Course Code: **20CE5T06**

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III-B. Tech I-Semester Regular/Supplementary Examinations (BR20), NOVE-2024

THEORY OF STRUCTURES (CE)

Time: 3 hours Max. Marks: 70

*Question Paper consists of **FIVE** units, each carrying 14 marks*
*Each unit has **TWO** questions; either of them should be answered*
All parts of a question must be answered at one place

UNIT-I

1.a) A three hinged parabolic arch of span has its supports at depths of 4m and 16m below the crown C. The arch carries a load of 80kN at a distance of 5m to the left of C and a second load of 100kN at 100kN at 10m to the right of C. Determine the reactions at supports and bending moment under loads. (14M)

(OR)

1.c) A three hinged circular arch of 25m span with a central rise of 5m. It is loaded with a concentrated load of 10kN at 7.50m from the left hand support. Determine the a) Horizontal thrust, b) Reaction at each hinge, c) Bending moment under the load. (14M)

UNIT-II

2.a) Analysis the frame shown in fig.1 by portal method. Draw the bending moment diagram for beams and columns. (14M)

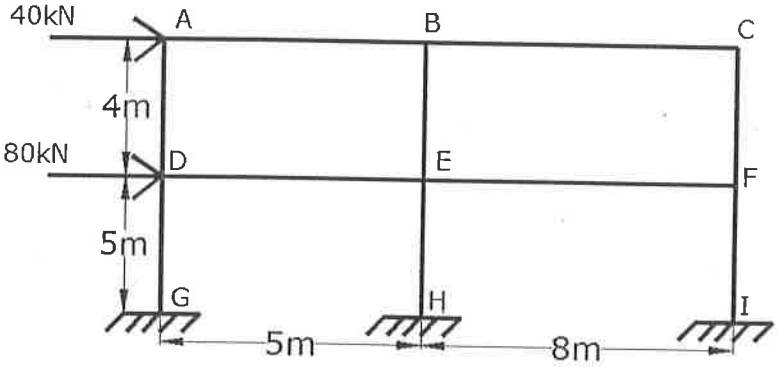


Fig. 1

(OR)

2.c) Analysis the frame shown in fig.2 by cantilever method. Draw the bending moment diagram for beams and columns. All members have same cross sectional area (14M)

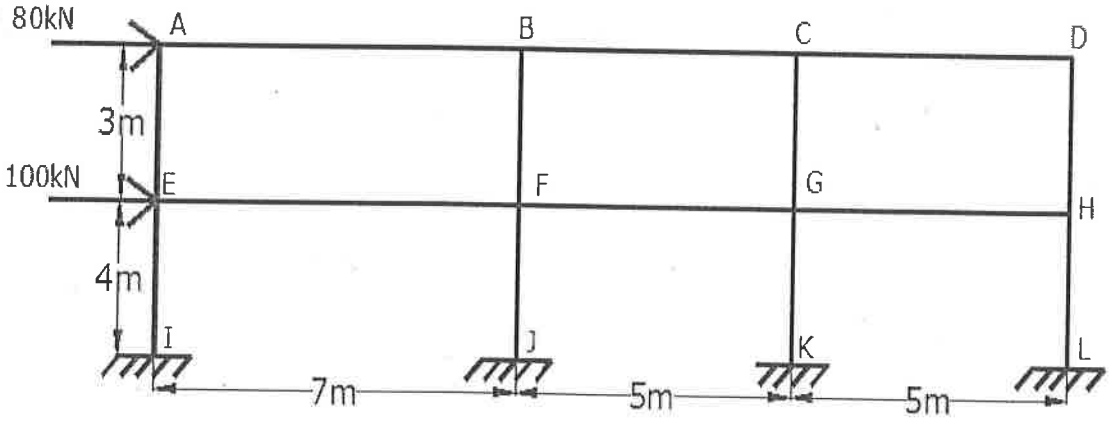


Fig. 2

UNIT-III

3.a) A light cable is supported at two points 20m apart which are at the same level. The cable supports three concentrated loads 40kN; 30kN and 20kN are at 5m, 10m and 15m from left supports. The dip at first point is found to be 0.8m. Determine the tension in the different segments and find the total length of the cable. (14M)

(OR)

3c) A cable ABC of uniform cross section is used to span a distance of 40m. The cable is subjected to uniformly distributed load of 10kN/m. The left support A is below the right support B by 2m and the lowest point on the cable 'C is located below left support A by 1m. Evaluate the reactions and maximum and minimum values of tension in the cable. Find the length of cable. (14M)

UNIT-IV

4.a) The following system of wheel loads move from left to right on a 15m span the 40kN load leading shown in fig. 3. For a section C, 4m from the left support determine the (i) maximum bending moment, (ii) maximum shear force (14M)

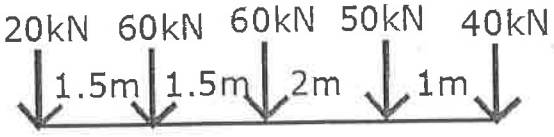


Fig. 3

(OR)

4.c) A live load 20kN/m, 6m long moves on a simply supported beam of 10m span. Find the maximum bending moment that can occur at a section 4m from the left end. Also find maximum shear force. (14M)

UNIT-V

5.a) The load system shown in fig. 4 crosses a plate girder bridge of span 30m from left to right. Determine the maximum bending moment and shear force at section 8 m from left support. Also find the absolute maximum bending moment. (14M)

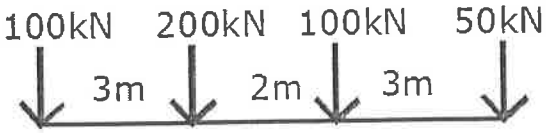


Fig. 4

(OR)

5.c) Draw the influence line diagram for the beam shown in fig. 5 a) Reaction A(R_A), b) Reaction B(R_B), c) Shear force at D (F_D), Bending moment at D (M_D), d) Shear force at E (F_E), e) Bending moment at E(M_E) (14M)

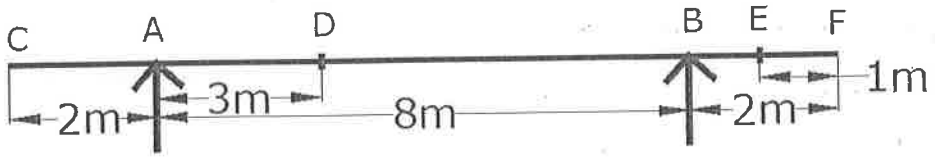


Fig. 5

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Course Code: 20CE5107

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III-B. Tech I-Semester Regular/Supplementary Examinations (BR20), NOVE- 2024

HIGHWAY ENGINEERING (CE)

Time: 3 hours Max. Marks: 70

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*Question Paper consists of **FIVE** units, each carrying 14 marks*
*Each unit has **TWO** questions; either of them should be answered*
All parts of a question must be answered at one place

UNIT-I

1.a)	Explain the classification of highways as per Nagpur Road Development Plan.	(7M)
1.b)	Discuss in detail the various factors controlling the highway alignment with sketches.	(7M)

(OR)

1.c)	What are the various road patterns practiced? Explain with diagrams.	(7M)
1.d)	What are the Engineering surveys to be conducted for highway location?	(7M)

UNIT-II

2.a)	Calculate the safe stopping distance for design speed of 50kmph for two-way traffic on a two-lane road. Assume coefficient of friction as 0.35 and reaction time of driver as 2.5seconds.	(7M)
2.b)	Derive an expression for over taking sight distance.	(7M)

(OR)

2.c)	Derive an expression for super elevation in highways.	(7M)
2.d)	Calculate the length of transition curve and the shift using the following data. Design speed = 65 kmph; Radius of circular curve = 220 m; Allowable rate of introduction of super elevation (pavement rotated about the centre line) =1 in 150; pavement width including extra widening = 7.5 m	(7M)

UNIT-III

3.a)	List the different types of traffic accidents? Briefly explain the causes of accidents. Explain various measures that can be taken to prevent the accident.	(7M)
3.b)	Explain collision and condition diagram. List preventive measure for road accidents.	(7M)

(OR)

3.c)	What are the characteristics of road users?	(7M)
3.d)	The average normal flow of traffic on cross roads A and B during design period are 400 and 250 PCU per hour; the saturation flow values on these roads are estimated as and 1000 PCU per hour respectively. The all-red time required for pedestrian crossings is 12 seconds. Design two phase traffic signal by Webster's method.	(7M)

UNIT-IV

4.a)	What are the various factors to be considered for design of pavement?	(7M)
4.b)	Explain CBR and the test procedure for laboratory test.	(7M)

(OR)

4.c)	Draw the cross section of flexible pavement and explain various functions of different components of flexible pavement.	(7M)
4.d)	What are the requirements of bituminous paving mixes?	(7M)

UNIT-V

5.a)	State the difference between flexible pavement and rigid pavements in detail.	(7M)
5.b)	What are different types of joints in rigid pavements? Explain.	(7M)

(OR)

5.c)	Explain the design of flexible pavement by IRC method.	(7M)
5.d)	What is radius of relative stiffness? Explain Westergaaard's stress analysis in cement concrete pavement.	(7M)

