambiguous range of 50 nmi and if the radar has a peak power of 600 kW. What is its average power with a pulse width of 1.8 μs.	K1	1	7M
2		Unit-II			
	a	i)Draw and explain CW radar with non-zero IF receiver.	K3	2	7M
		ii)Explain the basic principle of FM-CW radar.	K5	2	7M
		OR			
	b	i)Discuss the various unwanted signals which cause errors in FM-CW altimeter.	K2	2	7M
		ii) Discuss the concept of between transmitter and receiver.	K2	2	7M
3		Unit-III			
	a	i) A CW radar (MTI) is operating at a PRF of 1 KHz. Find the lowest blind speed, if it isolation is operating at 2 cm wavelength.	K1	3	7M
		ii)list out the limitations to MTI performance.	K1	3	7M
		OR			
	b	i)Explain the principle of operation of non-coherent MTI radar with a block diagram.	K5	3	7M
		ii)What is a delay-line canceller? Explain its frequency response characteristics with a neat sketch.	K1	3	7M

4		Unit-IV			
	a	i)What is Target glint? Compute the improvement in tracking accuracy that is possible when tracking radar uses pulse to pulse frequency agility. It is given that the agility bandwidth is 200 MHz, target depth is 7m, glint bandwidth is 5000 Hz and the pulse repetition frequency is 30 KHz.	K2	4	7M
		ii)Explain the function of Conical scan Tracking radar.	K5	4	7M
		OR			
	b	i)Explain Amplitude Comparison Monopulse tracking radar with the help of a neat block diagram.	K5	4	7M
		ii)In a Monopulse radar, two antennas are separated by $\frac{\lambda}{2}$ and angle θ between the line of sight and perpendicular bisector of the line joining the two antennas is 5^{o}.Find the phase differences between the Echo signals in the antennas, Assume necessary data.	K1	4	7M
5		Unit-V			
	a	i)Write about beam steering, beamwidth of phased array antennas.	K5	5	7M
		ii)Distinguish series feeds and parallel feeds.	K4	5	7M
		OR			
	b	i)Derive the impulse response of a matched filter that is commonly used in a radar receiver.	K3	5	7M
		ii)Explain the principle of operation of constant false alarm rate receiver.	K5	5	7M

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

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

IV B.Tech I Semester Supple. Examinations, March-2024

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
1		Unit-I			
	a	i) Explain the flow of data in Fog Computing model	2	1	7M
		ii) Label the key components and explain their roles in facilitating Edge Computing operations.	1	1	7M
		OR			
	b	i) Develop a block diagram comparing Edge Computing and Fog Computing. Highlight the similarities and differences between these two paradigms, emphasizing their respective strengths and weaknesses	3	1	9M
		ii) Explain the flow of data in Machine-to-Machine (M2M) communications model	2	1	5M
2		Unit-II			
	a	i) Create a block diagram for a telemedicine palliative care case study. Label and explain the various components involved, such as patient devices, healthcare provider systems, and data transmission.	2	2	14M
		OR			
	b	i) Describe the concept of a connected ecosystem in the context of IoT. Explain how different IoT devices and components interact within this ecosystem	3	2	7M
		ii) Provide examples of real-world IoT implementations. Explain the components, data flow, and functionalities of these implementations.	4	2	7M
3		Unit-III			
	a	i) Provide a step-by-step guide on how to interface a DHT sensor with a Raspberry Pi using a Python program.	4	3	7M
		ii) Explore the various operating systems that can be run on Raspberry Pi. Discuss the installation and configuration process for different OS options.	2	3	7M
		OR			
	b	i) Discuss various remote access tools and methods that can be used to interact with a Raspberry Pi remotely.	2	3	7M
		ii) Describe the Raspberry Pi board, including its main components and specifications. Explain how its form factor and design contribute to its versatility.	2	3	7M
4		Unit-IV			
	a	i) Design a block diagram that visually represents the concept of edge-to-cloud communication protocols.	3	4	7M
		ii) Explore the architecture of MQTT in detail. Discuss the roles of MQTT brokers, clients, and topics. Explain how messages are routed within the MQTT network.	2	4	7M
		OR			
	b	i) Create a block diagram that represents the security considerations when implementing MQTT in IoT applications.	3	4	7M
		ii) Provide an overview of the different communication formats used in MQTT, including one-to-one, one-to-many, and many-to-many communication scenarios.	2	4	7M

