BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)
III-B.Tech I-Semester Supplementary Examinations (BR20), NOV- 2025
THEORY OF STRUCTURES (CIVIL)

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) A three hinged parabolic arch rib has a span of 20 m and a rise 4m to the central point of the crown. The rib carries load of intensity 2 kN/m uniformly distributed horizontally on the left 3 m. Calculate the maximum and minimum bending moments. (7M)

1.b) State and prove Eddy's theorem. (7M)

(OR)

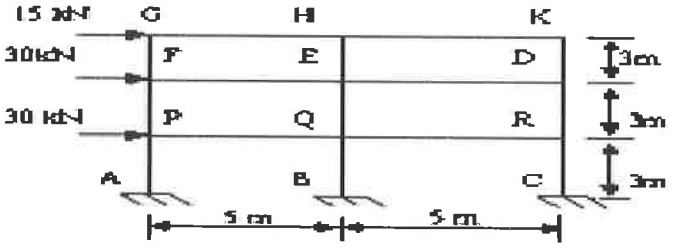
1.c) Classify the arches based on end conditions also discuss the effect of temperature on three hinged arches. (7M)

1.d) A two hinged parabolic arch of span 36 m and central rise 8 m carries a uniformly distributed load of 32 kN/m over the left half of the span. Determine the position and value of maximum bending moment. Also find the normal thrust and radial shear at the section. Assume that the moment of inertia at a section varies as secant of the slope at the section. (7M)

UNIT-II

2.a) Explain analysis of a frame subjected to lateral load by adopting portal method. (7M)

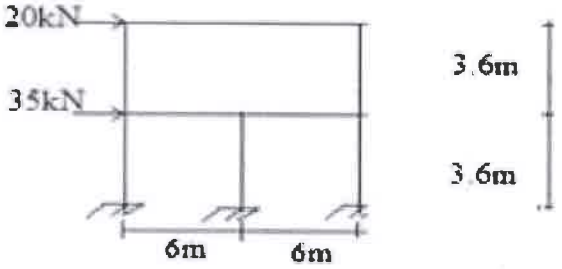
2.b) Analyze the frame shown in figure, for forces in Top storey by Portal method. Assume that all the columns have equal area of cross-section for the purpose of analysis. (7M)



(OR)

2.c) What do you understand by substitute frame method? Explain. (7M)

2.d) Analyze the two storey rigid moment resisting frame shown in Figure-1 by Cantilever method. Draw the BMD and SFD. Assume uniform flexural rigidity of beams and columns. (7M)



UNIT-III

3.a) What is a general cable theorem? Deduce an expression. (7M)

3.b) A cable is used to support six equal and equidistant loads over span of 14 m. The central dip of cable is 2 m and loads are 25 kN each. Find the length of the cable required and its sectional area if the safe tensile stress is 140 N/mm^2. (7M)

(OR)

3.c) Describe the analysis of a cable subjected to UDL. (7M)

3.d) A light cable of length 20 m is supported at two ends at the same level. The supports are at 16 m apart. The cable supports three loads of 10, 12 and 16 KN dividing the 16 m distance in four equal parts. Find the shape of the string and tension in various portions. (7M)

UNIT-IV

4.a) Draw the Influence line diagram for reactions of a simply supported beam of 12 m span. Also draw the influence line diagrams for Shear force and bending moments at quarter span and mid-span sections. (11M)

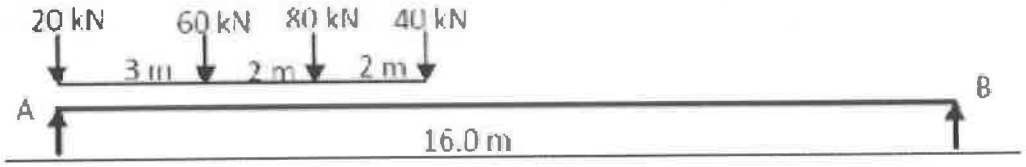
4.b) Construct influence line for bending moment at a section x of a simple beam of span L. (3M)

(OR)

4.c) Define ILD and construct a ILD for shear force for a simply supported beam carrying a point load W. Explain how this generated ILD can be used for calculating shear and bending moment for a simply supported beam carrying UDL shorter than the span. (14M)

UNIT-V

5.a) A train of concentrated loads shown in figure below. The loads move from left to right on a simply supported girder of span 16.0 m. Determine absolute maximum bending moment. (14M)



(OR)

5.c) Draw the influence line diagrams for forces in the members of a Warren Truss (14M)

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(5) Course Code:20CE5107

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III-B. Tech I-Semester Supplementary Examinations (BR20), NOV- 2025

HIGHWAY ENGINEERING (CIVIL ENGG)

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)	Mention various factors affecting road alignment	(7M)
1.b)	What are the differences between national highways, state highways, district roads, and rural roads?	(7M)
	(OR)	
1.c)	What are the various drawings required to plan an highway effectively	(7M)
1.d)	Explain the objectives and key features of the first road development plan, also known as the Nagpur plan.	(7M)
	UNIT-II	
2.a)	Define gradient. Mention various gradients used on a highway for proper vertical alignment of a highway	(7M)
2.b)	Define super elevation and also derive an expression for super elevation	(7M)
	(OR)	
2.c)	Define the camber and explain the factors affecting camber along with IRC specified values	(14M)
	UNIT-III	
3.a)	Explain the term traffic volume? What are the objectives of carrying out traffic volume studies?	(7M)
3.b)	What are the various parking parameters about which data is collected in a parking study	(7M)
	(OR)	
3.c)	What are the major causes of accidents? List out some of the preventive control measures	(14M)
	UNIT-IV	
4.a)	Write down the principles of various tests carried out on bitumen. Explain any two tests in detail with a neat sketch.	(7M)
4.b)	Describe the Marshall method of mix design	(7M)
	(OR)	
4.c)	Discuss in detail the importance of shape test in selecting suitable road aggregate	(7M)
4.d)	What are the key requirements for a bituminous paving mix in terms of stability, durability, flexibility, and resistance to water damage?	(7M)
	UNIT-V	
5.a)	Write the design process of IRC method for flexible pavements	(7M)
5.b)	Explain the step by step procedure for the design of rigid pavements using IRC 58 – 2015.	(7M)
	(OR)	
5.c)	What are the various layers in a flexible and rigid pavement? Explain the significance of each layer.	(7M)
5.d)	Draw the stress distribution and cross section in flexible pavements and rigid pavements?	(7M)

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BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ÓDALAREVU
(AUTONOMOUS)

III-B. Tech I-Semester Supplementary Examinations (BR20), Nov-2025

GEOMECHANICS – I (CIVIL ENGINEERING)

