BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

II B. Tech I-Semester Supply End Examinations (BR20), NOV-2025

PROBABILITY AND STATISTICS (Common to all Branches)

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) Calculate mean, median and standard deviation of the following distribution (14M)

Class-Interval	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70
Frequency	2	3	8	12	16	5	2	3

(OR)

1.b) It has been claimed that in 60% of all solar heat installations the utility bill is reduced by at least one third. Accordingly, what are the probabilities that the utility bill will be reduced by at least one third in (i) four of five installations (ii) at least four of five installations? (7M)

1.c) An insurance company found that only 0.01% of the population is involved in a certain type of accident each year. If its 1000 policy holders were randomly selected from the population, obtain the probability that not more than two of its clients are involved in such an accident next year? (7M)

UNIT-II

2.a) Let X be a continuous random variable with probability distribution is given by (7M)

$$f(x) = \begin{cases} kx, & \text{if } 0 \le x < 1 \\ k, & \text{if } 1 \le x < 2 \\ -kx + 3k, & \text{if } 1 \le x \le 3 \\ 0, & elsewhere \end{cases}$$

find k?

2.b) Fit a Binomial distribution to the following data (7M)

x	0	1	2	3	4	5	6	7
f	7	6	19	35	30	23	7	1

(OR)

2.c) Given that p(x) = K/2x, is a probability distribution for a random variable X that can take on the values x = 0,1,2,3 and 4. (i) Determine K (ii) Determine mean and variance of X. (7M)

2.d) Suppose the weights of 900 male students are normally distributed with mean $\mu = 140$ pounds and standard deviation 10 pounds. Obtain the number of students whose weights are (i) between 138 and 148 pounds (ii) more than 152 pounds. (7M)

UNIT-III

3.a) Discuss the procedure of testing of hypothesis. (7M)

3.b) A sample of 400 male students is found to have a mean height of 171.38 cm. Can it be (7M)

and S.D 3.3 cm.

(OR)

3.c) From the following information, state whether the two attributes i.e condition of house and condition of child are independent. (14M)

Condition of House		
Condition of child	Clean	Dirty
Clean	69	51
Fairly clean	81	20
Dirty	35	44

UNIT-IV

4.a) Fit a second degree polynomial to the data given below by method of least squares. (14M)

x	1	2	3	4	5	6	7
y	23	5.2	9.7	16.5	29.4	35.5	54.4

(OR)

4.b) Calculate the correlation coefficient from the following data. (14M)

Age of husband	25	28	30	32	35	36	38	39	42	45
Age of wife	20	26	29	30	25	18	26	35	35	46

UNIT-V

5.a) The following data gives readings of 10 samples of size 6 each in the production of a certain component. Calculate the values for central line and control limits for Mean-chart and Range-chart. Draw the control charts and comment on the state control. (14M)

Sample	1	2	3	4	5	6	7	8	9	10
Mean	43	49	37	44	45	37	51	46	43	47
Range	5	6	5	7	7	4	8	6	4	6

Draw Control Charts for mean (for n=6, A_2 =0.483). What is your conclusion?

(OR)

5.b) The following figures give us the number of defectives in 20 samples, containing 2000 items. (14M)

425,430,216,341,225,322,280,306,337,305

356,402,216,126,409,193,280,326,389

Calculate the values for central line and the control limits for p-chart (Fractional defective chart).