5	Unit-V				
	a	i) Explore the industrial and commercial IoT applications where Edge Computing with Raspberry Pi is particularly valuable.	2	5	7M
		ii) Explain the scalability challenges and solutions in Edge Computing using Raspberry Pi.	2	5	7M
	OR				
	b	i) Discuss the key features of Raspberry Pi that make it suitable for Edge Computing applications. Explain how its hardware and capabilities contribute to its role in edge processing.	2	5	7M
		ii) Explain the role of Edge Computing in industrial automation and control systems. Discuss how Raspberry Pi can be utilized in scenarios like factory automation and process control.	2	5	7M

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

* * *

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

IV B.Tech I Semester Supple. Examinations, March-2024 **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
1		**Unit-I**			
	a	i) Discuss the role of various hardware components required for Embedded Systems.	2	1	7M
		ii) Analyse the role of various Onboard Communication Interfaces.	4	1	7M
		OR			
	b	i) Describe serial bus communication protocol using the I2C bus.	2	1	7M
		ii) Design functional block diagram specifications of any embedded system.	4	1	7M
2		**Unit-II**			
	a	i) Describe the kernel services in operating systems with functions and actions.	2	2	7M
		ii) Compare the features of Windows CE and POSIX RTOS.	4	2	7M
		OR			
	b	i) Analyze the Architecture of the Kernel.	4	2	7M
		ii) What exactly is real time operating system? Explain with examples.	2	2	7M
3		**Unit-III**			
	a	i) Differentiate preemptive multitasking, Non -preemptive multi tasking.	4	3	7M
		ii) Give the analysis of priority inversion problem and illustrate any one of the priority inversion workarounds.	4	3	7M
		OR			
	b	i) Explain the scheduler in which RTOS insert into the list and the ready task for sequential Execution in a co-operative round robin model	4	3	7M
		ii) Illustrate FIFO Scheduling and LIFO Scheduling algorithms with suitable examples.	4	3	7M
4		**Unit-IV**			
	a	i) Analyse how shared data problems can be overcome with task synchronization Techniques.	4	4	7M
		ii) Distinguish Semaphore and Mutex techniques.	4	4	7M
		OR			
	b	i) With an example explain how to use binary semaphores for signalling or notifying occurrences of an event from a task or thread and for signalling or notifying another task waiting for that event.	4	4	7M
		ii) Demonstrate the dining philosopher's problem.	4	4	7M
5		**Unit-V**			
	a	i) Describe the functions of Hardware Software co simulators while integrating two simulators.		5	7M
		ii) Explain about Behavioral Synthesis		5	7M
		OR			
	b	i) Write a short note on RT Synthesis.		5	7M
		ii) Explain in detail about Logic Synthesis.		5	7M

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

***

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

IV B.Tech I Semester Supple. Examinations, March-2024

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
1		Unit-I			
	a	i) Discuss the free electron model and its relevance in understanding electronic behavior in materials.	1	1	7M
		ii) Explain the concept of energy bands in crystalline solids. How do they relate to the electronic properties of materials?	2	1	7M
		OR			
	b	i) How do nanoscale dimensions affect the total energy of a system? Provide examples of energy changes at the nanoscale.	2	1	7M
		ii) Discuss the structural changes that can occur at the nanoscale in materials or systems. How do these changes influence the properties of the materials?	1	1	7M
2		Unit-II			
	a	i) Explain the key principles behind scanning probe techniques. How do they enable the imaging and manipulation of nanoscale objects?	3	2	7M
		ii) What are the advantages of using scanning transmission electron microscopy (STEM) over traditional TEM for nanoscale characterization?	1	2	7M
	OR				
	b	i) Explain the concept of quantum confinement in semiconductor nanostructures. How does it lead to the formation of quantum wells, quantum wires, and quantum dots?	2	2	7M
		ii) Discuss the general aspects of electron optics in electron microscopy. How does it impact the quality of imaging in these techniques?	4	2	7M
3		Unit-III			
	a	i) Describe the epitaxial growth of quantum wells in semiconductor materials. Discuss the epitaxial process, including its techniques and underlying principles, and provide examples of its applications in nanoelectronic devices.	4	3	10M
		ii) List distinctive properties of colloidal quantum dots compared to other semiconductor nanostructures.	2	3	4M
		OR			
	b	i) Explore the role of lithography and etching techniques in semiconductor fabrication. Discuss their historical development, working principles, and the diverse applications they enable in creating precise nanostructures for electronic devices.	3,4	3	10M
		ii) How does annealing impact the properties of quantum wells?	2	3	4M
4		Unit-IV			
	a	i) Discuss the vibrational properties of carbon nanotubes, including their phonon modes and how they affect thermal conductivity and mechanical behavior.	2	4	9M
		ii) How are these properties utilized in practical applications?	2,4	4	5M
		OR			
	b	i) Explain the challenges and future prospects of using carbon nanotubes in large-scale industrial applications.	2,4	4	6M
		ii) Discuss recent advancements in the functionalization of carbon nanotubes and their impact on improving their properties and expanding their range of	2	4	8M