Time: 3 hours Max. Marks: 70

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*Question Paper consists of **FIVE** units, each carrying 14 marks*
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	UNIT-I	
1.a)	Derive a relationship for Dry density, bulk density and water content.	(7M)
1.b)	A partially saturated sample from a borrow pit has a natural moisture content of 15% and bulk unit weight of 1.9 g/cc. The specific gravity of solids is 2.70. Determine the degree of saturation and void ratio. What will be the unit weight of soil if the soil is fully saturated?	(7M)
	(OR)	
1.c)	Explain the IS classification of soil in detail for fine grained soils.	(7M)
1.d)	What do you understand by Compaction? Explain standard proctor test for compaction.	(7M)
	UNIT-II	
2.a)	Explain the method of variable head for determining the coefficient of permeability.	(7M)
2.b)	A clay stratum 8.0 m thick is located at a depth of 6 m from the ground surface. The natural moisture content of the clay is 56% and $G_s = 2.75$ The soil stratum between the ground surface and the clay consists of fine sand. The water table is located at a depth of 2 m below the ground surface. The submerged unit weight of fine sand is 10.5kN/m^3 and its moist unit weight above the water table is 18.68 kN/m^3. Calculate the effective stress at the center of the clay layer.	(7M)
	(OR)	
2.c)	What is flownet? Explain the characteristics of flownet in detail.	(7M)
2.d)	The data given below relate to two falling head permeameter tests performed on two different soilsamples: (a) stand pipe area = 4 cm^2, (b) sample area = 28 cm^2, (c) sample height = 5 cm, (d) initial head in the stand pipe =100 cm, (e) final head = 20 cm, (f) time required for the fall ofwater level in test 1, t = 500 sec, (g) for test 2, t = 15 sec. Determine the values of k for each of the samples.	(7M)
	UNIT-III	
3.a)	Explain the construction of Newmarks influence chart for determining vertical stress for irregular shaped loaded areas.	(7M)
3.b)	A concentrated load of 1000 kN is applied at the ground surface. Compute the vertical pressure (i)at a depth of 4 m below the load, (ii) at a distance of 3 m at the same depth. Use Boussinesq's equation.	(7M)
	(OR)	
3.c)	Derive an equation for vertical stress under a line load using Boussinesq concept.	(7M)
3.d)	Determine the vertical stress at a point P which is 3m below and at a radial distance of 3m from the vertical load of 100kN. Use Westergaard's solution.	(7M)
	UNIT-IV	
4.a)	Explain the assumptions of One-dimensional Consolidation theory by Terzaghi.	(7M)
4.b)	A 2.5 cm thick sample of clay was taken from the field for predicting the time of settlement for a proposed building which exerts a uniform pressure of 100 kN/m^2 over the clay stratum. The sample was loaded to 100 kN/m^2 and proper drainage was allowed from top and bottom. It was seen that 50 percent of the total settlement occurred in 3	(7M)

	is to be constructed on a 6 m thick layer of clay which extends from the ground surface and is underlain by sand.	
	(OR)	
4.c)	Explain the Casagrande Logarithm of Time Fitting Method for determining the coefficient of consolidation.	(7M)
4.d)	An oedometer test is performed on a 2 cm thick clay sample. After 5 minutes, 50% consolidation is reached. After how long a time would the same degree of consolidation be achieved in the field where the clay layer is 3.70 m thick? Assume the sample and the clay layer have the same drainage boundary conditions (double drainage).	(7M)
	UNIT-V	
5.a)	Explain the importance of Mohr's circles in Shear strength.	(7M)
5.b)	In an insitu vane shear test on a saturated clay, a torque of 35Nm was required to shear the soil. The diameter of the vane was 50mm and length 100mm. Calculate the undrained shear strength of the clay. The vane was then rotated to cause remoulding of the soil. The torque required to shear the soil in the remoulded state was 5 Nm. Also calculate the undrained shear strength of the clay in remoulded state.	(7M)
	(OR)	
5.c)	Explain the different drainage conditions that could be possible for testing.	(7M)
5.d)	CU triaxial tests conducted on specimens of a saturated clay soil gave the following results:	(7M)

Cell pressure kN/m^2	Additional axial stress or deviator stress kN/m^2	Pore water pressure at failure kN/m^2
150	102	80
300	200	164
450	304	264

Determine the effective stress parameters by the Mohr's Circle method.

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BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III B. Tech I Semester Supplementary Examinations (BR20), Nov 2025

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)	Demonstrate how abstraction can be applied in a class to hide unnecessary details.	(7M)
1.b)	Describe the significance of encapsulation in object-oriented programming with suitable example.	(7M)
	(OR)	
1.c)	Write a Java program to find the factorial of a number using a for loop.	(7M)
1.d)	Define data types and provide examples of primitive data types in Java.	(7M)
	UNIT-II	
2.a)	Write a program to demonstrate how garbage collection works by creating and deleting objects.	(7M)
2.b)	How does constructor overloading differ from method overloading?	(7M)
	(OR)	
2.c)	How does Java handle out-of-bounds errors in arrays?	(7M)
2.d)	Describe the benefits of using command line arguments in a program.	(7M)
	UNIT-III	
3.a)	Describe the importance of the catch block in exception handling.	(7M)
3.b)	Write a Java program to demonstrate the importance of CLASSPATH for locating packages.	(7M)
	(OR)	
3.c)	How does Java handle multiple interfaces implemented by a single class?	(7M)
3.d)	Write code to demonstrate method overriding and the use of super to call a superclass method.	(7M)
	UNIT-IV	
4.a)	Write a program to read data from a file in one thread and write the processed data to another file using a second thread.	(7M)
4.b)	How do thread priorities influence thread execution in Java?	(7M)
	(OR)	
4.c)	Create a Java program that demonstrates the creation of multiple threads and their life cycle.	(7M)
4.d)	What are the potential risks of not using synchronization in multithreaded applications?	(7M)
	UNIT-V	
5.a)	Write an AWT program that implements a simple form using FlowLayout with two text fields and a submit button.	(7M)
5.b)	Describe the main differences between JavaFX and AWT.	(7M)
	(OR)	
5.c)	Describe the different types of containers available in JavaFX.	(7M)
5.d)	Create a simple Java FX program with a ScrollBar to adjust the size of a label.	(7M)

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BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III-B.Tech I-Semester Supplementary Examinations (BR20), NOV- 2025

DESIGN AND DRAWING OF REINFORCED CONCRETE STRUCTURES (CE)

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 singly RC beam of effective span 8m to carry a service live load of 16kN/m and dead load of 20kN/m. Use M20 concrete and Fe415 HYSD steel bars. Draw to scale the cross-section and longitudinal section of the RC beam.	28M
	(OR)	
2	Design a one way slab with a clear span of 5m, simply supported on 250mm thick masonry walls, the slab is subjected to a live load of 5kN/m^2 and floor finish of 1kN/m^2. Use M25 concrete and Fe415 steel. Draw to scale the plan and cross sectional reinforcement detailing.	28M
	PART-B	
3	A RC beam of width 300mm and effective depth 500mm is to be designed to carry an ultimate moment capacity of 300kN-m. Using M20 grade concrete and Fe415 steel bars, design the suitable reinforcements in the beam.	14M
4	A singly reinforced rectangular beam of size 250 mm x 500 mm effective depth is subjected to a factored moment of 100kN-m. Find the reinforcement for flexure. Use M20 concrete and Fe 415 grade steel.	14M
5	Design the reinforcement in a RC beam of size 300mm x 600mm, subjected to an ultimate bending moment, torsional moment, and shear force of 140kN-m, 30kN-m and 120kN. Use M25 grade concrete Fe415 HYSD bars.	14M
6	Design a short axially loaded square column 500mm x 600mm for a service load of 2000kN. Use M20 grade concrete and Fe415steel. The column is restrained against translation but not against rotation at both ends.	14M
7	Design a rectangular footing of uniform thickness for an axially loaded column of size 300 mm x 600 mm, load on column is 1150kN. Safe bearing capacity of the soil is 200kN/m^2. Use M 20 concrete and Fe 415 steel.	14M

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Course Code: **20EE5T06**

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III-B. Tech I-Semester Supplementary Examinations (BR20), NOV- 2025

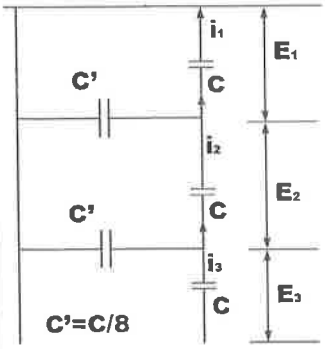
POWER SYSTEMS - II (EEE)