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Course Code: 20CE3101

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

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

SURVEYING (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

<table>
<tr><td colspan="3">UNIT-I</td></tr>
<tr><td>1.a)</td><td>What are the instruments used in chain surveying? What factors should be considered in deciding the stations of a chain survey? How is a chain survey executed in the field</td><td>(7M)</td></tr>
<tr><td>1.b)</td><td>Show the different methods of overcoming difficulties if there are obstacles in chaining</td><td>(7M)</td></tr>
<tr><td colspan="3">(OR)</td></tr>
<tr><td>1.c)</td><td>The following were observed in a compass traverse. Correct local attraction
<table>
<tr><td>Line</td><td>Fore bearing</td><td>Back bearing</td></tr>
<tr><td>AB</td><td>$68^0 15'$</td><td>$248^0 15'$</td></tr>
<tr><td>BC</td><td>$148^0 45'$</td><td>$326^0 15'$</td></tr>
<tr><td>CD</td><td>$224^0 30'$</td><td>$46^0 00'$</td></tr>
<tr><td>DE</td><td>$217^0 15'$</td><td>$38^0 15'$</td></tr>
<tr><td>EA</td><td>$327^0 45'$</td><td>$147^0 45'$</td></tr>
</table></td><td>(7M)</td></tr>
<tr><td>1.d)</td><td>Explain the basic principles of surveying</td><td>(7M)</td></tr>
<tr><td colspan="3">UNIT-II</td></tr>
<tr><td>2.a)</td><td>The following staff readings were observed successively with level, the instrument having been moved forward after the second, fourth and eighth readings:

0.875, 1.235, 2.310, 1.385, 2.930, 3.125, 4.125, 0.120, 1.875, 2.030, 3.765

The first reading was taken with the staff held upon a bench mark of elevation 132.135. Enter the reading in level book form and reduce the levels. Apply the usual checks. Find also the difference in level between the first and the last points</td><td>(7M)</td></tr>
<tr><td>2.b)</td><td>Compare rise and fall method and height of collimation method</td><td>(7M)</td></tr>
<tr><td colspan="3">(OR)</td></tr>
<tr><td>2.c)</td><td>Explain the working of a dumpy level with a sketch. What are the various temporary adjustments</td><td>(7M)</td></tr>
<tr><td>2.d)</td><td>How is graphical adjustment of closing error done in a closed traverse.</td><td>(7M)</td></tr>
<tr><td></td><td>UNIT-III</td><td></td></tr>
<tr><td>3.a)</td><td>What is parts of theodolite? Explain briefly the temporary adjustments of theodolite.</td><td>(7M)</td></tr>
<tr><td>3.b)</td><td>Discuss the various characteristics and uses of contours with suitable examples</td><td>(7M)</td></tr>
<tr><td colspan="3">(OR)</td></tr>
<tr><td>3.c)</td><td>Explain the method of finding horizontal angles by repetition and reiteration using a theodolite</td><td>(7M)</td></tr>
<tr><td>3.d)</td><td>Explain the essential parts of theodolite</td><td>(7M)</td></tr>
<tr><td colspan="3">UNIT-IV</td></tr>
<tr><td>4.a)</td><td>What are the different methods employed in tachometric survey? Describe the method most commonly used.</td><td>(7M)</td></tr>
<tr><td>4.b)</td><td>A circular curve has a 200 m radius and 650 deflection angle. Find (i) Degree of the curve (ii) Length of the curve (iii) Tangent length (iv) Length of long chord (v) Apex distance and (vi) Mid-ordinate</td><td>(7M)</td></tr>
</table>

	(OR)	
4.c)	Determine the constants of tachometer k and C from basic concepts of stadia method.	(7M)
4.d)	Describe the conditions under which tachometric surveying is advantageous	(7M)
	UNIT-V	
5.a)	Demonstrate the space, control and user segments of GPS and their functions?	(7M)
5.b)	What are the different types of EDM instruments? Describe in detail	(7M)
	(OR)	
5.c)	What is photogrammetric? Explain the types of photogrammetry.	(7M)
5.d)	How does drone photogrammetry differ from traditional aerial photogrammetry?	(7M)

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Course Code: **20EC3T04**

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE:: ODALAREVU
(AUTONOMOUS)
II-B.Tech I-Semester Supplementary Examinations (BR20), NOV-2025
ELECTRONIC DEVICES AND CIRCUITS (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)	With the help of V-I characteristics, explain UJT operation	(7M)
1.b)	Explain the V-I Characteristics of P-N diode.	(7M)