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Course Code: **20CE5T08**

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III-B. Tech I-Semester Regular/Supplementary Examinations (BR20), NOVE- 2024

GEO MECHANICS - I (CE)

Time: 3 hours Max. Marks: 70

*Question Paper consists of **FIVE** units, each carrying 14 marks*
*Each unit has **TWO** questions; either of them should be answered*
All parts of a question must be answered at one place

UNIT-I

1.a) Explain the phase diagram with neat sketch. (7M)

1.b) Discuss the compaction characteristics of soil. Explain the Standard Proctor Test and its significance in field compaction control. (7M)

(OR)

1.c) Derive the equation: (7M)

$$\gamma = \frac{(G+Se)\gamma_w}{(1+e)}$$

1.d) A soil sample has a bulk unit weight of 18 kN/m³ and a water content of 10%. The specific gravity of solids is 2.65. Calculate the dry unit weight, void ratio, and degree of saturation of the soil. (7M)

UNIT-II

2.a) Explain the laboratory procedure for calculating the coefficient of permeability using constant head permeability test. (7M)

2.b) A soil sample with a cross-sectional area of 50 cm² and a length of 15 cm is subjected to a constant head permeability test. During the test, a constant head of 75 cm is maintained, and 300 ml of water is collected over a period of 10 minutes. Calculate the coefficient of permeability (k) of the soil in cm/sec. (7M)

(OR)

2.c) Explain Darcy's Law in calculating soil permeability. Discuss any three factors affecting permeability. (7M)

2.d) A sheet pile wall is installed in sandy soil to retain water, and a flow net is constructed around the wall. The flow net shows 4 flow channels and 12 equipotential drops between the upstream and downstream sides. The total head difference between the upstream and downstream sides is 5 meters. (7M)

1. Calculate the seepage (discharge) per unit width of the wall.
2. If the coefficient of permeability (k) of the soil is 4×10^{-4} cm/sec, determine the discharge rate in liters per second per meter width of the wall.

UNIT-III

3.a) Derive Boussineq's equation for calculating the vertical stress under a concentrated point load of P kN in a homogenous, elastic and isotropic soil mass. (7M)

3.b) A concentrated point load of 100 kN is applied at the surface of a homogeneous, elastic, and isotropic soil mass. Using Boussinesq's equation, determine the vertical stress induced at a point located 4 meters directly below the load. (7M)

1. Calculate the vertical stress (σz) at this depth.
2. If another point is located 3 meters horizontally away from the axis of loading at the same depth (4 meters), calculate the vertical stress at that point.

(OR)

3.c) Explain in detail the construction of Newmark's Influence Charts. (7M)

3.d) Discuss a) Isobars b) Pressure bulb along with a neat sketch in detail. (7M)

UNIT-IV

4.a) Explain Terzaghi's one-dimensional consolidation theory. (7M)

4.b) A clay layer 6 m thick is subject to a load increase, causing primary consolidation. The initial void ratio of the clay layer is 0.8, and the compression index Cc is 0.25. If the initial effective stress is 100 kN/m² and the final effective stress after loading is 200 kN/m², calculate the settlement due to primary consolidation. (7M)

(OR)

4.c) Explain the terms a) Time factor in Consolidation b) Degree of Consolidation c) coefficient of volume change (6M)

4.d) A certain clay layer in field has a thickness of 5m. After 1 year when the clay was 50% consolidated, a settlement of 8cm occurred. For an identical clay layer 25m thick under identical loading conditions, calculate the settlement that would occur at the end of 1 year and 4 years respectively in cm. (8M)

UNIT-V

5.a) Define Mohr-Coulomb failure theory. Explain the terms "cohesion" and "angle of internal friction" and describe how they influence soil shear strength. (7M)

5.b) In a triaxial test, a soil sample is subjected to a confining pressure of 150 kN/m² and fails under an additional axial stress of 300 kN/m². Calculate the cohesion (c) and the angle of internal friction (ϕ) for the soil if the deviator stress at failure is 200 kN/m². (7M)

(OR)

5.c) Discuss the procedure of vane shear test with neat sketch. (7M)

5.d) A dry sand sample in a tri-axial test gave $\emptyset = 32^{\circ}$ under a cell pressure of 100KPa. Calculate the deviator stress of the sand sample at failure. (7M)

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BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III-B. Tech I-Semester Regular/Supplementary Examinations (BR20), NOV- 2024

OBJECT ORIENTED PROGRAMMING (CE & EEE)

Time: 3 hours Max. Marks: 70

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*Question Paper consists of **FIVE** units, each carrying 14 marks*
*Each unit has **TWO** questions; either of them should be answered*
All parts of a question must be answered at one place

UNIT-I

1.a) Discuss Java Program structure basic steps with suitable example. (7M)
1.b) Explain different OOP Principles with example. (7M)

(OR)

1.c) Discuss in detail Java Condition control statements with flowchart and syntax. (7M)
1.d) Write a Java Program to find the second largest element in the given three numbers a,b,c. (7M)

UNIT-II

2.a) Define class. Explain its declaration with an example. (7M)
2.b) How to declare class objects? Explain method declaration with an example. (7M)

(OR)

2.c) Discuss the following with an example. i) Overloaded methods ii) Static Methods (7M)
2.d) Write a Java Program to find the Factorial of the given number using recursion Static class. (7M)

UNIT-III

3.a) Define Inheritance? Discus various types of Java inheritances with suitable examples. (7M)
3.b) How interfaces are implemented? Explain the advantages of nested interfaces with an example. (7M)

(OR)

3.c) Explain the usage of super key word with suitable examples. (7M)
3.d) Distinguish between Method Overriding and Method Overloading. (7M)

UNIT-IV

4.a) Describe and discuss Thread life cycles. (7M)
4.b) How to reading and writing data through the file explain with an example. (7M)

(OR)

4.c) Define Synchronize block? Discuss the usage of Synchronization in threading concepts. (7M)
4.d) What is multithreaded programming? How to Create new Thread, explain with an example. (7M)

UNIT-V

5.a) Describe and discuss three components of Java FX. (7M)
5.b) Describe any five AWT Components? Distinguish between AWT and Swing components with an example. (7M)

(OR)

5.c) Write a Java Program to create button. (7M)
5.d) Discuss different java layout managers with an example. (7M)

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Course Code: 20CE5D01

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III-B. Tech I-Semester Regular/Supplementary Examinations (BR20), NOV- 2024

DESIGN AND DRAWING OF REINFORCED CONCRETE STRUCTURES
(CIVIL ENGINEERING)

Time: 3 hours

Max. Marks: 70

Question Paper consists of PART-A and PART-B
Answer ONE question from PART-A
Answer THREE questions from PART-B

Note: *IS-456:2000 code book and column interaction diagrams from SP16 are permitted.*
Assume suitable data if provided data is not sufficient.

	PART-A	
1	Design a rectangular footing to carry a column load of 1200 kN from a 300mm X 450mm column. The safe bearing capacity of the soil is 200 kN/m^2. The materials are M30 grade concrete and Fe500 grade steel. Draw reinforcement details. (Use LSM)	28M
	(OR)	
2	Design a reinforced concrete slab of dimensions 4m x 6m with two short edges discontinuous. The slab is supported by 250mm thick RCC beams cast monolithically with slab. The live load on the slab is 4kN/sqm. Floor finish on the slab is 1 kN/sqm. Use M20 concrete and Fe415 steel. Draw reinforcement details. (Use LSM)	28M
	PART-B	
3	Write a note on balanced, under reinforced and over reinforced RC sections.	14M
4	Design a rectangular beam for an effective span of 6m. The super-imposed load is 80 kN/m and the width of the beam is 300 mm. Use M20 grade concrete and Fe415 grade steel.	14M
5	Determine the ultimate shear capacity of the cross section with the following data. Cross section is of 250 mm x 550 mm, tension steel consists of 5#20mm. Two 20 mm bars are cranked at 50^0. 8 mm two legged vertical stirrups are spaced at 120mm c/c. Concrete is of M30 and Fe415 steel (use LSM).	14M
6	Design an uniaxial column to carry an axial load of 800kN and a moment of 120kN-m. Use M30 concrete and Fe 500 steel. (Use LSM)	14M
7	Design a one way slab to carry a live load of 3kN/m^2. The slab is simply supported with a span of 4m. Use M25 concrete and Fe500 steel. (Use LSM)	14M

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Course Code: 20EE5T06

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III-B.Tech I-Semester Regular/Supplementary Examinations (BR20), NOV- 2024

POWER SYSTEMS-II (EEE)

Time: 3 hours

Max. Marks: 70

*Question Paper consists of **FIVE** units, each carrying 14 marks*
*Each unit has **TWO** questions; either of them should be answered*
All parts of a question must be answered at one place

UNIT-I

1.a) What are ACSR Conductors explain advantages of ACSR conductors when used for over head lines? (7M)

1.b) Derive the inductance of a conductor of a Single Phase System? (7M)

(OR)

1.c) Explain clearly about GMR & GMD of a transmission line with diagrams? (7M)