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)	Derive the formula for calculating GMR and GMD in power transmission lines and explain their application in the inductance calculation of multi-conductor lines.	(7M)
1.b)	A 3-Phase, 50 Hz, 66 KV, 100 Km overhead line conductors are placed in a horizontal plane with diameter of 1.25 cm. Calculate the capacitance & charging current per phase assuming complete transposition of the line.	(7M)
	(OR)	
1.c)	Derive an expression for 3 phase capacitances in symmetrical & asymmetrical configuration.	(7M)
1.d)	a three phase, 50hz overhead line has regularly transposed conductors equilaterally spaced 4m apart. The capacitance of such line is 0.01μF/km. recalculate the capacitance/km to neutral when the conductors in the same horizontal plane with successive spacing of 4m and are regularly transposed.	(7M)
	UNIT-II	
2.a)	Derive A,B,C,D constants of an End condenser method with a phasor diagram	(7M)
2.b)	Find the following for a single circuit transmission line delivering a load of 50 MVA at 110 KV & 0.8 P.F. lagging. Find Sending end voltage, sending end current, sending end power & efficiency of transmission. Given $A=D=0.98\angle 3^0$, $B=110\angle 75^0\Omega$, $C=0.0005\angle 80^0$ Siemen.	(7M)
	(OR)	
2.c)	Explain Nominal-π method of medium transmission lines with a phasor diagram	(7M)
2.d)	A 3-Phase, 50 Hz overhead transmission line 100 Km has Resistance/Km/Phase=0.1Ω, Inductive reactance/km/phase=0.2Ω, capacitive susceptance/km/phase=$0.04*10^{-4}$ Siemen. Determine i) Sending end current ii) Sending end voltage iii) Sending end power factor iv) Transmission efficiency when supplying a balanced load of 10,000kw at 66kv, P.F of 0.8 lagging. Use Nominal-T method	(7M)
	UNIT-III	
3.a)	Analyse the input and output voltages and currents for a long transmission line using Rigorous method.	(14M)
	(OR)	
3.c)	Explain Surge impedance, Surge impedance loading, Wavelength and velocity of propagation	(7M)
3.d)	Derive the expression for surge impedance loading (SIL) of a transmission line. Explain the significance of operating a transmission line at or near its SIL and discuss the implications of under loading or overloading a line relative to its SIL.	(7M)
	UNIT-IV	
4.a)	Explain the purpose of shunt compensation in transmission lines. Discuss the methods used to provide shunt compensation and how they impact voltage regulation,	(7M)

4.b)	Explain the concept of critical voltages in relation to corona discharge. Discuss how corona contributes to power loss and causes radio interference	(7M)
	(OR)	
4.c)	Explain the Ferranti effect in transmission lines. Derive the conditions under which this effect becomes significant	(7M)
4.d)	For a transmission line operating at a specified frequency, calculate the effects of skin and proximity on the line's effective resistance.	(7M)
	UNIT-V	
5.a)	Explain the voltage distribution along an insulator string in an overhead line. Discuss why the voltage distribution is not uniform and how it affects string efficiency.	(7M)
5.b)	Determine the maximum voltage that the string of the suspension insulators as shown, can withstand if the maximum voltage per unit is 17.5Kv. 	(7M)
	(OR)	
5.c)	Define string efficiency and explain its significance in transmission line insulation systems.	(14M)

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BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)
III-B. Tech I-Semester Supplementary Examinations (BR20), NOV-2025
ELECTRICAL MEASUREMENTS AND 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)	Explain the importance of damping mechanism in an instrument and how are they Classified?	(7M)
1.b)	Derive an expression for the force of attraction between the plates in a parallel plate electrostatic voltmeter.	(7M)
	(OR)	
1.c)	List and explain the various sources of errors in Electrodynamometer instruments and how to mitigate them.	(14M)
	UNIT-II	
2.a)	Explain the working of Ramp type Digital voltmeter with a neat block diagram Discuss how these errors affect the accuracy and reliability of voltage measurements.	(14M)
	(OR)	
2.c)	Discuss the factors that affect the accuracy and resolution of a digital frequency meter. How can these factors be mitigated in practical applications?	(14M)
	UNIT-III	
3.a)	Explain the measurement of active power in 3-phase balanced system and derive expression for powerfactor.	(14M)
	(OR)	
3.c)	Explain the testing of 1-phase energy meter by phantom loading method.	(7M)
3.d)	A 50 A, 230V meter on full load test makes 61 revolutions in 37 seconds. If the normal disc speed is 520 revolutions per KWH, find the percentage error.	(7M)
	UNIT-IV	
4.a)	Draw the circuit diagram of H.V. Schering bridge and phasor diagram under balance conditions. Derive the equations under balance conditions	(14M)
	(OR)	
4.c)	Derive the expression for bridge sensitivity for a Wheatstone bridge with equal arms. Find also the expression for current through the galvanometer for a small unbalance.	(7M)
4.d)	The four arms of a Wheatstone bridge as follows: AB= 100Ω; BC =1000Ω; CD = 4000Ω; DA = 400Ω The galvanometer has a resistance of 100Ω, a sensitivity of 100mm/μA and is connected across AC. A source of 4V D.C. is connected across BD. Calculate the current through the galvanometer and its deflection if the resistance of arm DA is changed from 400 Ω to 401 Ω.	(7M)
	UNIT-V	
5.a)	Explain with a neat diagram the operation of a piezo electric transducers?	(7M)
5.b)	Explain about LVDT using neat diagrams.	(7M)
	(OR)	
5.c)	Explain the pressure measurement for the following categories: i) McLeod gauge ii) Thermal conductivity gauge.	(7M)
5.d)	Write short notes on the following: i) Angular velocity ii) Torque.	(7M)

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BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III-B. Tech I-Semester Supplementary Examinations (BR20), NOV- 2025

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*
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All parts of a question must be answered at one place

	UNIT-I	
1.a)	a) Represent $(199)_{10}$ a) binary b) BCD	(7M)
1.b)	If the Hamming code sequence 1100110 is transmitted and due to error in one position, is received as 1110110, locate the position of the error bit using parity checks and give the method for obtaining the correct sequence.	(7M)
	(OR)	
1.c)	Construct Hamming code for BCD 0110. Use even parity.	(7M)
1.d)	Perform the following addition using excess-3 code. i) 386 + 756 ii) 1010 + 444.	(7M)
	UNIT-II	
2.a)	Implement the following Boolean function using NOR gates Y=(AB'+A'B)(C+D').	(7M)
2.b)	Convert the following expressions into sum of products and product of sum. 1. (AB+C)(B+C'D) 2. X'+X(X+Y')(Y+Z')	(7M)
	(OR)	
2.c)	What are logic gates? Explain about different logic gates giving their graphic symbols and truth tables.	(7M)
2.d)	Simplify the following function and implement it with NAND gates F= (B'+D')(A'+C'+D)(A+B'+C'+D)(A'+B+C'+D')	(7M)
	UNIT-III	
3.a)	Minimize below expression using EX-NOR function $f = \bar{A}B\bar{C} + \bar{A}\bar{B}C + A\bar{C}D + AC\bar{D}$	(7M)
3.b)	Simplify the following using K-map method F(A , B , C , D) = Σ(0, 2, 4, 6, 9, 11, 13, 15)	(7M)
	(OR)	
3.c)	Draw the logic diagram of a 2 to 4 line decoder using NOR gates including an enable input	(7M)
3.d)	Design a combinational logic to subtract one bit from the other. Draw the logic diagram using NAND and NOR Gates	(7M)
	UNIT-IV	
4.a)	Implement the following Boolean function with a multiplexer (a) F(A, B, C, D) = ∑(1, 2, 5, 8, 6, 10,12,14) (b) F(A, B, C, D) = ∑(1, 2, 5,6, 12)	(7M)
4.b)	Discuss a few applications of multiplexers and distinguish between a multiplexer and a decoder.	(7M)
	(OR)	
4.c)	Design a 3 bit binary number and generate a Excess-3 code using ROM.	(14M)
	UNIT-V	
5.a)	Draw the circuit of JK flip flop using gates and explain its operation and truth table	(14M)
	(OR)	
5.c)	What is Finite state machine and explain its capabilities	(7M)
5.d)	Explain in detail about the design procedures involved with designing an asynchronous sequential circuit by minimizing the circuit complexity and producing a stable circuit without critical races.	(7M)