(OR)

1.c)	Explain about the Current components in a P-N diode	(7M)
1.d)	Explain the Avalanche and Zener Breakdowns.	(7M)

UNIT-II

2.a)	Derive the equation for ripple factor of half wave rectifier.	(7M)
2.b)	A 50 Hz transformer having 60 **V r. m. s.** on each side of the centre tap supplies a full wave rectifier circuit. The circuit load is 210 Ω with a shunt capacitor filter of 1000 μF. Find the ripple factor.	(7M)

(OR)

2.c)	With suitable wave forms explain bridge rectifier.	(7M)
2.d)	Describe the operation of full wave rectifier.	(7M)

UNIT-III

3.a)	Explain the working of transistor	(7M)
3.b)	Compare CB, CE and CC configurations with suitable diagrams	(7M)

(OR)

3.c)	Write the construction, operation and characteristic behaviour of JFET under various biasing conditions.	(7M)
3.d)	Explain the MOSFET characteristics in enhancement mode.	(7M)

UNIT-IV

4.a)	What is the necessity of biasing circuits? Derive the expression for stability factor of self-bias circuit.	(7M)
4.b)	Explain the DC load Line and AC load Line analysis.	(7M)

(OR)

4.c)	Draw and explain the Voltage Divider Biasing.	(7M)
4.d)	Explain the characteristics of JFET.	(7M)

UNIT-V

5.a) Describe the operation of common drain FET amplifier and derive the equation for Current gain and voltage gain. (7M)

5.b) Draw the circuit of source follower Amplifier and derive the expressions for A_I, A_V, Ri and Ro. (7M)

(OR)

5.c) Compare various BJT Transistor amplifiers (7M)

5.d) Derive the input resistance, current gain, voltage gain and output resistance of CB amplifier (7M)

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Course Code: **20ME3T01**

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

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

THERMODYNAMICS (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)	Distinguish among different types of thermodynamic systems.	(7M)
1.b)	Explain the concept of thermodynamic equilibrium.	(7M)

(OR)

1.c)	Explain how Zeroth law of thermodynamics can be used for temperature measurement.	(7M)
1.d)	Two tanks are connected by a valve. One tank contains 1.5 kg of CO gas at 75°C and 0.9 bar. The other tank holds 7.5 kg of the same gas at 25°C and 1.4 bar. The valve is opened and the gases are allowed to mix while receiving energy by heat transfer from the surroundings. The final equilibrium temperature is 45°C. Using the ideal gas model, determine (a) the final equilibrium pressure, (b) the heat transfer for the process.	(7M)

UNIT-II

2.a)	Discuss First law of thermodynamics.	(7M)
2.b)	Brief about Throttling and free expansion process.	(7M)

(OR)

2.c)	Explain the Vander waals equation of state.	(7M)
2.d)	What are the uses of compression by charts?	(7M)

UNIT-III

3.a)	Establish the equivalence of Kelvin- Planck and Clausius statements.	(7M)
3.b)	What is a PMM1? Why is it impossible?	(7M)

(OR)

3.c)	Discuss Carnot principle and Carnot cycle. Mansion its draw back.	(7M)
3.d)	Discuss Gibbs -Helmholtz functions.	(7M)

UNIT-IV

4.a)	What is a triple point ? Explain with a neat diagram p-V-T surface.	(7M)
4.b)	Write short notes on Dryness fraction. Explain in detail Clasius- Clapeyron equation.	(7M)

(OR)

4.c)	Write about Psychometric properties of atmospheric air.	(7M)
4.d)	A gaseous mixture consists of 1 kg of oxygen and 2 kg of nitrogen at a pressure of 150 kPa and a temperature of 200C. Determine the changes in internal energy, enthalpy and entropy of the mixture when the mixture is heated to a temperature of 1000C (i) at constant volume and (ii) at constant pre.	(7M)