		applications.			
5	Unit-V				
	a	Explore the concept of "smart dust" sensors for the future. What are smart dust sensors, and how do they differ from traditional sensors? Discuss potential applications and challenges in deploying these tiny sensors in various environments.	2, 4	5	14M
	OR				
	b	i) Discuss the concept of "Order from Chaos" in the context of Nano sensors.	2	5	5M
		ii) Describe sensors based on physical properties, such as Nano sensors that rely on changes in electrical, optical, or mechanical properties of materials.	2,4	5	9M

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

***

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

IV B.Tech I Semester Supple. Examinations, March-2024

Sub Code: R20CC4102 **HUMAN COMPUTER INTERACTION**

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
1		Unit-I			
	a	i) Describe the content organization issues and provide guidelines for design.	2	1	7M
		ii) Why Usability is so important? Explain the principles of User Interface design.	2	1	7M
		OR			
	b	i) List and explain the benefits of good design.	2	1	7M
		ii) Discuss the brief history of screen design.	2	1	7M
2		Unit-II			
	a	i) Explain the importance of Menu selection and dialog boxes in User interface design.	2	2	7M
		ii) Compare and contrast between the Linear menus and Tree structured menus with examples.	2	2	7M
		OR			
	b	i) Explain the Form-filling design guidelines.	2	2	7M
		ii) Explain in detail Error Messages.	2	2	7M
3		Unit-III			
	a	i) Explain the process of determining basic business functions.	2	3	7M
		ii) What is the importance of human characteristics in HCI?	2	3	7M
		OR			
	b	i) Discuss about different technologies used for Human interaction with computers.	2	3	7M
		ii) Justify that "The response time/productivity relation changes based on the task and user".	2	3	7M
4		Unit-IV			
	a	i) What is the role of screen navigation in screen design? Explain.	2	4	7M
		ii) Discuss about organizing screen elements in detail.	2	4	7M
		OR			
	b	i) What are the guidelines for presenting information on screen?	2	4	7M
		ii) Explain about different statistical graphical techniques.	2	4	7M
5		Unit-V			
	a	i) What is coordination? Discuss the important coordinations supported by interface developers for window design.	2	5	7M
		ii) What are the advantages and disadvantages of online manuals?	2	5	7M
		OR			
	b	i) What are the guidelines for alphanumeric displays, spreadsheets and Graphs.	2	5	7M
		ii) Describe choosing colors for statistical graphical screens.	2	5	7M