1.d) Calculate the capacitance per phase of a 3ø, 3 wire system, by considering earth effect, when the conductors are arranged in a horizontal plane with spacing of $D_{12}=D_{23}=3.2m$ & $D_{31}=7m$. The conductors are transposed and each has a diameter of 2.0 cm. Assume that the transmission line is 4m above the ground level? (7M)

UNIT-II

2.a) Explain the performance of single phase short transmission line? Also derive the expression for Vs? (7M)

2.b) Derive the regulation and efficiency of Short Transmission Line? (7M)

(OR)

2.c) A Medium single phase Transmission line 100 km long has the following constants: Resistance/km=0.25Ω, Reactance/km=0.8Ω, Susceptance/km=$14X10^{-6}$ Siemens & V_r =66kv determine the i)I_s, ii) V_s and iii) Regulation. (7M)

2.d) Derive ABCD constants for Nominal π - model for Medium Transmission Line? (7M)

UNIT-III

3.a) Write Short notes on Incident, Reflected and Refracted Waves? (7M)

3.b) A 3 phase transmission line 200 KM long has the following constant: Resistance/per phase/km=0.25Ω, Reactance/per phase/km=0.8Ω, Shunt admittance/per phase/km=$1.5X10^{-6}$ Siemens.Calculate the Sending end voltage & current when the line is delivering a load of 20MW at 0.8 p.f lagging. The receiving end voltage is kept constant at 110kv. (7M)

(OR)

3.c) Derive the ABCD parameters of long transmission line using rigours method (14M)

UNIT-IV

4.a) Derive the Expression for voltage across the terminating inductance on which a step wave of Magnitude V is travelling? (7M)

4.b) Derive the reflection & Refraction Co-efficient of a transmission line when terminated through a resistance? (7M)

(OR)

4.c) Write short note on Skin effect and Ferranti Effect? (7M)

4.d) Explain about the factors effecting corona of a transmission line? (7M)

UNIT-V

5.a) Derive the expression for sag and tension when the supports are at equal heights? (7M)

5.b) A Transmission line conductor having a diameter of 19.5mm weight-0.9kg/m. The span is 300m. The wind pressure is 40kf/m^2 of projected area with ice coating is 13mm. The ultimate strength of the conductor is 8000kg. Calculate the Maximum Sag if the factor of safety is 2 and ice weight 900kg/m^3? (7M)

(OR)

5.c) Explain about the various types of insulators with diagram? (7M)

5.d) Define string efficiency. Why is it necessary to have high string efficiency and how can it being achieved? (7M)

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Course Code: **20EE5T07**

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III-B. Tech I-Semester Regular/Supplementary Examinations (BR20), NOVE-2024

POWER ELECTRONICS (EEE)

Time: 3 hours Max. Marks: 70

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*Question Paper consists of **FIVE** units, each carrying 14 marks*
*Each unit has **TWO** questions; either of them should be answered*
All parts of a question must be answered at one place

UNIT-I

1.a)	Discuss the transfer, output and switching characteristic of power IGBT.	(7M)
1.b)	Describe any two commutation methods of turn off mechanism of SCR.	(7M)
	(OR)	
1.c)	Explain various methods for turn on of SCR with neat sketches.	(7M)
1.d)	Explain the dynamic characteristics of SCR with necessary waveforms.	(7M)
	UNIT-II	
2.a)	Explain the working of single phase full converter with R load and derive the expression for the average value.	(7M)
2.b)	Explain the working of three phase half converter for a firing delay angle of 45 degree.	(7M)
	(OR)	
2.c)	Discuss, in detail, the operation of single phase fully controlled SCR bridge converter with RL load. Draw the relevant waveforms.	(14M)
	UNIT-III	
3.a)	With the circuit diagram and output voltage waveforms, explain the working of Buck-Boost chopper.	(14M)
	(OR)	
3.c)	Derive the relationship between duty ratio and average output voltage in Boost converter.	(7M)
3.d)	Explain about buck chopper with neat waveforms.	(7M)
	UNIT-IV	
4.a)	Explain with a neat circuit diagram the working of a step down cycloconverters.	(7M)
4.b)	Explain the operation of single phase AC voltage controller with R Load.	(7M)
	(OR)	
4.c)	Explain the operation of single phase AC voltage controller with RL Load.	(7M)
4.d)	Draw and Analyse the V-I characteristics of TRIAC.	(7M)
	UNIT-V	
5.a)	With a neat circuit diagram, explain working of single phase half bridge inverters with R load.	(7M)
5.b)	What is pulse width modulation? List the various PWM techniques. Explain.	(7M)
	(OR)	
5.c)	With a neat circuit diagram, explain working of three phase bridge inverter with 120 degrees mode of operation and draw the relevant wave forms.	(14M)

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Course Code: **20EE5T08**

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III-B. Tech I-Semester Regular/Supplementary Examinations (BR20), NOVE- 2024

Electrical Measurements & Instrumentation (EEE)

Time: 3 hours Max. Marks: 70

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*Question Paper consists of **FIVE** units, each carrying 14 marks*
*Each unit has **TWO** questions; either of them should be answered*
All parts of a question must be answered at one place

UNIT-I

1.a)	Define accuracy and precision with examples.	(7M)
1.b)	Describe how a shunt is utilized to extend the measurement range of an ammeter.	(7M)
	(OR)	
1.c)	What are the various sources of gross, systematic and random errors in the measuring instruments? How those errors are minimized?	(7M)
1.d)	Design a range switch for an ammeter with an internal resistance R_m=100 ohms and a full scale deflection with a current of I_m=1mA. The meter is to measure in the range of 10mA, 50mA, 100mA	(7M)

UNIT-II

2.a)	Demonstrate the principle of operation of digital Voltmeter with a diagram?	(7M)
2.b)	Explain the operation of Successive Approximation type DVM with a neat circuit diagram.	(7M)
	(OR)	
2.c)	Describe the operation of Dual slope integrating type digital voltmeter. Why Dual slope integrating type DVM is more advantageous when compared to Ramp type DVM?	(14M)

UNIT-III

3.a)	Explain the special features incorporated in a normal electro dynamometer wattmeter to make it as LPF wattmeter.	(7M)
3.b)	A 50A, 230V energy meter on full load u.p.f test makes 61 revolutions in 37 seconds. If the normal disc speed is 520 revolutions per KWH, determine the %error in the reading.	(7M)
	(OR)	
3.c)	Explain the construction and working of a single phase induction type energy meter.	(7M)
3.d)	Describe how reactive power is measured in a three-phase balanced system using single wattmeter	(7M)

UNIT-IV

4.a)	Define the quality factor (Q) and explain how it is measured using a Q-meter.	(7M)
4.b)	Draw the circuit diagram of Maxwell's inductance - Capacitance Bridge. and derive the conditions under balance.	(7M)
	(OR)	
4.c)	Explain the working principle of Wheatstone's Bridge. Derive the condition for the Wheatstone's Bridge to be balanced.	(7M)
4.d)	The four impedances of an a.c. bridge Z_1=400Ω∟50^0 ,Z_2 = 200Ω∟40^0, Z3=800Ω∟-50^0, Z4=400Ω∟30^0 Find out the bridge balanced or not?	(7M)

UNIT-V

5.a) Distinguish between the active & passive transducers. (7M)

5.b) Describe the working of Resistance Thermometer and its features. (7M)

(OR)

5.c) Explain the measurement of force by accelerometer. (7M)

5.d) Demonstrate the principle of inducitive transducers. (7M)

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BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III-B. Tech I-Semester Regular/Supplementary Examinations (BR20), NOVE- 2024

SWITCHING THEORY AND LOGIC DESIGN (EEE)

Time: 3 hours Max. Marks: 70

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*Question Paper consists of **FIVE** units, each carrying 14 marks*
*Each unit has **TWO** questions; either of them should be answered*
All parts of a question must be answered at one place

UNIT-I

1.a) Explain the subtraction of binary number using 2`s complement method with examples. (7M)

1.b) Convert $(864)_{10}$ BCD Excess-3 code, Binary code (7M)

(OR)

1.c) Perform the subtraction using 1's complement and 2's complement methods. (7M)
i) 11010 – 10000 ii)11010 – 1101 iii)100 - 110000

1.d) How do you convert a gray number to binary? Generate a 4-bit gray code directly using the mirror image property? (7M)

UNIT-II

2.a) Explain NAND and NOR Universal gates. (7M)

2.b) Explain the method to convert SOP and POS forms into their standards forms. (7M)

(OR)

2.c) State and Prove De Morgan's theorem of Boolean Algebra (7M)

2.d) Show that a positive logic NAND gate is a negative logic OR gate (7M)

UNIT-III

3.a) Design and implement 4 Bit parallel adder and 4 bit subtractor circuits. (7M)

3.b) Reduce using mapping the following expression and implement the real minimal expression in Universal logic. F= $\sum$m (0, 2, 4, 6, 7, 8, 10, 12, 13, 15). (7M)

(OR)

3.c) Perform the realization of half adder and full adder using decoders and logic gates. (7M)

3.d) What are the limitations of K-maps? Compare K-map and tabular methods of minimization. (7M)

UNIT-IV

4.a) What is a PL Decoder? Compare the three combinational PLDs? (7M)

4.b) Design BCD to Excess-3 code converter using a PROM. (7M)

(OR)

4.c) Draw the logic diagram of programmable logic array. Explain its operation. (7M)

4.d) Discuss the merits & demerits of PROM, PAL, PLA. (7M)

UNIT-V

5.a) Define the following terms in connection with a flip-flop (7M)
(i) Setup time (ii) Hold time (iii) Propagation delay time (iv) Preset (v) Clear.