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Course Code: **20ME5T06**

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III-B.Tech I-Semester Supplementary Examinations (BR20), NOV- 2025

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 factors to be consider for the selection of materials for design of machine elements? Enumerate the most commonly used engineering materials and state five important mechanical properties. (14M)

(OR)

1.c) Explain briefly about various theories of failures. (7M)

1.d) Discuss the design procedure of spigot and socket cotter joint. (7M)

UNIT-II

2.a) What is Endurance limit? How do you estimate the Endurance strength of a material? (7M)

2.b) A 25 mm diameter shaft is made of forged steel 30C8 (sut = 600 N/mm^2). There is a step in the shaft, and the theoretical stress concentration factor at the step is 2.1. The notch sensitivity factor is 0.84. Determine the Endurance limit of the shaft, if it is subjected to a reversed bending moment. (7M)

(OR)

2.c) Explain the following terms in connection with design of machine members subjected to variable loads: (a) Endurance limit, (b) Size factor, (c) Surface finish factor. (7M)

2.d) A bar of circular cross-section is subjected to alternating tensile forces varying from a minimum of 200 kN to a maximum of 500 kN. It is to be manufactured of a material with an ultimate tensile strength of 900 MPa and an endurance limit of 700 MPa. Determine the diameter of bar using safety factors of 3.5 related to ultimate tensile strength and 4 related to endurance limit and a stress concentration factor of 1.65 for fatigue load. Use Goodman straight line as basis for design. (7M)

UNIT-III

3.a) Enumerate the different types of riveted joints and rivets. (7M)

3.b) A plate 100 mm wide and 12.5 mm thick is to be welded to another plate by means of parallel fillet welds. The plates are subjected to a load of 50 kN. Find the length of the weld so that the maximum stress does not exceed 56 MPa. Consider the joint first under static loading and then under fatigue loading. (7M)

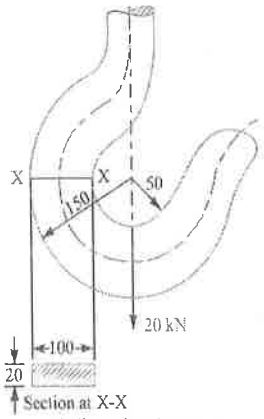
(OR)

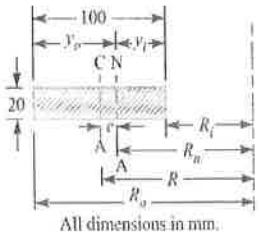
3.c) Design a double riveted butt joint with two cover plates for the longitudinal seam of a boiler shell 1.5 m in diameter subjected to steam pressure of 1 MPa. Assume joint efficiency as 75%, allowable tensile stress in plate as 83 MN/m^2 ; compression stress as138 MN/m2 and shear stress in the rivet as 55 MN/m^2 . (7M)

3.d) What are bolts of uniform strength? Where are they used? Explain with a sketch. (7M)

UNIT-IV

4.a) The crane hook carries a load of 20 kN as shown in Fig. The section at X-X is rectangular whose horizontal side is 100 mm. Find the stresses in the inner and outer fibres at the given section. (14M)





(OR)

4.c) A hollow shaft of 40 mm outer diameter and 25 mm inner diameter is subjected to a twisting moment of 120 N-m, simultaneously, it is subjected to an axial thrust of 10 kN and a bending moment of 80 N-m. Calculate the maximum compressive and shear stresses. (14M)

UNIT-V

5.a) An electric motor driven power screw moves a nut in a horizontal plane against a force of 75 kN at a speed of 300 mm / min. The screw has a single square thread of 6 mm pitch on a major diameter of 40 mm. The coefficient of friction at screw threads is 0.1. Estimate power of the motor. (10M)

5.b) Why are square threads preferable to V-threads for power transmission? (4M)

(OR)

5.c) The mean diameter of the square threaded screw having pitch of 10 mm is 50 mm. A load of 20 kN is lifted through a distance of 170 mm. Find the work done in lifting the load and the efficiency of the screw, when 1. The load rotates with the screw, and 2. The load rests on the loose head which does not rotate with the screw. The external and internal diameter of the bearing surface of the loose head is 60 mm and 10 mm respectively. The coefficient of friction for the screw and the bearing surface may be taken as 0.08. (14M)

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Course Code: **20ME5E01**

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)
III-B.Tech I-Semester Supplementary Examinations (BR20), NOV- 2025
INDUSTRIAL AUOMATION 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)	Discuss robotics and its applications.	(7M)
1.b)	Explain the need of automation.	(7M)
	(OR)	
1.c)	Discuss advantages and disadvantages of automation.	(7M)
1.d)	How do you classify coordinate system?	(7M)
	UNIT-II	
2.a)	Explain function line diagram of robot arms.	(7M)
2.b)	Discuss common types of arms.	(7M)
	(OR)	
2.c)	Explain types of gripper mechanisms.	(7M)
2.d)	Evaluate various considerations in gripper selection and design.	(7M)
	UNIT-III	
3.a)	For the point [3 7 5] perform the following operations: a) Rotate 300 about X-axis b) Translate 8 units along y-axis c) Rotate 300 about x then translate 6 units along Y- axis. d) Rotate 900 about z-axis	(14M)
	(OR)	
3.c)	Explain the implementation of DH notation for a links coordinate system and joint parameters.	(14M)
	UNIT-IV	
4.a)	Discuss steps in trajectory planning.	(7M)
4.b)	Explain path planning.	(7M)
	(OR)	
4.c)	Explain straight line motion.	(7M)
4.d)	Discuss description of path with robot programme language.	(7M)
	UNIT-V	
5.a)	Compare hydraulic and pneumatic Actuators.	(7M)
5.b)	Explain stepper motor with neat sketch.	(7M)
	(OR)	
5.c)	What are application of robot regarding continuous arc welding?	(7M)
5.d)	Briefly explain drones.	(7M)

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(AUTONOMOUS)

III-B. Tech I-Semester Supplementary Examinations (BR20), NOV- 2025

STEAM & GAS POWER SYSTEMS (ME)