UNIT-V

5.a)	Explain about otto cycles and derive its efficiency with PV&TS diagram.	(14M)

(OR)

5.c)	Demonstrate the P-V and T-S diagram of any one power cycle of your choice.	(7M)
5.d)	Explain the vapour compression refrigeration cycle.	(7M)

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Course Code: **20EC3101**

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::OEDALAREVU
(AUTONOMOUS)

II-B. Tech I-Semester Supplementary Examinations (BR20), November- 2025

ELECTRONIC CIRCUITS-I (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)	What is a PN Junction? Explain the operation with its V-I characteristics	(7M)
1.b)	Draw the energy band diagram for (i) Conductors (ii) Insulators (iii) Semiconductors. Explain in detail.	(7M)
	(OR)	
1.c)	Explain the construction and working of UJT with the help of V-I characteristics.	(7M)
1.d)	Write short notes on the principle of Photo diode.	(7M)
	UNIT-II	
2.a)	Explain the construction and working of half wave rectifier.	(7M)
2.b)	What are the various filter circuits used in rectifiers. Compare their performance.	(7M)
	(OR)	
2.c)	Derive the expressions for PIV, Ripple factor, Conversion Efficiency and TUF of a Full wave rectifier.	(7M)
2.d)	Derive the expression for Ripple factor for Full Wave Rectifier with L-section filter.	(7M)
	UNIT-III	
3.a)	Explain about input and output characteristics of a transistor when it is connected in common base configuration.	(7M)
3.b)	Why self-bias technique is so popular? And derive an expression for its stability factor.	(7M)
	(OR)	
3.c)	Explain the construction of JFET and write down principle of operation of JFET.	(7M)
3.d)	Draw the fixed bias circuit and derive three stability factors. Write the draw backs of it.	(7M)
	UNIT-IV	
4.a)	Draw the circuit diagram of CE amplifier using hybrid parameters and derive the expression for A_i, A_v and Ri.	(7M)
4.b)	Draw the circuit of source follower Amplifier and derive the expressions for A_i , A_v, R_i and R_o.	(7M)
	(OR)	
4.c)	Compare the three transistor amplifier configurations with related A_i , A_v, R_i and R_o.	(7M)
4.d)	Draw the small-signal model of common drain JFET amplifier. Derive expressions for voltage gain and output resistance.	(7M)
	UNIT-V	
5.a)	Derive the gain response of RC low pass circuit when sinusoidal signal as input.	(7M)
5.b)	Explain the working of different diode clippers with neat waveforms.	(7M)
	(OR)	
5.c)	Explain the function of clamping circuit using diode with different inputs.	(7M)
5.d)	Sketch RC differentiator and Integrator circuits and explain their operation.	(7M)

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Course Code: **20CS3T02**

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)
II-B.Tech I-Semester Supplementary Examinations (BR20), NOV-2025
Unified Modelling Language & Design Patterns (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)	Explain about workflows of unified process model.	(7M)
1.b)	Discuss about mapping disciplines to UML artifacts.	(7M)
	(OR)	
1.c)	Explain how the OOAD and UML helps in project development.	(7M)
1.d)	Elaborate the goals of a good design.	(7M)
	UNIT-II	
2.a)	What different artifacts that may start in inception phase? Explain.	(7M)
2.b)	Give the use case diagram for sports event management system with descriptions of use case and actors identified.	(7M)
	(OR)	
2.c)	Explain how requirements are organized in UP artifacts?	(7M)
2.d)	Explain use case types and formats with examples?	(7M)
	UNIT-III	
3.a)	Draw the sequence diagram for performing any ATM transaction.	(7M)
3.b)	Why we need pattern? Explain the importance of GRASP design patterns.	(7M)
	(OR)	
3.c)	Draw a sequence diagram for issuing and renewing books in online library management system.	(7M)
3.d)	Design class diagrams in each MVC layer.	(7M)
	UNIT-IV	
4.a)	What is the intent of facade pattern and also discuss its applicability?	(7M)
4.b)	Write and explain about principle, structure, example, implementation, and design issues & advantages of publish-subscribe design pattern.	(7M)
	(OR)	
4.c)	Compare and contrast between Fabrication and Façade design patterns.	(7M)
4.d)	Differentiate pure fabrication and indirect fabrication?	(7M)
	UNIT-V	
5.a)	What are the types of components in UML? Write the differences between component and deployment diagrams	(7M)
5.b)	Explain any four purposes of activity diagrams during system development process.	(7M)
	(OR)	
5.c)	Write and explain the design principles of package design.	(7M)
5.d)	Draw a state chart diagram for airline management system.	(7M)