5.b) Construct a JK flip-flop using Universal Logic Gates. (7M)

(OR)

5.c) Design T flip flop by using SR flip flop. (7M)

5.d) What is a shift register? Draw the block diagram and timing diagram of a shift register that shows the serial transfer of information from register A to register B. (7M)

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BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III-B.Tech I-Semester Regular/Supplementary Examinations (BR20), NOV- 2024

DESIGN OF MACHINE ELEMENTS (ME)

Time: 3 hours Max. Marks: 70

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*Question Paper consists of **FIVE** units, each carrying 14 marks*
*Each unit has **TWO** questions; either of them should be answered*
All parts of a question must be answered at one place

UNIT-I

1.a)	What are the considerations for design of machine components.	(7M)
1.b)	Discuss the Indian standard system of limits and fits.	(7M)

(OR)

1.c)	Write short notes on the following : (i) Inter changeability;	(3M)
	(ii) Tolerance;	(2M)
	(iii) Allowance;	(2M)
1.d)	A mild steel rod of 12 mm diameter was tested for tensile strength with the gauge length of 60 mm. Following observations were recorded : Final length = 80 mm; Final diameter = 7 mm; Yield load = 3.4 kN and Ultimate load = 6.1 kN. Calculate : 1. yield stress, 2. ultimate tensile stress, 3. percentage reduction in area, and 4. percentage elongation	(7M)

UNIT-II

2.a)	What is meant by endurance strength of a material? How do the size and surface condition of a component and type of load affect such strength?	(7M)
2.b)	A machine component is subjected to a flexural stress which fluctuates between + 300 MN/m2 and – 150 MN/m2 . Determine the value of minimum ultimate strength according to 1. Gerber relation; 2. Modified Goodman relation; and 3. Soderberg relation. Take yield strength = 0.55 Ultimate strength; Endurance strength = 0.5 Ultimate strength; and factor of safety = 2.	(7M)

(OR)

2.c)	Write Soderberg's equation and state its application to different type of loadings.	(7M)
2.d)	The load on a bolt consists of an axial pull of 10 kN together with a transverse shear force of 5 kN. Find the diameter of bolt required according to 1. Maximum principal stress theory; 2. Maximum shear stress theory; 3. Maximum principal strain theory.	(7M)

UNIT-III

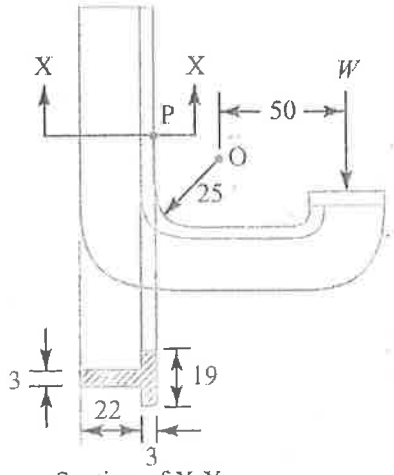
3.a)	Explain Types of Riveted Joints with neat sketch.	(7M)
3.b)	A plate 100 mm wide and 10 mm thick is to be welded to another plate by means of double parallel fillets. The plates are subjected to a static load of 80 kN. Find the length of weld if the permissible shear stress in the weld does not exceed 55 MPa.	(7M)

(OR)

3.c)	A double – riveted double – strap butt joint is used to connect two plates, each of 12 mm thickness, by means of 16 mm diameter rivets having a pitch of 48 mm. The rivets and plates are made of steel. The permissible stresses in tension, shear, and compression are 80, 60, and 120 N/mm 2 respectively. Find the efficiency of the joint.	(7M)
3.d)	(a) What are the various assumptions made in the design of riveted joint?	(4M)
	(b) What is the difference between chain riveting and zig -zag riveting?	(3M)

UNIT-IV

4.a) A C-clamp is subjected to a maximum load of W, as shown in Fig. If the maximum tensile stress in the clamp is limited to 140 MPa, find the value of load W. (14M)



Section of X-X

All dimensions in mm.

(OR)

4.c) Derive an expression for radius of neutral axis and centroidal axis for rectangular section and also write the formulae for inside stresses, outside stresses and resultant stresses with neat sketches. (14M)

UNIT-V

5.a) Discuss the types of screw threads used for power screws with neat sketch. (7M)

5.b) A vertical screw with single start square threads of 50 mm mean diameter and 12.5 mm pitch is raised against a load of 10 kN by means of a hand wheel, the boss of which is threaded to act as a nut. The axial load is taken up by a thrust collar which supports the wheel boss and has a mean diameter of 60 mm. The coefficient of friction is 0.15 for the screw and 0.18 for the collar. If the tangential force applied by each hand to the wheel is 100 N, find suitable diameter of the hand wheel. (7M)

(OR)

5.c) A vertical two start square threaded screw of a 100 mm mean diameter and 20 mm pitch supports a vertical load of 18 kN. The axial thrust on the screw is taken by a collar bearing of 250 mm outside diameter and 100 mm inside diameter. Find the force required at the end of a lever which is 400 mm long in order to lift and lower the load. The coefficient of friction for the vertical screw and nut is 0.15 and that for collar bearing is 0.20 (14M)

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BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III-B.Tech I-Semester Regular/Supplementary Examinations (BR20), NOV- 2024

KINEMATICS OF MACHINERY (ME)

Time: 3 hours | Max. Marks: 70

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*Question Paper consists of **FIVE** units, each carrying 14 marks*
*Each unit has **TWO** questions; either of them should be answered*
All parts of a question must be answered at one place

UNIT-I

1.a) Demonstrate with suitable example what is the significance of degrees of freedom of kinematic chain when it function as a mechanism. (7M)

1.b) Distinguish among different constraint motions. (7M)

(OR)

1.c) Describe the Grubler's Criterion for Plane Mechanisms. (7M)

1.d) Explain the various inversions of a Single Slider Crank Chain? (7M)

UNIT-II

2.a) Construct a pantograph, explain its working and show that it can be used to reproduce to an enlarged scale a given figure? (7M)

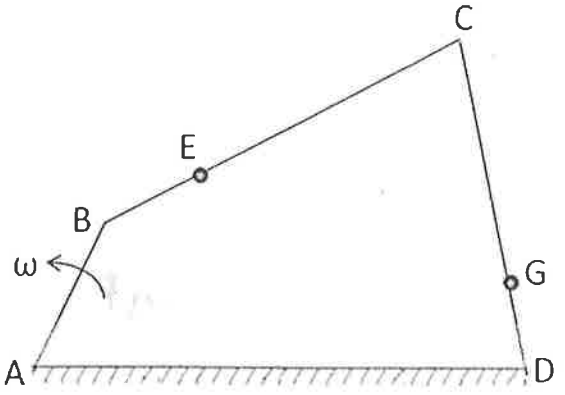
2.b) Explain about Peaucellier mechanisms and Hart's mechanisms? (7M)

(OR)

2.c) Explain Davis steering gear mechanism with neat sketch. (14M)

UNIT-III

3.a) In a four bar linkage ABCD shown in Figure. Find the angular velocity of BC, velocity of C, velocity of a point E on BC and velocity at G on CD by using instantaneous center method. The link AB revolves with angular velocity π radians/sec. (14M)



AB = 0.5 m BC = 1.5 m
CD = 1.0 m DA = 1.75 m
BE = 0.5 m GD = 0.25 m

$\angle BAD = 60^0$

(OR)

3.c) State and prove the 'Aronhold Kennedy's Theorem' of three instantaneous centres. (14M)

UNIT-IV

4.a) Classify different types of cams and followers. Explain. (7M)

4.b) Construct the displacement, velocity and acceleration diagrams for a follower when it moves with simple harmonic motion. (7M)

(OR)

4.c) Write the types of belt drives used in real life applications and differentiate between them with neat sketches. (14M)

UNIT-V

5.a) Explain the terms :a) Addendum b) Dedendum c) Tooth thickness d) Backlash e) Circular pitch. (14M)

(OR)

5.c) In a reverted epicyclic gear train, the arm A carries two gears B and C and a compound gear D-E..The gear B meshes with gear E and the gear C meshes with gear D. The number of teeth on gears B,C and D are 75, 30 and 90 respectively. find the speed and direction of the gear C ,when the gear B is fixed and the arm makes 100rpm clockwise. (14M)

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BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III-B. Tech I-Semester Regular/Supplementary Examinations (BR20), NOV- 2024

MEASUREMENTS AND CONTROL (ME)

Time: 3 hours Max. Marks: 70

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*Question Paper consists of **FIVE** units, each carrying 14 marks*
*Each unit has **TWO** questions; either of them should be answered*
All parts of a question must be answered at one place