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 about the Rankine cycle and also derive the expression for the efficiency of the cycle with PV and TS diagram	(14M)
	(OR)	
1.c)	The steam turbine is fed with the steam having an enthalpy of 3100 kJ/kg.It moves out of the turbine with an enthalpy of 2100 kJ/kg. Feed heating is done at 3.2 bar with steam enthalpy of 2500 kJ/kg. The condensate from the condenser with an enthalpy of 125 kJ/kg enters into the feed heater. The quality of the bled steam 11200 kg/h. Find the power developed s by the turbine. Assume that the water leaving the feed heater is saturated liquid at 3,2 bar and heater is direct mixing type. Neglect the pump work.	(7M)
1.d)	Describe the process of flue gas analysis. Why is it important in determining combustion efficiency?	(7M)
	UNIT-II	
2.a)	Explain the working of Cochron boilers with neat sketch.	(14M)
	(OR)	
2.c)	Explain the conditions required for maximum discharge in a chimney. Why is it important to achieve this condition?	(7M)
2.d)	A boiler with induced draught has an efficiency of 70%. If the efficiency of an artificial draught system (forced draught) is increased to 75%, calculate the reduction in fuel consumption required to produce the same amount of steam. Assume the boiler initially consumes 150 kg of fuel per hour.	(7M)
	UNIT-III	
3.a)	Derive the expression for critical pressure ratio for a convergent - divergent steam nozzle.	(7M)
3.b)	Calculate the critical pressure and throat area per unit mass flow rate of steam expanding through a convergent-divergent nozzle from 10 bar dry saturated down to atmosphere pressure of 1 bar. Assume that inlet velocity is negligible and that the expansion is isentropic.	(7M)
	(OR)	
3.c)	Differentiate between the impulse and reaction turbines	(7M)
3.d)	Steam enters the blade row of an impulse turbine with a velocity of 600m/s at an angle of 25°C to the plane of rotation of the blades. The mean blade speed is 250m/s. the blade angle at the exit side is 30°. The blades friction less is 10%. Determine i) The blades angle at inlet ii) The work done per kg of steam iii) The diagram efficiency iv) The axial thrust per kg of steam per sec.	(7M)
	UNIT-IV	
4.a)	Explain the working of Parson's reaction turbine with the combined velocity diagram.	(7M)
4.b)	The following particulars are refers to a single stage Parson's turbine Blade velocity: 140 m/s, Absolute velocity at inlet: 300 m/s , the blade outlet angle =200. The rate of steam flow 7.6 kg/s.	(7M)

	i. The blade inlet angle ii. Tangential force and iii. Power developed	
	(OR)	
4.c)	Explain the working of Evaporative condenser with a neat sketch	(7M)
4.d)	The surface condenser is designed to handle 16000 kg of steam per hour. The steam enters the condenser at 0.09 bar and 0.88 dryness fraction and the condensate leaves the condenser at the corresponding saturation temperature. Determine the rise in cooling water temperature if the cooling water flow rate is 8.96×10^5 kg/hour. Assume that the pressure is constant throughout the condenser.	(7M)
	UNIT-V	
5.a)	The air enters the compressor of an open cycle constant pressure gas turbine at a pressure of 1bar and temperature of 200C. The pressure of the air after compression is 4bar. The isentropic efficiency of compressor and turbine are 80% and 85% respectively. The air-fuel ratio used is 90:1. If flow rate of air is 3.0kg/sec. Calculate i) power developed ii) thermal efficiency of cycle. Assume Cp = 1.0KJ/KgK , γ=1.4 of air and gases, calorific value of fuel is 41800KJ/Kg	(14M)
	(OR)	
5.c)	Explain the basic principle of jet propulsion and classify jet propulsive engines. Provide examples of different types of jet engines used in aviation and other applications.	(7M)
5.d)	With the help of a schematic diagram, explain the thermodynamic cycle of a turbojet engine, and discuss how the cycle affects the engine's efficiency and thrust.	(7M)

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Course Code: **20EC5T07**

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III-B.Tech I-Semester Supplementary Examinations (BR20), NOV- 2025

LINEAR IC APPLICATIONS (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) Derive the expression for voltage gain for dual input, dual output differential amplifier. (7M)

1.b) Compare ideal and practical OP-AMP parameters. (7M)

(OR)

1.c) What is an Op-Amp? Draw the functional block diagram of an Op-Amp and explain each block in detail. (7M)

1.d) Describe the basic current mirror circuit, its design, and applications. (7M)

UNIT-II

2.a) Explain the IC 741 op-amp block diagram & its features in detail. (7M)

2.b) Write about AC characteristics of op-amp. (7M)

(OR)

2.c) Draw the circuit of a voltage to current converter if the load is floating and grounded. Are there any limitations as the size of the load when grounded? (5M)

2.d) Define the terms: (9M)
CMRR, PSRR, SVRR, Input bias current, Input offset voltage,Gain bandwidth product.

UNIT-III

3.a) Discuss the design and function of an op-amp integrator circuit and its uses. (7M)

3.b) Find R1 and RF in the lossy integrator so that peak gain is 20 dB and the gain is 3 dB down from its peak value when $\omega = 10000$ rad/s. use a capacitance of 0.01μF. (7M)

(OR)

3.c) Discuss the working of a Wien bridge oscillator using an op-amp. (7M)

3.d) Describe the working of a 2nd-order Butterworth high-pass filter using an op-amp. (7M)

UNIT-IV

4.a) What is 555 timer? Explain the working of 555 timer as monostable multivibrator. (7M)

4.b) With the help of a neat internal function diagram explain the working of IC 555 as a astable multi vibrator. (7M)

(OR)

4.c) Briefly explain the use of PLL for the process of FSK demodulation. (7M)

4.d) Draw and explain the functional diagram of 555 timer. (7M)

UNIT-V

5.a) Explain the following characteristics of analog-to-digital converter: Resolution, Accuracy, Settling time, Linearity. (7M)

5.b) With a neat circuit diagram, explain the operation of weighted resistor digital-to-analog converter. (7M)

(OR)

5.c) Illustrate the working principle of dual slope type analog-to-digital converter. Write its advantages and limitations. (7M)

5.d) With the help of neat circuit diagram explain parallel analog-to-digital converter. (7M)

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BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III-B.Tech I-Semester Supplementary Examinations (BR20), NOV- 2025
ANTENNA AND WAVE PROPAGATION (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)	Draw the antenna equivalent circuit. Prove the reciprocity theorem	(7M)
1.b)	Discuss about antenna gain and explain its significance.	(7M)
	(OR)	
1.c)	Write notes on polarization, Antenna Aperture (A_{eff}) and directivity (D)? What is the relation between A_{eff} and D?	(10M)
1.d)	Discuss about beam area with necessary equations.	(4M)

UNIT-II

2.a)	Write the salient features of Yagi-Uda arrays.	(7M)
2.b)	Compare Broadside array and End-fire array.	(7M)
	(OR)	
2.c)	Design a helical antenna and explain the working at axial mode?	(7M)
2.d)	Discuss about power radiated by a half-wave dipole and show that the Radiation resistance is 73Ω.	(7M)

UNIT-III

3.a)	Explain the Zoning technique in Lens antenna.	(7M)
3.b)	Explain the 90^0-corner reflector.	(7M)
	(OR)	
3.c)	Explain about the corner reflector and the grid reflector.	(7M)
3.d)	What are the various feed systems for parabolic reflector? Briefly explain them.	(7M)

UNIT-IV

4.a)	What are the advantages and limitations of Microstrip antennas?	(7M)
4.b)	Explain the procedure of antenna gain measurement.	(7M)
	(OR)	
4.c)	Draw the basic structure of rectangular Microstrip antenna and explain it.	(7M)
4.d)	Explain the salient features of Microstrip Antennas.	(7M)

UNIT-V

5.a)	Derive the LOS range in space wave Propagation?	(7M)
5.b)	Explain the Tropospheric wave Propagation.	(7M)
	(OR)	
5.c)	Define and explain Skip Zone and Virtual height.	(7M)
5.d)	Explain the wave-tilt principle in a ground wave Propagation	(7M)

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BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III-B. Tech I-Semester Supplementary Examinations (BR20), NOV- 2025