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

***

NAKASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

IV B.Tech I Semester Supple. Examinations, March-2024 **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
1		Unit-I			
	a	i) Explain about the anatomy of E-commerce	2	1	7M
		ii) List and Briefly explain E-Commerce applications	2	1	7M
		OR			
	b	i) Discuss about Consumer research and electronic commerce	2	1	7M
		ii) What is e-commerce? State how e-commerce differ from traditional commerce	2	1	7M
2		Unit-II			
	a	i) Discuss about pre purchase preparation in mercantile model	2	2	7M
		ii) Discuss about smart cards	2	2	7M
		OR			
	b	i) Explain with diagram payment transaction sequence in e-checks	2	2	7M
		ii) List out various risks involved in electronic payment systems.	2	2	7M
3		Unit-III			
	a	i) Explain about work flow management in intra organizational commerce.	2	3	7M
		ii) Explain about product or service customization.	2	3	7M
		OR			
	b	i) Discuss on Agile Manufacturing in supply chain management.	2	3	7M
		ii) Write notes on pull based and push based supply chain management	2	3	7M
4		Unit-IV			
	a	i) Explain about digital document management issues and concerns	2	4	7M
		ii) Explain the process to build an end to end data warehouse	2	4	7M
		OR			
	b	i) What is the significance of online marketing? Explain the limitations of on-line Marketing	2	4	7M
		ii) Explain the guidelines that each firm should follow for advertising on the Internet	2	4	7M
5		Unit-V			
	a	i)Discuss about electronic white and yellow pages of directory Business?	2	5	7M
		ii)Explain about Explain wide area information service engine.	2	5	7M
		OR			
	b	i) Explain the probabilistic information retrieval models.	2	5	7M
		ii) Illustrate the characteristics of digital video.	2	5	7M

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

***

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

IV B.Tech I Semester Supple. Examinations, March-2024

Sub Code: R20CS4108 **MOBILE AD HOC AND SENSOR NETWORKS**
(CSE)
Time: 3 hours 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)Write about the various characteristics of AdHoc Networks	2	1	7M
		ii)Explain in detail about Topology based versus Position based Approaches	2	1	7M
		OR			
	b	i)Explain in detail about the challenges in MANETs	2	1	7M
		ii)Write about Position based Routing Protocols	2	1	7M
2		Unit-II			
	a	i)How the TCP protocol will help the AdHoc Network to communicate	3	2	7M
		ii) Analyze the mobility related solutions TCP over adhoc	2	2	7M
		OR			
	b	i) Explain TCP over Ad Hoc wireless networks in detail.	2	2	7M
		ii)Write about TCP Protocol in detail	3	2	7M
3		Unit-III			
	a	i) Explain about the Energy consumption in Wireless Sensors. How to save the energy explain in detail	2	2	7M
		ii) Explain about the Sensing and Communication range in detail	3	3	7M
		OR			
	b	i) Write in detail about the Clustering Concept for Sensors	2	3	7M
		ii) Explain about various Design issues That araise while designing Wireless Sensor Applications	3	3	7M
4		Unit-IV			
	a	i) How the High level Application layer support will be provided in Sensor Networks	2	3	7M
		ii) Write in detail about MAC Layer in Sensor Networks	2	3	7M
		OR			
	b	i)Explain the importance of Routing Layer in Sensor Networks	3	4	7M
		ii)How Data Retrieval will be performed in Sensor Networks	2	4	7M
5		Unit-V			
	a	i)Explain in detail about Heterogeneous Architecture	3	4	7M
		ii)Write the difference between MANETs, WLANs and Cellular Network	2	4	7M
		OR			
	b	i)Explain in detail about the protocol Stack	2	4	7M
		ii)Write in detail about a comparison of Integrated Architectures	2	4	7M

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

***

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

IV B.Tech I Semester Supple. Examinations, March-2024

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 the classifications of cyber crimes ?	2	1	7M
		ii) Discuss cyber crimes in Indian perspective.	2	1	7M
		OR			
	b	i) Discuss cyber crime era: Survival mantra for netizens.	2	1	7M
		ii) Discuss cyber offenses in social networks.	2	1	7M
2		Unit-II			
	a	i) Discuss about credit card frauds in mobile and wireless computing Era.	2	2	7M
		ii) Give security challenges posed by mobile computing devices.	2	2	7M
		OR			
	b	i) Discuss in detail organizational security policies and measures in mobile computing Era.	2	2	14M
3		Unit-III			
	a	i)Discuss about password cracking, key loggers and spywares	2	3	14M
		OR			
	b	i) What are Dos, DDos attacks? Explain	2	3	7M
		ii)What is SQL Injection? Explain	2	3	7M
4		Unit-IV			
	a	i) Discuss about cyber crime scenario in India and challenges to Indian law.	2	4	14M
		OR			
	b	i) Discuss the need of security education, training and awareness programs.	2	4	14M
5		Unit-V			
	a	i) Discuss about background of cyber forensics and digital forensics signs.	2	5	7M
		ii) Explain computer forensics and cyber forensics.	2	5	7M
		OR			
	b	i) Explain cyber forensics life cycle and discuss challenges in computer forensics.	2	5	14M