UNIT-I

1.a)	Explain the significance of a generalized measurement system and its main components.	(7M)
1.b)	Discuss the difference between systematic and random errors in measurement systems.	(7M)
	(OR)	
1.c)	Analyze a generalized measurement system and identify the potential sources of error in each stage.	(14M)

UNIT-II

2.a)	Explain the difference between unilateral and bilateral tolerance systems with examples.	(7M)
2.b)	Given a nominal size of 50 mm with a tolerance of +0.05 mm / -0.02 mm, calculate the upper and lower limits.	(7M)
	(OR)	
2.c)	What are limit gauges? Explain their purpose in the manufacturing process.	(7M)
2.d)	Describe the hole basis and shaft basis systems of fit. Provide examples of when each system is used.	(7M)

UNIT-III

3.a)	Define stress and strain. Explain the difference between tensile stress and compressive stress.	(7M)
3.b)	List the types of load cells and explain any one type briefly.	(7M)
	(OR)	
3.c)	Describe the working principle of an electrical strain gauge.	(7M)
3.d)	Explain the difference between static (bonded) and dynamic (unbonded) strain gauge measurements.	(7M)

UNIT-IV

4.a)	Explain the working principle of piezoelectric transducers for displacement measurement.	(7M)
4.b)	Differentiate between mechanical and electrical tachometers.	(7M)
	(OR)	
4.c)	Compare and contrast the performance of inductive and capacitive transducers in terms of sensitivity and accuracy for displacement measurement.	(14M)

UNIT-V

5.a)	Define IoT-based instrumentation. Explain its significance in modern manufacturing systems.	(7M)
5.b)	Describe the principle of operation of a rolling gear tester.	(7M)
	(OR)	
5.c)	Discuss the methods of oxygen measurement in industrial applications.	(7M)
5.d)	What is the involute profile of a gear tooth? Explain its importance in gear design.	(7M)

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BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III-B.Tech I-Semester Regular/Supplementary Examinations (BR20), NOV- 2024

INDUSTRIAL AUTOMATION AND ROBOTICS (ME)

Time: 3 hours | Max. Marks: 70

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*Question Paper consists of **FIVE** units, each carrying 14 marks*
*Each unit has **TWO** questions; either of them should be answered*
All parts of a question must be answered at one place

UNIT-I

1.a)	Define Automation. Discuss the reasons for automating the existing mechanized units.	(7M)
1.b)	Differentiate flexible automation and fixed automation.	(7M)

(OR)

1.c)	Enlist the applications and characteristics of future robots.	(7M)
1.d)	Describe the classification of robots by coordinate system.	(7M)

UNIT-II

2.a)	With the help of line diagram, explain basic components of a Robot system.	(7M)
2.b)	Sketch the following robots indicating the joints and degree of freedom. i) SCARA robot. ii) Gantry robot. Write their applications.	(7M)

(OR)

2.c)	What are the various factors in selection and design of end effectors? Explain.	(7M)
2.d)	How is a robot end effector specified? Explain.	(7M)

UNIT-III

3.a)	Determine the revolution matrix for a rotation of 45^0 about y-axis followed by a rotation of 120^0 about z-axis, and a final rotation of 90^0 about x-axis.	(7M)
3.b)	Describe about D-H Transformation for a forward Kinematics problems of planar 3 DoF manipulator.	(7M)

(OR)

3.c)	Describe about Inverse analysis of SCARA Robot.	(7M)
3.d)	Describe specifications of rotation matrices.	(7M)

UNIT-IV

4.a)	Differentiate between path planning and trajectory planning.	(7M)
4.b)	Discuss briefly about path control and path generation.	(7M)

(OR)

4.c)	A jointed - arm robot of configuration RRR is to move all three axes so that the first joint is rotated through 50^0, the second joint is rotated through 90^0 and the third joint is rotated through 25^0. Maximum speed of any of these rotational joints is 100 mm/s. Ignore effects of acceleration and deceleration. i) Determine the time required to move each joint if skew motion is used. ii) Determine the time required to move the arm to the desired position and the rotational velocity of each joint, if joint - interpolation motion is used.	(9M)
4.d)	Write about Textual Robot languages programming as a path in space.	(5M)

UNIT-V

5.a)	Comparison between electrical, hydraulic and pneumatic actuators.	(7M)
5.b)	Brief notes on (i) stepper motors (ii) feedback components.	(7M)

(OR)

5.c)	What are general considerations in Robot material handling?	(7M)
5.d)	What are the uses of sensors in robot? Give examples and explain any one.	(7M)

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Course Code: **20ME5D02**

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III-B.Tech I-Semester Regular/Supplementary Examinations (BR20), NOV- 2024

STEAM AND GAS POWER SYSTEMS (ME)

Time: 3 hours Max. Marks: 70

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*Question Paper consists of **FIVE** units, each carrying 14 marks*
*Each unit has **TWO** questions; either of them should be answered*
All parts of a question must be answered at one place

NOTE: STEAM TABLES BY R.S. KHURMI MUST BE SUPPLLIED IN THE EXAM HALL

UNIT-I

1.a) Explain briefly the working principles of (i) Reheating and (ii) Regeneration as applied to Rankine cycle. (7M)

1.b) A steam power plant operating on the ideal reheat Rankine cycle Steam at boiler is at 15MPa and 550^{0}C expanded through the high pressure turbine. It is reheated at constant pressure of 40 bar and to 550^{0}C and is expanded in low pressure turbine to a condenser at a pressure or 10kPa. Determine (i) The theoretical efficiency of the cycle and (ii)steam rate (7M)

(OR)

1.c) Explain the following (i) Difference between Degree of reaction and Heat of reaction (ii) Difference between Enthalpy of Formation and Adiabatic flame temperature. (7M)

1.d) Determine adiabatic flame temperature when liquid Octane at 25^{0}C is burned with 300% theoretical air at 25^{0}C in a steady flow process. (7M)

UNIT-II

2.a) What are the factors to be considered while selecting a boiler? Classify boilers based on four factors. (7M)

2.b) What are the accessories of a boiler? Explain the working of economiser with the help of a neat sketch.. (7M)

(OR)

2.c) Explain the following terms related to boilers (i) Equivalent Evaporation (ii) Boiler efficiency. (7M)

2.d) A boiler takes feed water at 105^{0}C. The steam pressure of generation is 18 bar and steam is saturated. The steam generated per kg of coal is 5.5 kg with coal quality of 20100 kJ/kg. Calculate the thermal efficiency of a boiler. (7M)

UNIT-III

3.a) Develop an expression for critical pressure ratio for maximum discharge from a nozzle and also expression for maximum mass discharge. (7M)

3.b) A steam turbine develops 185 kW with steam consumption of 16.5 kg/kW-h. At the entry of the nozzle the pressure and temperature is 12 bar and 2200C respectively. The steam leaves the nozzle at 1.2 bar. The throat diameter of the nozzle is 7 mm. Find the number of nozzles required. (7M)

(OR)

3.c) Prove that diagram or blade efficiency for a single stage impulse turbine is given by η_{bl} = 2 ρ [cos α_1 - ρ] [1 + k C] where $\rho = \frac{v}{v_{w_1}}$, $K = \frac{v_{f_2}}{v_{f_1}}$, $C = \frac{\cos\beta_2}{\cos\beta_1}$ (7M)

3.d) With a single row wheel, the mean diameter of the blade ring is 800 mm and the speed of the rotation is 3000 rpm. The steam issues from the nozzles with a velocity of 300 m/sec and the nozzle angle is 20^0. The inlet and outlet blade angles are equal and the blade friction factor is 0.86. What is the power developed in the blading when the axial thrust on the blades is 140 N. (7M)

UNIT-IV

4.a) Distinguish between impulse and reaction turbines. (7M)

4.b) A reaction turbine at 360 rpm consumes 5 kg of steam/sec. Tip leakage in 10%. Discharge blade tip angle for both moving and fixed blades in 200. Axial velocity of flow is 0.75 times blade velocity. The power developed by a certain pair is 4.8 kw. Where the pressure is 2 bar and dryness fraction is 0.95. Find the drum diameter and blades height (7M)

(OR)

4.c) Explain the working of Evaporative condenser with the help of a neat sketch. (7M)

4.d) A surface condenser operates under a vaccum of 706mm of Hg. The cooling water enters the condenser at 150C and leaves at 360C. Find the condenser efficiency. (7M)

UNIT-V

5.a) Explain briefly the following methods (i) Regeneration (ii) Intercooling and (iii) Reheating to improve the performance of gas turbine power plants. (14M)

(OR)

5.c) Explain the working of Liquid propellant Rocket with the help of a neat sketch. (7M)

5.d) Define and derive the expressions for the following terms as applied to jet engines. (i) Thrust (ii) Thrust power (iii) Propulsive power and Propulsive efficiency. (7M)

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Course Code: **20EC5T07**

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III-B.Tech **I**-Semester Regular/Supplementary Examinations (**BR20**), NOV- 2024

LINEAR IC APPLICATIONS- (ECE)

Time: 3 hours

Max. Marks: 70

*Question Paper consists of **FIVE** units, each carrying 14 marks*
*Each unit has **TWO** questions; either of them should be answered*
All parts of a question must be answered at one place