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)	Explain the Architecture of 8086 Micro Processor with Detail Functioning	(7M)
1.b)	Draw the Register Organization of 8086 Micro Processor and Explain in detail	(7M)
	(OR)	
1.c)	Explain and Draw Any one Signal Description in 8086 Micro Processor(Either Minimum Mode or Maximum Mode)	(7M)
1.d)	Explain the Memory organization & Programming Model of 8086 Micro Processor	(7M)
	UNIT-II	
2.a)	Explain some Instruction in 8086 Micro Processor with an Example(At least 7)	(7M)
2.b)	Explain the Interrupt Structure of 8086 with Neat Diagrams.	(7M)
	(OR)	
2.c)	Define Addressing Mode & Explain Different types of Addressing Modes with Examples	(7M)
2.d)	Write a Assemble Language program to Add & Subtract two 16-bit numbers in 8086.	(7M)
	UNIT-III	
3.a)	Explain different Control word formats of 8255 PPI	(7M)
3.b)	Explain the Interfacing of seven segment Display with 8086	(7M)
	(OR)	
3.c)	Explain the Neat Block Diagram of 8251 USART	(7M)
3.d)	Explain master and Slave mode of Representation of 8259.	(7M)
	UNIT-IV	
4.a)	Explain the Architecture of 8051 Micro Controller	(7M)
4.b)	Draw the Pin Diagram of 8051 Micro Controller	(7M)
	(OR)	
4.c)	Classify Different Modes of Timers in 8051 Micro Controller and Explain any 2 in detail.	(7M).
4.d)	Explain the Memory Organization in8051 Micro Controller with neat Representation	(7M)
	UNIT-V	
5.a)	Explain the Architecture of ARM Processor	(7M)
5.b)	Explain Design Challenges of Embedded System.	(7M)
	(OR)	
5.c)	Discuss the Instruction set of ARM Controller	(7M)
5.d)	Explain the Pipeline Concept of ARM Processor	(7M)

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Course Code: **20CS5E01**

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III-B.Tech I-Semester Supplementary Examinations (BR20), NOV- 2025

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

UNIT-I

1.a)	Describe the operational concepts between the processor and memory.	(7M)
1.b)	Explain the different functional units of a computer.	(7M)
	(OR)	
1.c)	What are the various ways of representing negative numbers? Explain with example.	(7M)
1.d)	Distinguish between Fixed point and Floating point representation.	(7M)

UNIT-II

2.a)	Discuss the logic micro operations in detail.	(7M)
2.b)	Implement Bus line for an 8-bit register using three state-buffers.	(7M)
	(OR)	
2.c)	Write a detailed note on computer organization and design.	(7M)
2.d)	Design and implement 4-bit Arithmetic unit which performs ADD, ADD with carry, SUB, Sub with borrow, Increment and decrement operations.	(7M)

UNIT-III

3.a)	Explain about address sequencing in control memory with neat diagrams?	(7M)
3.b)	Tabulate data transfer instructions with examples in detail?	(7M)
	(OR)	
3.c)	Explain the following i)General register organization ii) stack organization	(7M)
3.d)	Draw and explain the schematic of Micro program sequencer for a control memory.	(7M)

UNIT-IV

4.a)	Brief out the hardware organization of Associative memory with diagrams.	(7M)
4.b)	Write a suitable practical scenario for Content Addressable memory?	(7M)
	(OR)	
4.c)	What is Locality of Reference and explain about Cache memory in detail.	(7M)
4.d)	What is virtual memory? Explain the relation between address space and memory space in a virtual memory system along with its memory table for mapping?	(7M)

UNIT-V

5.a)	Differentiate tightly coupled and loosely coupled multiprocessors.	(7M)
5.b)	Write about Time shared common bus and multiport memory.	(7M)
	(OR)	
5.c)	Write about pipelining and its importance in high speed applications.	(7M)
5.d)	Demonstrate the pipeline organization.	(7M)

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Course Code: 20EC5D03

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)
III-B.Tech I-Semester Supplementary Examinations (BR20), NOV-2025
COMPUTER NETWORKS (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)	Write about peer-to-peer processes and encapsulation concepts in OSI model.	(7M)
1.b)	Give the structure and working principle of WAN with virtual private networks and Internet Service Provider. And also explain its role in Internet.	(7M)
	(OR)	
1.c)	What is a Computer Network? Classify Computer Networks. Explain them briefly.	(14M)
	UNIT-II	
2.a)	What is the need of Flow control? Explain the common approaches for flow control in data link layer.	(7M)
2.b)	What is Redundancy? What are its types? Explain CRC.	(7M)
	(OR)	
2.c)	What is Multiplexing? Explain types of Multiplexing.	(7M)
2.d)	What is Error Detection and correction? Explain.	(7M)
	UNIT-III	
3.a)	Explain in detail about the sliding window protocol using Selective Repeat.	(7M)
3.b)	Differentiate between Static and Dynamic Channel Allocation schemes.	(7M)
	(OR)	
3.c)	Explain in detail the operation of pure ALOHA and slotted ALOHA.	(7M)
3.d)	Explain the working of Multiple Access Protocols.	(7M)
	UNIT-IV	
4.a)	What is Store and forward packet switching? Explain.	(7M)
4.b)	Differentiate the open loop congestion control and closed loop congestion control.	(7M)
	(OR)	
4.c)	What are the general principles of congestion control? Explain.	(7M)
4.d)	Explain the Distance Vector Routing with an example.	(7M)
	UNIT-V	
5.a)	Give the format of the UDP segment and TCP segment? Explain when UDP is preferred to TCP.	(7M)
5.b)	Discuss the role played by the message transfer agent.	(7M)
	(OR)	
5.c)	Write a short note on Remote Procedure Call.	(7M)
5.d)	How DNS service maps domain names to IP addresses.	(7M)

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Course Code: 20CS5T09

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III-B.Tech I-Semester Supplementary Examinations (BR20), Nov-2025

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)	Compare the WAN, LAN and MAN topologies.	(7M)
1.b)	What is the significance of layered architecture? Explain the OSI layered architecture with neat sketch.	(7M)
	(OR)	
1.c)	Explain about various transmission media in physical layer with a neat sketch.	(7M)
1.d)	Discuss in brief about TCP/IP protocol Suite.	(7M)
	UNIT-II	
2.a)	Give brief description about the co-axial cables and also mention their disadvantages.	(7M)
2.b)	Explain the functions of the following devices: Hub, Bridge, Router and Gateway.	(7M)
	(OR)	
2.c)	Differentiate between guided and unguided transmission media.	(7M)
2.d)	In detail explain how frequency division multiplexing combines analog signals	(7M)
	UNIT-III	
3.a)	Describe the working principle of Carrier sense multiple access with collision Detection (CSMA/CD).	(7M)
3.b)	With an example explain the sliding window Flow control mechanism.	(7M)
	(OR)	
3.c)	Explain about ALOHA and CDMA.	(7M)
3.d)	Explain error detection using Checksum.	(7M)
	UNIT-IV	
4.a)	With an example explain the shortest path routing algorithms used in computer networks.	(7M)
4.b)	Explain congestion control in virtual circuit sub nets and datagram subnets.	(7M)
	(OR)	
4.c)	Demonstrate how to make routing table using distance vector routing and list down the limitations.	(7M)
4.d)	What are the functions of transport layer? State transport service primitives.	(7M)
	UNIT-V	
5.a)	What are advantages of Wireless Application Protocol?	(7M)
5.b)	How DNS service maps domain names to IP addresses.	(7M)
	(OR)	
5.c)	With neat sketch explain the architecture, services and message format of Electronic Mail.	(14M)

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Course Code: 20CS5T10

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III-B. Tech I-Semester Supplementary Examinations (BR20), NOV- 2025