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

***

NAKASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

IV B.Tech I Semester Supple. Examinations, March-2024

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) What is Natural Language Processing (NLP)? Explain the different phases of NLP and the challenges involved in NLP.	K2	CO1	7M
		ii) Discuss the different applications of NLP. Provide specific examples of how NLP is used in real-world applications.	K2	CO1	7M
		OR			
	b	i) Explain the different parts of speech in English grammar. How are they used in NLP?	K2	CO1	7M
		ii) What is the Noisy Channel Model? How is it used to model spelling errors in NLP?	K2	CO1	7M
		Unit-II			
2	a	i) What are the different types of N-gram language models?	K2	CO2	7M
		ii) What is language modeling? Explain the different types of language models.	K2	CO2	7M
		OR			
	b	i) What are the advantages and disadvantages of neural language models over N-gram language models?	K2	CO2	7M
		ii) Discuss the application of neural language models in NLP system development. Provide specific examples.	K2	CO2	7M
		Unit-III			
3	a	i) What is part-of-speech (POS) tagging? Explain the different types of POS tags.	K4	CO3	7M
		ii) Explain how hidden Markov models (HMMs) can be used for POS tagging.	K4	CO3	7M
		OR			
	b	i) Explain the rule-based approach to POS tagging. What are the different types of rules used in rule-based POS taggers?	K4	CO3	7M
		ii) Explain the transformation-based learning (TBL) approach to POS tagging. How does TBL differ from rule-based POS tagging?	K4	CO3	7M
		Unit-IV			
4	a	i) Explain the difference between top-down and bottom-up parsing.	K4	CO4	7M
		ii) Explain the probabilistic CKY parsing algorithm for PCFGs.	K4	CO4	7M
		OR			
	b	i) What is a probabilistic context-free grammar (PCFG)?	K4	CO4	7M
		ii) What is a treebank? How are treebanks used in parsing?	K4	CO4	7M
		Unit-V			
5	a	i) What is vector semantics? How are word vectors used to represent the meaning of words?	K4	CO5	7M
		ii) What is SVD and latent semantic analysis (LSA)? How is LSA used to generate dense word vectors?	K4	CO5	7M
		OR			
	b	i) What is the concept of word sense? How can word vectors be used to represent the different senses of a word?	K4	CO5	7M
		ii) What is WordNet? How is WordNet used to represent word meaning and lexical relations?	K4	CO5	7M

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

IV B.Tech I Semester Supple. Examinations, March-2024

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) Summarize current approaches in advertising with respect to digital marketing.	2	1	7M
		ii) What are elements of digital marketing? Explain in detail.	2	1	7M
		OR			
	b	i) Give a comparison of marketing and digital marketing.	2	1	7M
		ii) Demonstrate the P.O.E.M Framework.	2	1	7M
2		Unit-II			
	a	i) How online advertising differs from traditional advertising? Explain.	2	2	7M
		ii) Explain about search engine marketing and email marketing.	2	2	7M
		OR			
	b	i) What are major search engines? What search engines looks for? Explain	2	2	7M
		ii) Explain about Analytical Tools in digital marketing.	2	2	7M
3		Unit-III			
	a	i) Identify the strengths and capabilities of the different digital and social media platforms which can help in marketing a new venture.	2	3	8M
		ii) How to Use Facebook for Marketing. Explain.	2	3	6M
		OR			
	b	i) Discuss the role of social media in digital marketing.	2	3	7M
		ii) Explain in detail about Importance of LinkedIn Marketing.	2	3	7M
4		Unit-IV			
	a	i) How twitter Marketing is different than other forms of digital marketing.	2	4	7M
		ii) Explain about Mobile Advertising Analytics.	2	4	7M
		OR			
	b	i) Discuss about Digital Marketing Strategies.	2	4	7M
		ii) Why Instagram is good for advertising? Explain.	2	4	7M
5		Unit-V			
	a	i) Explain the following (a) Difference between on-page and off-page SEO. (b) Major on- page SEO tools and techniques.	2	5	8M
		ii) What are the benefits of Google Analytics over universal analytics.	2	5	6M
		OR			
	b	i) Discuss about Trends in digital advertising.	2	5	7M
		ii) Write the Difference Between SEO and SEM.	2	5	7M