UNIT-I

1.a)	Explain the DC and AC analysis of a dual-input balanced-output differential amplifier	(7M)
1.b)	Explain how differential amplifiers achieve common-mode rejection and why it is important in practical applications.	(7M)

(OR)

1.c)	Explain the concept of level translator in detail.	(7M)
1.d)	Describe the basic current mirror circuit, its design, and applications.	(7M)

UNIT-II

2.a)	Briefly explain the various types of IC packages. Mention the criteria for selecting an IC package.	(7M)
2.b)	Explain the operation of op-amp with neat block diagram	(7M)

(OR)

2.c)	Explain the working of an inverting amplifier and derive its gain equation.	(7M)
2.d)	Explain the following: i) Input offset voltage ii) Input offset current iii)CMMR	(7M)

UNIT-III

3.a)	Derive an expression for non-inverting and inverting summing amplifier	(7M)
3.b)	Explain the role of an instrumentation amplifier and its key features.	(7M)

(OR)

3.c)	Discuss the function of a voltage-to-current converter circuit using an op-amp.	(7M)
3.d)	Explain the design and response of a 1st-order Butterworth low-pass filter using an op-amp.	(7M)

UNIT-IV

4.a)	Describe the monostable operation of a 555 timer and its applications.	(7M)
4.b)	Describe the working of a Schmitt trigger circuit using a 555 timer.	(7M)

(OR)

4.c)	Explain the importance of phase detectors in PLL circuits	(7M)
4.d)	Briefly explain the use of PLL for the process of FSK demodulation.	(7M)

UNIT-V

5.a)	Explain the specifications of digital to analog converters and analog to digital converters.	(7M)
5.b)	What is the principle of successive-approximation type analog to digital converter? Explain with a neat diagram.	(7M)

(OR)

5.c)	Explain the operation of R-2R Ladder type digital-to-analog converter.	(7M)
5.d)	With a neat circuit diagram, explain the operation of weighted resistor digital-to-analog converter.	(7M)

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BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III-B.Tech I-Semester Regular/Supplementary Examinations (BR20), NOV- 2024

ANTENNAS AND WAVE PROPAGARTION (ECE)

Time: 3 hours Max. Marks: 70

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*Question Paper consists of **FIVE** units, each carrying 14 marks*
*Each unit has **TWO** questions; either of them should be answered*
All parts of a question must be answered at one place

UNIT-I

1.a)	Explain about field regions of an antenna.	(7M)
1.b)	Discuss about linear, circular and elliptical polarizations.	(7M)
	(OR)	
1.c)	Explain the following: (i) Main lobes and side lobes (ii) Beam width	(7M)
1.d)	Explain current distribution on a lossless two-wire transmission line, flared transmission line and linear dipole.	(7M)

UNIT-II

2.a)	Explain about Radiation from a Quarter-wave monopole.	(7M)
2.b)	Define axial ratio and their significance in helical antenna.	(7M)
	(OR)	
2.c)	Derive the expression for far field components of a small loop antenna.	(7M)
2.d)	Explain the concept of principle of pattern multiplication.	(7M)

UNIT-III

3.a)	Discuss in detail about the pyramidal Horn antenna and write down its merits and de- merits.	(7M)
3.b)	What is parabolic reflector? Explain its operating principles.	(7M)
	(OR)	
3.c)	With necessary diagrams explain the principle of operation of Lens antennas and also discuss its advantages and disadvantages.	(7M)
3.d)	A parabolic dish provides a power gain of 50 dB at 10 GHz with 70% efficiency. Find out i)HPBW ii) BWFN iii) Diameter	(7M)

UNIT-IV

4.a)	Design a Microstrip antenna at operating frequency 2 GHz and ε_r=2.2. Assume the required Data.	(7M)
4.b)	Explain the procedure for measurement of directivity.	(7M)
	(OR)	
4.c)	Find the power gain and directivity of a horn whose dimensions are 10 x 5 cm operating at a frequency of 6 GHz.	(7M)
4.d)	Explain the design procedure of rectangular patch antenna.	(7M)

UNIT-V

5.a)	Explain the mechanism of ionospheric propagation.	(7M)
5.b)	Explain the effect of curvature of the earth on space wave propagation.	(7M)
	(OR)	
5.c)	What is meant by Duct propagation? Explain.	(7M)
5.d)	Explain the effect of wave tilt in Ground wave propagation.	(7M)

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Course Code: 20EC5109

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III-B. Tech I-Semester Regular/Supplementary Examinations (BR20), NOV- 2024

MICROPROCESSORS AND EMBEDDED SYSTEMS (ECE)

Time: 3 hours Max. Marks: 70

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*Question Paper consists of **FIVE** units, each carrying 14 marks*
*Each unit has **TWO** questions; either of them should be answered*
All parts of a question must be answered at one place

UNIT-I

1.a) With a neat sketch explain the architecture with BIU and EU OF 8086 microprocessor. (7M)

1.b) Explain the functions of the following pins of 8086. (7M)
i) RESET ii) READY iii) LOCK' iv) NMI

(OR)

1.c) Explore the memory segmentation in 8086 with a neat sketch. (7M)

1.d) Draw and explain the minimum mode read & write cycle timing diagrams. (7M)

UNIT-II

2.a) Discuss the addressing modes of 8086 with examples. (7M)

2.b) Summarize the instruction formats of 8086. (7M)

(OR)

2.c) Write the description of the following instructions. (7M)
i) DAA ii) TEST iii) CMP iv) LOCK

2.d) Differentiate Macro and Procedure with an example. (7M)

UNIT-III

3.a) Sketch the architecture of 8255 and explain the function of each block. (7M)

3.b) Draw and explain the control word formats of 8255. (7M)

(OR)

3.c) Draw and explain the control word formats of 8259. (7M)

3.d) Explain the architecture of PIC 8259 with a neat sketch. (7M)

UNIT-IV

4.a) Distinguish between microprocessor and microcontroller. (7M)

4.b) Explore the memory organization in 8051 microcontroller. (7M)

(OR)

4.c) Illustrate the timer modes of 8051 with neat sketches. (7M)

4.d) Explain the interrupt structure of 8051. (7M)

UNIT-V

5.a) What is an embedded system and explain the design challenges of an embedded system. (7M)

5.b) Draw and explain the architecture of ARM processor. (7M)

(OR)

5.c) Discuss the design technology of an embedded system. (7M)

5.d) Explain the register organization of ARM processor. (7M)

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Course Code: 20CS5E01

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III-B.Tech I-Semester Regular/Supplementary Examinations (BR20), NOV- 2024

COMPUTER ORGANIZATION (ECE/CSE/CSE(AI&DS))

Time: 3 hours Max. Marks: 70

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*Question Paper consists of **FIVE** units, each carrying 14 marks*
*Each unit has **TWO** questions; either of them should be answered*
All parts of a question must be answered at one place

1.a) Explain briefly about performance evaluation of Computer Organisation. (7M)

1.b) Explain Fixed point representation. (7M)

(OR)

1.c) What is an instruction cycle and write the phases of Instruction cycle? (7M)

1.d) With a neat flowchart, explain how the control unit determines the instruction after decoding an instruction. (7M)

2.a) Why RTL is preferred for describing internal organization of digital computers. (7M)

2.b) Illustrate the register transfer mechanism for P: R2 R1 with necessary diagrams. (7M)

(OR)

2.c) Design Bus system for Four-bit register using 4x1 Mux. (7M)

2.d) Design and implement 4-bit Arithmetic unit which performs ADD, ADD with carry, SList out the Register transfer notations for Arithmetic Micro Operations. UB, Sub with borrow, Increment and decrement operations. (7M)

3.a) Draw and explain the Read and Write requests and timing diagram of a read operation of CPU and external bus transfer. (7M)

3.b) Classify and describe the possible modes of data transfer to and from peripherals with examples (7M)

(OR)

3.c) Write in detail about the design of control unit. (7M)

3.d) Demonstrate the general configuration of Micro programmed Control unit with a neat block diagram. (7M)

4.a) Discuss the Memory Hierarchy in computer system with regard to Speed, Size and Cost? (7M)

4.b) Explain about main memory and its types. (7M)

(OR)

4.c) Illustrate the mapping process involved in transformation of data from main to Cache memory. (7M)

4.d) Explain Virtual address Mapping using Pages with necessary examples. (7M)

5.a) Justify how parallel processing improves the performance of multiprocessing environment? (7M)

5.b) Illustrate a processor with multiple functional units with a neat diagram. (7M)

(OR)

5.c) Illustrate the behavior of a instruction pipeline. (7M)

5.d) Differentiate the CISC & RISC pipelines. (7M)

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Course Code: **20EC5D03**

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III-B.Tech I-Semester Regular/Supplementary Examinations (BR20), Nov 2024

COMPUTER NETWORKS (ECE)

Time: 3 hours Max. Marks: 70

*Question Paper consists of **FIVE** units, each carrying 14 marks*
*Each unit has **TWO** questions; either of them should be answered*
All parts of a question must be answered at one place