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Course Code: **20HS3T02**

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE: ODALAREVU
(AUTONOMOUS)

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

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

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*
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	UNIT-I	
1.a)	Describe Sole Proprietorship and Partnership organisation.	(7M)
1.b)	What is Joint Stock Company? and explain its features.	(7M)
	(OR)	
1.c)	What is Business Organization? And describe its features.	(7M)
1.d)	Explainthe external Factors of Business Environment.	(7M)
	UNIT-II	
2.a)	Explain the Nature of Managerial Economics.	(7M)
2.b)	Explain the Price Elasticity Demand.	(7M)
	(OR)	
2.c)	Describe the determinants of Law of Demand.	(7M)
2.d)	Explain the significance of Elasticity of Demand.	(7M)
	UNIT-III	
3.a)	Explain the Break-Even Analysis with Diagram.	(7M)
3.b)	Explain the Managerial significance of Break-Even Analysis.	(7M)
	(OR)	
3.c)	Discuss the Law of Diminishing Marginal Returns.	(7M)
3.d)	Explain the economies of Scale.	(7M)

UNIT-IV

4.a)	Describe the features of Monopoly Market.	(7M)
4.b)	Describe the different Pricing Methods.	(7M)

(OR)

4.c)	Distinguish Perfect Competition Market and Monopoly Market.	(7M)
4.d)	Explain the price determination under Perfect Competition Market.	(7M)

UNIT-V

5.a)	Explain the merits and demerits of Internal Rate of Return.	(7M)
5.b)	Calculate Pay Back Period for following data. Investment is ₹ 50,000	(7M)

Years	Cash Inflow (₹)
1	13,000
2	15,000
3	17,000
4	19,000
5	21,000

(OR)

5.c) Journalize for the following transactions: (7M)

Date	Particulars	₹
January 1,2024	Good sold for cash	2,600
January 2, 2024	Goods purchased for cash	2,000
January 3, 2024	Purchase of Goods from the company ABC on credit	3,000
January 4, 2024	Sale of goods to the company PQR on credit	4,000
January 5, 2024	Cash received from the company PQR	3,900
January 6, 2024	Cash paid to the company ABC	2,950
January 7, 2024	Furniture purchased for Cash	3,000

5.d)	Distinguish between Trail Balance and Balance Sheet.	(7M)

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(5)

Course Code: 20CE3T02

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
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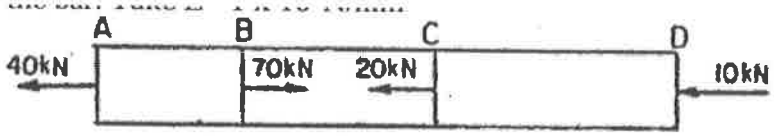
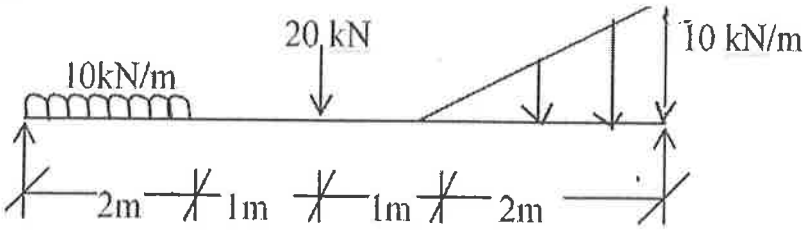
II-B.Tech I-Semester Supply Examinations (BR20), NOV - 2025