FORMAL LANGUAGE AND AUTOMATA THEORY (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

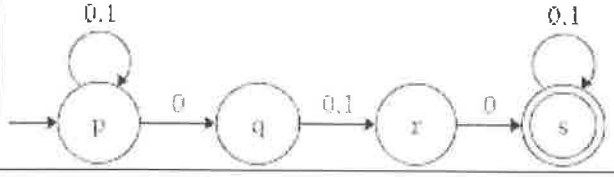
1.a) Design a DFA that recognizes set of all strings such that the number of **0**'s is even and the number of **1**'s is a multiple of 3 over the input alphabet $\sum = \{0,1\}$. (7M)

1.b) Draw NFA without ε-transitions for a given NFA with ε-transition, where q0 and q2 are the initial and final states respectively. (7M)

	A	b	c	ε
q0	{q0}	Φ	Φ	{q1}
q1	Φ	{q1}	Φ	{q2}
q2	Φ	Φ	{q2}	Φ

(OR)

1.c) Let us consider the NDFA shown in the figure below. Convert it into equivalent DFA (7M)



1.d) Reduce the following DFA where q_1 is the initial state and q6 is the final state (7M)

Q\∑	0	1
q_1	q_2	q_3
q_2	q_4	q_5
q_3	q_6	q_7
q_4	q_4	q_5
q_5	q_6	q_7
q_6	q_4	q_5
q_7	q_6	q_7

UNIT-II

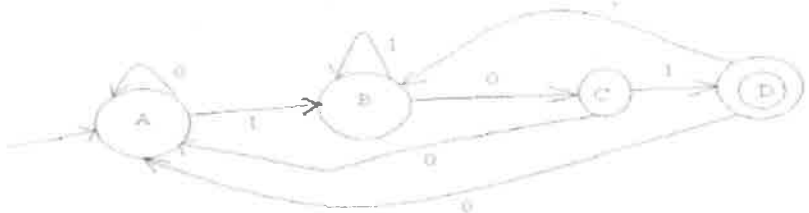
2.a) Write Regular Expression for the following languages (7M)

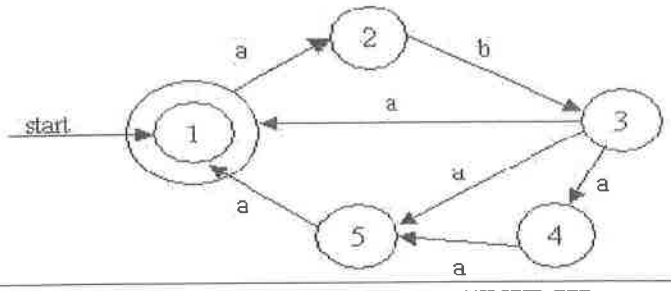
i).Set of Strings of a's and b's that ends with 'ab' or 'bb'

ii).Set of strings of a's and b's that begins with 'ab' and contains the substring 'ba'.

iii)For the language over Σ={0,1} where the set of strings in which every 0 is immediately followed by atleast two 1's

2.b) Obtain a right linear grammar and left linear grammar for the following FA. (7M)



	(OR)	
2.c)	State Pumping lemma for Regular grammars Prove i) $L=\{a^n b^n c^n / n>1\}$ is not regular ii) L= {w/w is a palindrome over {0,1}} is not regular	(7M)
2.d)	Find Regular Expression for the following NFA 	(7M)
	UNIT-III	
3.a)	Consider the grammar G = ({S, A}, {a, b], P, S), where P consists of S →aAS | a A→ SbA|SS|ba Construct Left Most Derivation and Derivation tree for the string "aabbaa"	(7M)
3.b)	Find a grammar in chomsky normal form equivalent to S →AACD A→aAb/ ϵ C→aC/a D→aDa/bDb/ ϵ	(7M)
	(OR)	
3.c)	Eliminate useless symbols from the following grammar S→aAa A→Sb/bCC/DaA C→abb/DD E→aC D→aDA	(7M)
3.d)	Convert the following grammar into GNF. $A_1 \rightarrow A_2A_3$, $A_2 \rightarrow A_3A_1/b$, $A_3 \rightarrow A_1A_2/a$	(7M)
	UNIT-IV	
4.a)	Explain the graphical notation of PDA with an example and acceptance of context free	(7M)

	languages by PDA	
4.b)	Construct a PDA to the following CFG S→aAA; A→aS/bS/a	(7M)
	(OR)	
4.c)	Consider the following PDA which accepts L by empty stack and convert it into equivalent PDA which accepts L by final state. $M = (\{q_0, q_1\}, \{a, b\}, \{B, z_0\}, \delta, q_0, z_0, \Phi)$ where δ is given by $\delta(q_0, a, z_0) = (q_0, Bz_0)$ $\delta(q_0, a, B) = (q_0, BB)$ $\delta(q_0, b, B) = (q_1, \varepsilon)$ $\delta(q_1, b, B) = (q_1, \varepsilon)$ $\delta(q_1, \varepsilon, z_0) = (q_1, \varepsilon)$ the above PDA accepts $L = \{a^n b^n / n \geq 1\}$ by empty stack	(7M)
4.d)	Construct the context free grammar G which accepts the PDA A by empty stack, where $A=(\{q_0, q_1\}, \{a, b\}, \{Z_0,Z\}, \delta, q_0,Z_0, \varphi)$ δ is given by $\delta(q_0, b,Z_0) = \{(q_0,ZZ_0)\}$, $\delta(q_0,\wedge,Z_0) = \{(q_0, L)\}$ $\delta(q_0, b,Z) = \{(q_0,ZZ)\}$, $\delta(q_0, a,Z) = \{(q_1,Z)\}$ $\delta(q_1, b,Z) = \{(q_1,\wedge)\}$, $\delta(q_1, a,Z_0) = \{(q_0,Z_0)\}$	(7M)
	UNIT-V	
5.a)	Check whether the following PCP has a solution A=(abab, aaabbb, aab, ba, ab, aa) B=(ababaaa, bb, baab, baa, ba, a)	(7M)
5.b)	Explain the different Types of Turing Machines	(7M)
	(OR)	
5.c)	Design a TM that accepts $L=\{WW^R / W\Sigma(0+1)^*\}$	(7M)
5.d)	Describe decidable and undecidable problems	(7M)

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BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III-B. Tech I-Semester Supplementary Examinations (BR20), NOV- 2025

DATABASE MANAGEMENT SYSTEM

(CSE, CSE_AI&DS, AI&ML and 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 is the Three-Tier Schema Architecture? How Does the Three-Tier Architecture Support Data Independence?	(7M)
1.b)	What is DBMS? Mention Database applications?	(7M)
	(OR)	
1.c)	Can you explain the concept of the client-server architecture?	(7M)
1.d)	How does data management in a database differ from that in a file system?	(7M)
	UNIT-II	
2.a)	How do null values affect query results and aggregate functions in a database?	(7M)
2.b)	Explain DDL,DML commands with examples.	(7M)
	(OR)	
2.c)	What is relational algebra in the context of database management systems?	(7M)
2.d)	What are the rules for sorting data using the ORDER BY clause in SQL? How does the GROUP BY clause help in aggregating data in SQL queries?	(7M)
	UNIT-III	
3.a)	What are generalization, specialization, and aggregation in the ER model? Explain with examples.	(7M)
3.b)	What are free and bound variables in Tuple Relational Calculus? Explain with examples.	(7M)
	(OR)	
3.c)	How are functional dependencies used to validate the correctness of keys in a database schema?	(7M)
3.d)	Can you explain the differences between left join, right join, and full outer join with examples?	(7M)
	UNIT-IV	
4.a)	Define Normalization. Explain 1NF, 2NF, 3NF with suitable examples.	(7M)
4.b)	Explain Boyce-Codd normal form(BCNF)	(7M)
	(OR)	
4.c)	Define relationship between Functional dependency and Keys?	(7M)
4.d)	Explain the concept of Dependency-Preserving Decomposition. Why is it important for database normalization?	(7M)
	UNIT-V	
5.a)	How does the Two-Phase Locking (2PL) protocol help in concurrency control? Provide an example	(7M)
5.b)	Explain various types of Locks in Detail.	(7M)
	(OR)	
5.c)	Explain how the lock compatibility matrix works and its significance in controlling lock acquisition during concurrent transaction	(7M)
5.d)	Enlighten in detail about ISAM?	(7M)