UNIT-I

1.a)	Explain the functions of various layers in ISO-OSI reference model.	(7M)
1.b)	Explain the different topologies of the network.	(7M)
	(OR)	
1.c)	Define Encapsulation and Peer to Peer communication in the layered architecture.	(7M)
1.d)	What are the types of computer networks and write different applications of WAN and MAN? Explain.	(7M)

UNIT-II

2.a)	Explain guided transmission media.	(7M)
2.b)	What is multiplexing? Discuss about frequency and time division multiplexing.	(7M)
	(OR)	
2.c)	Explain about stop and wait protocol with neat diagram.	(7M)
2.d)	Discuss about framing and error control.	(7M)

UNIT-III

3.a)	Explain the working of Multiple Access Protocols.	(7M)
3.b)	Explain various classes of IEEE 802.X Standard Ethernet.	(7M)
	(OR)	
3.c)	Explain with an example to show that the RTS/CTS in the 802.11 protocol is a little different than in the MAC protocol.	(7M)
3.d)	Explain 802.11 physical layer and protocol stack.	(7M)

UNIT-IV

4.a)	Explain Distance Vector routing algorithm with an example.	(7M)
4.b)	What are the differences between Static Routing Algorithm and Dynamic Routing Algorithm?	(7M)
	(OR)	
4.c)	What are the general principles of congestion control? Explain.	(7M)
4.d)	How does a virtual circuit differ from a physical circuit? What advantages would a virtual circuit provide?	(7M)

UNIT-V

5.a)	Give the header formats of the UDP segment and TCP segment? Explain why UDP is preferred to TCP.	(7M)
5.b)	Discuss the role played by the message transfer agent.	(7M)
	(OR)	
5.c)	Explain about various components of DNS.	(7M)
5.d)	Write about electronic mail in detail.	(7M)

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Course Code: 20CS5109

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III-B. Tech I-Semester Regular/Supplementary Examinations (BR20), NOV- 2024

COMPUTER NETWORKS [CSE]

Time: 3 hours Max. Marks: 70

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*Question Paper consists of **FIVE** units, each carrying 14 marks*
*Each unit has **TWO** questions; either of them should be answered*
All parts of a question must be answered at one place

	UNIT-I	
1.a)	Illustrate OSI reference model with a neat diagram.	(10M)
1.b)	Differentiate between OSI and TCP /IP reference models.	(4M)
	(OR)	
1.c)	Explain the different topologies of the network.	(8M)
1.d)	Compare the WAN, LAN and MAN topologies.	(6M)
	UNIT-II	
2.a)	Describe Light Wave Transmission. Explain its advantages and disadvantages.	(7M)
2.b)	Give brief explanation about STP and UTP cables with neat sketch.	(7M)
	(OR)	
2.c)	Compare and Contrast frequency division multiplexing and Code Division Multiplexing.	(7M)
2.d)	Explain Time Division Multiplexing (TDM) and Its Applications.	(7M)
	UNIT-III	
3.a)	Explain the Different Framing Methods Used in the Data Link Layer (DLL).	(7M)
3.b)	A bit stream 11100011 is transmitted using the standard CRC method. The generator polynomial is x^4+x^3+1. Show the actual bit string transmitted. Suppose the third bit from the left is inverted during transmission. What are the consequences?	(7M)
	(OR)	
3.c)	Discuss about the ALOHA SYSTEMS and CSMA mechanism.	(7M)
3.d)	Briefly discuss about the controlled access protocols.	(7M)
	UNIT-IV	
4.a)	illustrate Routing of Packets within Virtual Circuit Subnet.	(7M)
4.b)	Illustrate shortest path routing algorithm with suitable example.	(7M)
	(OR)	
4.c)	Explain TCP Connection management Finite State Machine. Explain all states in it.	(7M)
4.d)	Draw and explain each field in the TCP Segment header.	(7M)
	UNIT-V	
5.a)	Discuss the different types of user agents and how they interact with message formats in the context of network communication.	(7M)
5.b)	With neat sketch explain the architecture, services and message format of Electronic Mail.	(7M)
	(OR)	
5.c)	Describe the WAP protocol stack and explain the functions of its various layers.	(7M)
5.d)	Explain briefly about the Domain Name System.	(7M)

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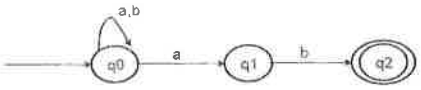
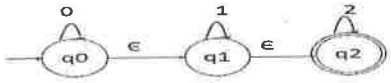
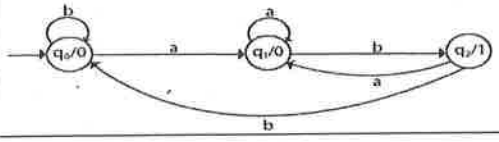
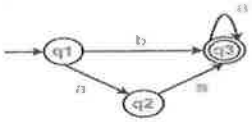
BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III-B. Tech I-Semester Regular/Supplementary Examinations (BR20), NOV- 2024

FORMAL LANGUAGE AND AUTOMATA THEORY (CSE)

Time: 3 hours Max. Marks: 70

*Question Paper consists of **FIVE** units, each carrying 14 marks*
*Each unit has **TWO** questions; either of them should be answered*
All parts of a question must be answered at one place

	UNIT-I	
1.a)	Convert NFA to DFA with transition table.  Figure 1	(7M)
1.b)	Construct a DFA to accept set of all strings ending with 010.	(7M)
	(OR)	
1.c)	Construct transition table and convert epsilon NFA to NFA.  	(7M)
1.d)	Convert Moore machine into its equivalent Mealy machine.  	(7M)
	UNIT-II	
2.a)	Construct Finite Automata for (1+00*1)+(1+00*1)(0+10*1)*(0+10*)= 0*1(0+10*1)*	(7M)
2.b)	Discuss Equivalence between Finite Automata and Regular Expressions.	(7M)
	(OR)	
2.c)	Explain about Closure properties of Regular languages.	(7M)
2.d)	Convert Finite automata to Regular expression.  	(7M)
	UNIT-III	
3.a)	Construct the given grammar into Chomsky Normal Form for S→aA/aBB, A→aAA/ε, B→bB/bbC, C→B.	(7M)
3.b)	Explain about Leftmost and Rightmost Derivations with example.	(7M)
	(OR)	
3.c)	Explain Simplification of CFG and remove null production of S→aA, A→b/ε	(7M)
3.d)	Convert the given production rule into GNF S → XB | AA,A → a | SA,B → b,X → a	(7M)

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	UNIT-IV	
4.a)	Define PDA and construct PDA for $\{L=a^n\ b^n \mid n>=1\}$.	(7M)
4.b)	Explain closure properties of Context Free Language.	(7M)
	(OR)	
4.c)	Convert the following grammar to a PDA that accepts the language by empty stack S →0S1|A A →A0 |S|ε.	(7M)
4.d)	Explain two stack Pushdown Automata for $L = \{x^n y^n z^n \mid n \geq 1\}$	(7M)
	UNIT-V	
5.a)	Explain variations of the Turing Machine.	(7M)
5.b)	Define and explain about Universal Turing Machine.	(7M)
	(OR)	
5.c)	Construct Turing Machine $L=\{a^n\ b^n\ c^n \mid n>=1\}$	(7M)
5.d)	Explain about Church's hypothesis.	(7M)

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Course Code: 20CS5T11

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III-B. Tech I-Semester Regular/Supplementary Examinations (BR20), NOV-2024

DATABASE MANAGEMENT SYSTEMS (CSE, CSE (AI&DS), AI&ML &CSE(AI&ML))

Time: 3 hours Max. Marks: 70

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*Question Paper consists of **FIVE** units, each carrying 14 marks*
*Each unit has **TWO** questions; either of them should be answered*
All parts of a question must be answered at one place

UNIT-I

1.a)	Distinguish between Database approach and File System.	(7M)
1.b)	Describe Three Tier Schema Architecture for Data Independence.	(7M)
	(OR)	
1.c)	List the advantages and disadvantages of using database systems.	(7M)
1.d)	Illustrate Different Data Models in DBMS with example.	(7M)

UNIT-II

2.a)	Differentiate between key and integrity constrains with example.	(7M)
2.b)	Describe Different Data Types in SQL give example.	(7M)
	(OR)	
2.c)	Explain the following SQL functions with Examples i)Date and Time functions ii) string conversion functions	(6M)
2.d)	Consider following relations and write SQL Queries for given statements. Assume suitable constrains Instructor(ID,Name,Dept_name,Salary) Teachers(ID,Course_id,Sec_id,Sem,Year) (i) Find the average salary of the instructors in CSE department. (ii) Find the number of instructors in each department who teach a course in even semester of 2024. (iii) Find the names of instructor with salary amounts between 20000 and 40000. (iv) Find the names of instructors whose name starts with 'b' and ends with 'u'.	(8M)

UNIT-III

3.a)	Construct an E-R diagram for a car-insurance company whose customers own one or more cars each. Each car has associated with it zero to any number of recorded accidents. State any assumptions you make.	(7M)
3.b)	List and explain with appropriate examples how to use aggregate function in SQL.	(7M)
	(OR)	
3.c)	Design a database for banking enterprise using ER Model.	(7M)
3.d)	What relation set operators does SQL support? Explain	(7M)