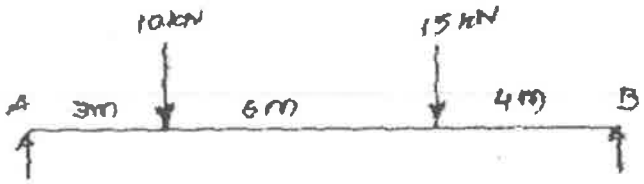
MECHANICS OF SOLIDS (CE & ME)

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)	Sketch a typical stress-strain curve for a ductile material and explain briefly the salient features of the curve.	(7M)
1.b)	A brass bar, having a cross-section area of 900 mm^2, is subjected to axial forces as shown in the figure, in which AB= 0.6m, BC=0.8m, and CD = 1.0m. Find the total elongation of the bar. Take E= 1 x 105N/mm^2. 	(7M)
	(OR)	
1.c)	The stresses at a point in a component are 100 MPa (tensile) and 50 MPa (compressive). Determine the magnitude of the normal and shear stresses on a plane inclined at an angle of 25° with tensile stress. Also determine the direction of the resultant stress and the magnitude of the maximum intensity of shear stress.	(7M)
1.d)	A circular rod of steel 14mm diameter is testing in a testing machine and it is found that when the tension is 18kN the total extension on a 21cm length is 0.15mm. Find the value of E.	(7M)
	UNIT-II	
2.a)	Sketch the shear force and bending moment diagrams and given all the salient values for the following beam. 	(14M)
	(OR)	
2.c)	A continuous beam ABC consists of two spans AB and BC of lengths 6 m and 8 m. The span AB carries a point load of 120 kN at 4 m from A while the span BC carries a point load at 5 m frame. Find the moments and reactions at supports. Draw SFD and BMD.	(7M)
2.d)	Explain the procedure adopted for analyzing simply supported beams subjected to inclined loads.	(7M)
	UNIT-III	
3.a)	An I section beam consists of two flanges 150 mm X 20 mm and a web of 310 X 10 mm. Find the magnitude of maximum shear stress when it is subjected to a shear force of 40 kN.	(7M)
3.b)	State the assumptions made in the theory of simple bending and derive bending equation. M/I=f/y=E/R	(7M)
	(OR)	
3.c)	A wooden beam 100 mm wide, 250 mm deep and 3 m long is carrying a uniformly distributed load of 40 kN/m. Determine the maximum shear stress and sketch the variation of shear stress along the depth of the beam.	(14M)

	UNIT-IV	
4.a)	Find the central deflection of a simply supported beam loaded with uniformly distributed load throughout the span.	(14M)
	(OR)	
4.c)	A beam is loaded as shown in Fig. Determine the deflection under the load points. Take E = 200 GPa and I = 160 x 10^6 mm^4. 	(14M)
	UNIT-V	
5.a)	A spherical shell of 800 mm is subjected to an internal pressure of 2 N/mm^2. Find the thickness of the shell if the allowable stress in the material of the shell is 100 N/mm^2.	(14M)
	(OR)	
5.c)	A thick metallic cylindrical shell of 150 mm internal diameter is required to withstand an internal pressure of 8 N/mm^2. Find the necessary thickness of the shell, if the permissible tensile stress in the section is 20 N/mm^2.	(14M)

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(AUTONOMOUS)