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

***

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

IV B.Tech I Semester Supple. Examinations, March-2024

R20

Sub Code: R20IT4107 **BLOCK CHAIN TECHNOLOGIES**

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
1		Unit-I			
	a	i) Discuss in detail about the birth of blockchain with the emergence of bitcoin.	K1	CO1	7M
		ii) Explore different blockchain applications	K2	CO1	7M
		OR			
	b	i) Illustrate Blockchains Origin with the shortcomings of current transaction systems	K3	CO1	7M
		ii)How could recognize the key business benefits of blockchain with revolutionizing the Traditional Business Network	K3	CO1	7M
2		Unit-II			
	a	i) What Makes a Blockchain Suitable for Business? Elaborate	K1	CO2	7M
		iii)Discuss in detail about different Consensus Protocols.	K2	CO2	7M
		OR			
	b	i) How Blockchain Works? Why It's Called "Blockchain? Explain	K3	CO2	7M
		ii)What are Smart contracts and Identifying Participants and Their Roles in blockchain.	K1	CO2	7M
3		Unit-III			
	a	i)How could Recognize the Market Friction? Explain various types of it.	K3	CO3	7M
		ii) Discuss in detail about process of Friction-Free Business Networks.	K2	CO3	7M
		OR			
	b	i) How can achieve Easing interaction friction, and innovation friction? Elaborate.	K3	CO3	7M
		ii) Explain Propelling Business with Blockchains through Increased Visibility	K2	CO3	7M
4		Unit-IV			
	a	i) Explain the usage of blockchain in Supply Chain Management.	K2	CO4	7M
		ii) Illustrate the process of blockchain based Electronic medical records and Healthcare payments preauthorization	K3	CO4	7M
		OR			
	b	i) How can apply blockchain in government sector? Discuss in detail.	K3	CO4	7M
		ii) Discuss in detail about various Financial Services those can possible to implement using blockchain.	K2	CO4	7M
5		Unit-V			
	a	i) How Can IBM Help Developers Innovate With Block chain?	K3	CO5	7M
		ii) what is stopping adoption? Discuss about Protection mechanisms from attackers,	K2	CO5	7M
		OR			
	b	i)Explain in detail about Hyper ledger Vision and Hyper ledger Fabric process.	K2	CO6	7M
		iii) Elaborate scalability problems. Also discuss about different Network attacks to destroy bit coin	K2	CO6	7M

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

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

IV B.Tech I Semester Supple. Examinations, March-2024

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) Describe the structure of a neuron and its role as a building block in neural networks	K2	CO1	7M
		ii) How can neural networks be represented as directed graphs? Provide an example to illustrate this concept.	K2	CO1	7M
		OR			
	b	i) Compare and contrast error correction learning, memory-based learning, and Hebbian learning as distinct approaches to learning in neural networks.	K2	CO1	7M
		ii) Explore the concept of Boltzmann learning and its role in optimizing neural network performance.	K2	CO1	7M
2		Unit-II			
	a	i) Describe the concept of linear least square filters and how they are used to optimize neural network performance.	K3	CO2	7M
		ii) Define learning curves in the context of neural networks and discuss how they reflect the network's training progress.	K3	CO2	7M
		OR			
	b	i) Discuss the adaptive filtering problem in the context of neural networks and provide examples of scenarios where it is applicable.	K3	CO2	7M
		ii) Provide an in-depth explanation of the Back Propagation algorithm and its significance, using the XOR problem as an illustrative example.	K3	CO2	7M
3		Unit-III			
	a	i) Discuss the significance of differentiation in the Back Propagation algorithm, including its mathematical principles and practical applications.	K4	CO3	7M
		ii) Describe the Hessian Matrix and its relevance to neural network optimization.	K4	CO3	7M
		OR			
	b	i) Explain the purpose of Cross Validation in supervised learning, detailing its methodologies and benefits in model evaluation and selection.	K4	CO3	7M
		ii) What methods can be employed to enhance the convergence rate of learning algorithms?	K4	CO3	7M
4		Unit-IV			
	a	i) What is a self-organizing map (SOM)? How can SOMs be used in other fields, such as image processing, natural language processing, and robotics?	K4	CO3	7M
		ii) What is learning vector quantization (LVQ)?	K4	CO3	7M
		OR			
	b	i) What are the properties of a feature map?	K4	CO3	7M
		ii) What is adaptive pattern classification?	K4	CO3	7M