UNIT-IV

4.a)	What is a functional dependency? Determine all the functional dependencies that hold on the following relation. Student(Rollno, Name, DoB, Class, City, Zipcode)	(7M)
4.b)	With suitable example explain the properties of decomposition	(7M)
	(OR)	
4.c)	Illustrate redundancy and the problems that it can cause. Give examples of insert, delete, and update anomalies. Suggest solutions	(7M)
4.d)	Let R (ABCDE) and F={ A->B, B->C, C->D, D->E }. Find all candidate keys of R.	(7M)

UNIT-V

5.a) What are ACID properties? Define with examples. (7M)

5.b) Illustrate Concurrency control for lost updates with example. (7M)

(OR)

5.c) Show that the two phase locking protocol ensures conflict serializability and that transactions can be serialized according to their lock points. (7M)

5.d) List and explain various issues while transactions are running concurrently in DBMS. (7M)

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Course Code: 20CS5D03

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III-B.Tech I-Semester Regular/Supplementary Examinations (BR20), NOV- 2024

SOFTWARE ENGINEERING

(CSE/CSE(AI&DS)/AI&ML/CSE(AI&ML))

Time: 3 hours Max. Marks: 70

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*Question Paper consists of **FIVE** units, each carrying 14 marks*
*Each unit has **TWO** questions; either of them should be answered*
All parts of a question must be answered at one place

UNIT-I

1.a)	What are software myths, and how can they impact the software development process?	(7M)
1.b)	Software engineering is a layered technology. Justify your answer.	(7M)
	(OR)	
1.c)	Explain about Perspective process models	(7M)
1.d)	Differentiate between personal and team process models	(7M)

UNIT-II

2.a)	What is the difference between functional and non-functional requirements.	(7M)
2.b)	Explain requirements validation process	(7M)
	(OR)	
2.c)	Explain SCRUM process in agile development	(7M)
2.d)	Explain requirements Elicitation process.	(7M)

UNIT-III

3.a)	Draw the use case diagram for identification of requirements in a library management system.	(7M)
3.b)	Explain the need of Data flow diagrams in Software engineering.	(7M)
	(OR)	
3.c)	What are interaction diagrams in UML? explain	(7M)
3.d)	What is behavioural model in software engineering?	(7M)

UNIT-IV

4.a)	Define coupling & cohesion. Why is a highly coupled module difficult to unit testing.	(7M)
4.b)	Discuss the role of UML in object-oriented Design	(7M)
	(OR)	
4.c)	Define architectural design. Discuss about data design.	(7M)
4.d)	Explain Component level design	(7M)

UNIT-V

5.a)	Software architecture becomes an important step in building the system. Justify your answer	(7M)
5.b)	Differentiate between Functional and Structural Testing	(7M)
	(OR)	
5.c)	What are the three golden rules for user interface design? Explain.	(7M)
5.d)	How can you define Defect debugging Efficiency? explain	(7M)

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Course Code: 20AD3103

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III-B. Tech I-Semester Regular/Supplementary Examinations (BR20), NOV- 2024

COMPUTER NETWORKS [CSE(AI&DS), AI&ML, CSE(AI&ML)]

Time: 3 hours Max. Marks: 70

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*Question Paper consists of **FIVE** units, each carrying 14 marks*
*Each unit has **TWO** questions; either of them should be answered*
All parts of a question must be answered at one place

	UNIT-I	
1.a)	Illustrate OSI reference model with a neat diagram.	(10M)
1.b)	Differentiate between OSI and TCP /IP reference models.	(4M)
	(OR)	
1.c)	Explain the different topologies of the network.	(8M)
1.d)	Compare the WAN, LAN and MAN topologies.	(6M)
	UNIT-II	
2.a)	Explain the Different Framing Methods Used in the Data Link Layer (DLL).	(7M)
2.b)	A bit stream 11100011 is transmitted using the standard CRC method. The generator polynomial is x^4+x^3+1. Show the actual bit string transmitted. Suppose the third bit from the left is inverted during transmission. What are the consequences?	(7M)
	(OR)	
2.c)	Explain Sliding Window Protocols in Detail.	(14M)
	UNIT-III	
3.a)	Discuss about the ALOHA SYSTEMS and CSMA mechanism.	(7M)
3.b)	Briefly discuss about the controlled access protocols.	(7M)
	(OR)	
3.c)	Explain FDMA, TDMA and CDMA in detail.	(14M)
	UNIT-IV	
4.a)	illustrate Routing of Packets within Virtual Circuit Subnet.	(7M)
4.b)	Illustrate shortest path routing algorithm with suitable example.	(7M)
	(OR)	
4.c)	Explain TCP Connection management Finite State Machine. Explain all states in it.	(7M)
4.d)	Draw and explain each field in the TCP Segment header.	(7M)
	UNIT-V	
5.a)	Discuss the different types of user agents and how they interact with message formats in the context of network communication.	(7M)
5.b)	With neat sketch explain the architecture, services and message format of Electronic Mail.	(7M)
	(OR)	
5.c)	Describe the WAP protocol stack and explain the functions of its various layers.	(7M)
5.d)	Explain briefly about the Domain Name System.	(7M)

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Course Code: **20AD5T04**

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III-B.Tech I-Semester Regular/Supplementary Examinations (BR20), NOV- 2024

MACHINE LEARNING [CSE(AI&DS), AI&ML,CSE(AI&ML)]

Time: 3 hours Max. Marks: 70

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*Question Paper consists of **FIVE** units, each carrying 14 marks*
*Each unit has **TWO** questions; either of them should be answered*
All parts of a question must be answered at one place

UNIT-I

1.a)	Compare between batch and online learning.	(7M)
1.b)	Illustrate about Tradeoffs in Statistical Learning	(7M)
	(OR)	
1.c)	Explain about Sampling Distribution of an Estimator.	(7M)
1.d)	Write short notes on supervised learning.	(7M)
	UNIT-II	
2.a)	Explain about Training and Visualizing a Decision Tree.	(7M)
2.b)	Describe about Nonlinear SVM Classification.	(7M)
	(OR)	
2.c)	Describe about Linear regression.	(7M)
2.d)	Briefly explain about Binary classification.	(7M)
	UNIT-III	
3.a)	Differentiate between Bagging and pasting.	(7M)
3.b)	How Ada Boosting useful in machine learning.	(7M)
	(OR)	
3.c)	Describe about SVM regression.	(7M)
3.d)	How stacking works in machine learning.	(7M)
	UNIT-IV	
4.a)	Explain about The K-Means algorithm.	(7M)
4.b)	Discuss about Kernel PCA.	(7M)
	(OR)	
4.c)	Write Limits of K-Means.	(7M)
4.d)	Explain about Gaussian Mixtures.	(7M)
	UNIT-V	
5.a)	Briefly explain about the Multilayer Perceptron and Back propagation.	(7M)
5.b)	Explain about prefetching .	(7M)
	(OR)	
5.c)	Demonstrate Implementation of MLPs with Keras.	(7M)
5.d)	Write short notes on artificial neural networks..	(7M)

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Course Code: **20ML5E01**

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III- B.Tech I-Semester Regular/Supplementary Examinations (BR20), NOV- 2024

ARTIFICIAL INTELLIGENCE (AI&ML, CSE_AI&ML)

Time: 3 hours Max. Marks: 70

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*Question Paper consists of **FIVE** units, each carrying 14 marks*
*Each unit has **TWO** questions; either of them should be answered*
All parts of a question must be answered at one place

UNIT-I

1.a)	What are the applications of Artificial Intelligence?	(7M)
1.b)	Explain uses of Evaluation functions.	(7M)
	(OR)	
1.c)	What are the different steps followed in developing AI-languages? Explain.	(7M)
1.d)	Explain about Artificial intelligence systems.	(7M)
	UNIT-II	
2.a)	Discuss uninformed search methods with examples.	(7M)
2.b)	How to define a problem as state space search? Discuss it with the help of an example.	(7M)
	(OR)	
2.c)	Explain the various types of hill climbing search techniques.	(7M)
2.d)	Explain the A* search and give the proof of optimality of A*	(7M)
	UNIT-III	
3.a)	Differentiate prepositional & predicate logic.	(7M)
3.b)	Define Propositional calculus. Explain its Operators.	(7M)
	(OR)	
3.c)	What is Natural Deduction System? Explain in detail.	(7M)
3.d)	List some of the rules of Axiomatic system.	(7M)
	UNIT-IV	
4.a)	What are the approaches to knowledge representation? Discuss.	(7M)
4.b)	Explain in detail about script structure.	(7M)
	(OR)	
4.c)	Describe how will you represent facts in propositional and predicate logic with an example.	(7M)
4.d)	Illustrate in detail about forward and backward chaining with suitable example.	(7M)
	UNIT-V	
5.a)	What is Expert system? Explain its Phases.	(7M)
5.b)	Explain Architecture of expert systems.	(7M)
	(OR)	
5.c)	List the application of Expert systems.	(7M)
5.d)	Explain Bayesian Belief Networks?	(7M)

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