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Course Code: **20CS5D03**

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III -B. Tech I-Semester Supplementary Examinations (BR20), NOV- 2025

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)	Explain about various types of Prescriptive Process Models.	(7M)
1.b)	Explain about various types of Specialized Process Models.	(7M)
	(OR)	
1.c)	Explain software component? Explain its uses.	(7M)
1.d)	What is unified process? List the phases in unified process model.	(7M)
	UNIT-II	
2.a)	Explain the concept of Requirement Analysis.	(7M)
2.b)	Write a detailed note on the software engineering knowledge.	(7M)
	(OR)	
2.c)	What are the core principles in software engineering? Explain.	(7M)
2.d)	Explain the following i)Negotiating the requirements ii) Validating the requirements	(7M)
	UNIT-III	
3.a)	Explain SRS document and explain along with its contents.	(7M)
3.b)	Explain data dictionary.	(7M)
	(OR)	
3.c)	Explain about Scenario-based elements in Analysis model.	(7M)
3.d)	Explain about Class based modeling.	(7M)
	UNIT-IV	
4.a)	Explain the design concepts in software engineering.	(7M)
4.b)	Explain how to design class based components? Explain its basic design principle.	(7M)
	(OR)	
4.c)	Explain software architecture in a detail.	(7M)
4.d)	Differentiate architecture design and design phases of SDLC.	(7M)
	UNIT-V	
5.a)	Explain interface design principles and guidelines.	(7M)
5.b)	Write a short note on interface design Evaluation.	(7M)
	(OR)	
5.c)	Write a strategic approach to software testing.	(7M)
5.d)	What is system testing? Explain any two system testing in detail.	(7M)

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BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III-B. Tech I-Semester Supplementary Examinations (BR20), Nov 2025

COMPUTER NETWORK (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)	Explain the OSI Reference Model and the TCP/IP Model. Describe the main functions of each layer in both models.	(7M)
1.b)	Differentiate between WAN, LAN, and MAN network topologies based on their scope, technology, and application examples.	(7M)
	(OR)	
1.c)	Discuss the various Guided Transmission Media used in the physical layer of computer networks. Explain their characteristics, advantages, and limitations.	(7M)
1.d)	Describe the principles of Frequency Division Multiplexing (FDM) and Code Division Multiplexing (CDMA). How do they allow multiple signals to share a single communication channel?	(7M)
	UNIT-II	
2.a)	Explain the services provided by the Data Link Layer to the Network Layer. Detail the concepts of Framing and Flow Control.	(7M)
2.b)	Describe the different methods used for Error Detection and Correction at the data link layer. Give an example of an error detection technique.	(7M)
	(OR)	
2.c)	Compare and contrast the Elementary Data Link Protocols such as Simplex Stop-and-Wait and Simplex Unrestricted Protocol.	(7M)
2.d)	Discuss the working of Sliding Window Protocols. How does the Go-Back-N protocol differ from the Selective Repeat protocol?	(7M)
	UNIT-III	
3.a)	Explain the principles of ALOHA (Pure and Slotted). What are the advantages and disadvantages of each?	(7M)
3.b)	Describe the Carrier Sense Multiple Access (CSMA) protocols. Differentiate between CSMA/CD (Collision Detection) and CSMA/CA (Collision Avoidance).	(7M)
	(OR)	
3.c)	Explain the methods of Controlled Access to a channel. Discuss the working of Reservation and Token Passing mechanisms.	(7M)
3.d)	Describe the Channelization techniques: FDMA, TDMA, and CDMA. How is each used to divide the channel capacity?	(7M)
	UNIT-IV	
4.a)	Differentiate between Virtual Circuit and Datagram subnets in the Network Layer. What are the pros and cons of each approach?	(7M)
4.b)	Explain the working of Distance Vector Routing algorithms. Detail the Count-to-Infinity problem and its possible solutions.	(7M)
	(OR)	
4.c)	Describe the characteristics of Hierarchical Routing and Broadcast/Multicast Routing strategies. When is each routing strategy most appropriate?	(7M)
4.d)	Discuss the elements of transport protocols. Explain how the Internet Transport Protocols (TCP and UDP) manage connection and reliability.	(7M)

5.a)	Discuss the elements of transport protocols. Explain how the Internet Transport Protocols (TCP and UDP) manage connection and reliability.	(7M)
5.b)	Describe the Architecture and Services of Electronic Mail. Explain the roles of the User Agent and Message Transfer Agents.	(7M)
	(OR)	
5.c)	Discuss the complete process of Electronic Mail delivery, from the sender's User Agent to the final delivery to the recipient.	(7M)
5.d)	Explain the architecture and components of WAP (The Wireless Application Protocol). How did WAP enable the initial development of the wireless web?	(7M)

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Course Code: **20ML5E01**

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

III-B. Tech I-Semester Supplementary Examinations (BR20), NOV- 2025

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)	Explain the structure of Agents.	(7M)
1.b)	Explain any seven applications of Artificial Intelligence.	(7M)
	(OR)	
1.c)	Explain advantages and disadvantages of Artificial Intelligence.	(7M)
1.d)	What do you mean by Agent? Explain any three types of AI Agents with neat diagram?	(7M)
	UNIT-II	
2.a)	Explain about Breath first search algorithm with suitable example.	(7M)
2.b)	Explain about the concept of Problem-Solving Agents and List out the four essential properties of Search Algorithms.	(7M)
	(OR)	
2.c)	Explain about Steepest Ascent Hill Climbing algorithm? Mention the limitations of Hill Climbing algorithm.	(7M)
2.d)	Compare and Contrast of Informed search and Uninformed search.	(7M)
	UNIT-III	
3.a)	Prove that P∧(QVR) follows from P∧Q.	(7M)
3.b)	What do you mean by Well Formed Formula? Explain the steps to convert Well-formed formula into clause forms.	(7M)
	(OR)	
3.c)	Explain about Resolution refutation in predicate logic with suitable example.	(7M)
3.d)	Consider the following sentences: i) Mary loves everyone. ii) No one talks iii) Everyone loves himself. iv) Everyone loves everyone. v) Everyone loves everyone except himself vi) Every student smiles. vii) Every student walk or talk. Translate these sentences into formulas in predicate logic.	(7M)
	UNIT-IV	
4.a)	Explain various types of Knowledge.	(7M)
4.b)	What do you mean by Ontology Engineering? Explain various components of Ontology.	(7M)
	(OR)	
4.c)	Explain the generalized architecture of Knowledge Based Agent with neat diagram?	(7M)
4.d)	Explain the concepts of Mental Events and Mental Objects.	(7M)
	UNIT-V	
5.a)	Compare and Contrast of expert system and traditional system.	(7M)
5.b)	Discuss about expert system shell and tools.	(7M)
	(OR)	
5.c)	Explain the architecture of expert systems.	(7M)
5.d)	Explain various applications of Expert System.	(7M)

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