5		Unit-V			
	a	i) What are the challenges and applications of dynamical systems?	K4	CO4	7M
		ii) Explain the Hopfield model.	K4	CO4	7M
		OR			
	b	i) What is the restricted Boltzmann machine and how can it be used for machine learning tasks?	K4	CO4	7M
		ii) How can attractors be manipulated in a recurrent network to perform tasks such as pattern recognition and classification?	K4	CO4	7M

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

* * *

NEC NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

IV B.Tech I Semester Supple. Examinations, March-2024

Sub Code: R20CC3OE09 **CLOUD COMPUTING** **R20**

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			Unit-I			
	a	i)	Explain the basic structure of cloud computing with neat sketch. Write its benefits	2	1	7M
		ii)	Explain the role of Distributed Computing in the evolution of cloud computing	2	1	7M
			OR			
	b	iii)	Discuss the limitations of cloud computing	2	1	7M
		ii)	Explain the features of cloud computing	2	1	7M
2			Unit-II			
	a	i)	Explain about storage virtualization	2	2	7M
		ii)	Explain the VM Primitive Operations with neat sketch	2	2	7M
			OR			
	b	i)	Explain the Cloud Computing architecture with the following a) On the Basis of Load Balancing b) On the Basis of Disk Provisioning c) On the Basis of Storage Management	2	2	14M
3			Unit-III			
	a	i)	Explain the IaaS service in detail	2	3	7M
		ii)	Analyze the cloud sub service models	2	3	7M
			OR			
	b	i)	Explain the different types of clouds	2	3	14M
4			Unit-IV			
	a	i)	How to administrate the clouds. Explain	2	4	7M
		ii)	Explain the different types of browsers in detail	2	4	7M
			OR			
	b	i)	Discuss about disaster recovery planning	2	4	7M
		ii)	Analyze the disasters in the cloud	2	4	7M
5			Unit-V			
	a	i)	What is Azure? Explain types of Azure clouds	2	5	7M
		ii)	What are the advantages of the Azure Resource Manager? Explain	2	5	7M
			OR			
	b	i)	Explain the history of AWS	2	5	7M
		ii)	Explain the services and applications of AWS	2	5	7M

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

IV B.Tech I Semester Supple. Examinations, March-2024

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
1		**Unit-I**			
	a	i) Discuss the characteristics of Entrepreneurs.	2	1	7M
		ii) Distinguish between Entrepreneur and Businessman.	4	1	7M
		OR			
	b	i) Debate the Social responsibilities of Entrepreneurs.	3	1	7M
		ii) Critically evaluate the performance of Financial institutions to support the Entrepreneurs.	4	1	7M
2		**Unit-II**			
	a	i) Describe the characteristics of Creativity. Outline the nature of Creativity.	6	2	7M
		ii) Differentiate between Creativity and Innovations.	4	2	7M
		OR			
	b	i) Explain the concept of Innovation. Illustrate the process of Innovation.	5	2	7M
		ii) Examine the various factors affecting the Creativity.	4	2	7M
3		**Unit-III**			
	a	i) Write about the Entrepreneurship Training Programmes.	5	3	7M
		ii) Insist the importance of Entrepreneurship Development Programmes.	4	3	7M
		OR			
	b	i) Present the Objectives Entrepreneurship Development Programmes	5	3	7M
		ii) Explain the various considerations in designing the Entrepreneurship training Programmes	5	3	7M
4		**Unit-IV**			
	a	i) Explain the key characteristics of Project	5	4	7M
		ii) Classify the various kinds of Project. Give examples.	2	4	7M
		OR			
	b	i) Examine the phases of Project Life Cycle.	4	4	7M
		ii) Summarize the various methods Project Evaluation	5	4	7M
5		**Unit-V**			
	a	i) Outline the key provisions of MSME DI Act, 2006.	4	5	7M
		ii) Illustrate the various factors inducing the Growth.	4	5	7M
		OR			
	b	i) Trace the reasons for Small Scale business sickness. Suggest the remedies.	4	5	7M
		ii) Examine the various schemes of MSME sector.	4	5	7M

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

***