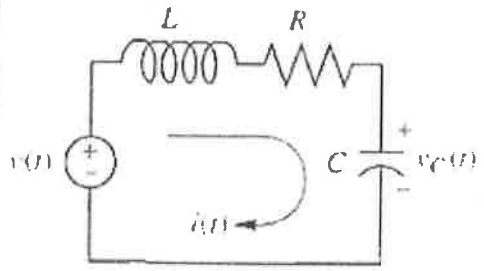
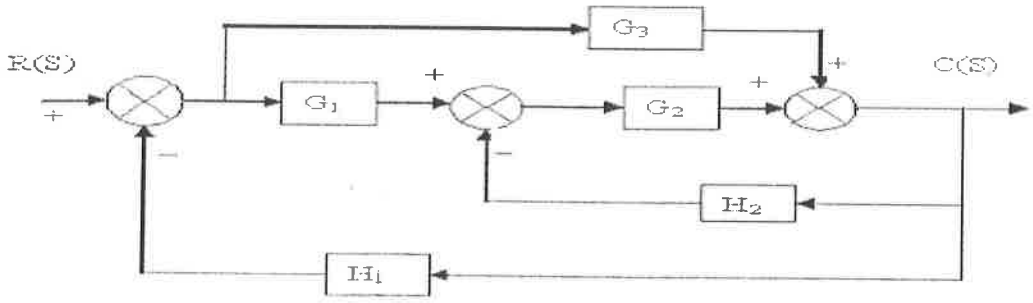
II-B. Tech I-Semester Supplementary Examinations (BR20), NOV- 2025

CONTROL SYSTEMS (EEE&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 Different examples of control systems-Classification of control systems? (CO1,L2)	(7M)
1.b)	Derive the transfer function of the circuit shown in figure (CO1,L3) 	(7M)
	OR	
1.c)	Find the overall gain of the system shown below? (CO1,L3) 	(7M)
1.d)	Differentiate between open loop and closed loop system giving suitable example. (CO1,L4)	(7M)
	UNIT-II	
2.a)	A unity feedback system has $G(s) = \frac{4}{s(s+1)}$. Determine nature of the response of the system for a unit step input. Also determine the rise time, peak time, maximum peak over shoot and settling time (CO2,L3)	(7M)
2.b)	By means of Routh criterion, determine the stability represented by characteristic equation $s^4 + 2s^3 + 8s^2 + 4s + 3 = 0$ (CO2,L5)	(7M)
	OR	
2.c)	Explain various types of time domain specifications? (CO2,L2)	(7M)

	UNIT-III	
3.a)	A unity feedback system has $G(s) = \frac{40(s+2)}{s(s+1)(s+4)}$ draw its polar plot? (CO3,L1)	(7M)
3.b)	Sketch the bode plot for the open loop transfer function G(s) =20/s(1+3s)(1+4s).Obtain Phase margin and gain margin. (CO3,L3)	(7M)
	OR	
3.c)	G(s)=k/s(s+2)(s+20), H(s)=1, construct bode plot and determine i.) limiting value of K for the system to be stable, ii.) value of k for the gain margin to be 10db, iii.) value of k for the phase margin to be 50deg (CO3,L3)	(7M)
3.d)	State and explain Nyquist stability criteria? (CO3,L2)	(7M)
	UNIT-IV	
4.a)	What is PD controller? derive the expression (CO4,L1)	(7M)
4.b)	What is Proportional controller? derive the expression (CO4,L1)	(7M)
	OR	
4.c)	Discuss Stability, steady-state accuracy, transient accuracy, disturbance rejection, insensitivity and robustness of control systems? (CO4,L2)	(7M)
4.d)	Compare all the compensators in detail (CO4,L5)	(7M)
	UNIT- V	
5.a)	Obtain the state model for the system whose transfer function is given by Y(s) / U(s) = (5s + 6) / (s^2 + 2s + 3) (CO5,L3)	(7M)
5.b)	Calculate the transfer function of the system represented in the state space model as $\dot{X} = \begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} -1 & -1 \\ 1 & 0 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 1 \\ 0 \end{bmatrix} [u]$ $Y = [0 \quad 1] \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$ (CO5,L3)	(7M)
	OR	
5.c)	Diagonalization of State Matrix $\begin{bmatrix} 3 & 0 & 0 \\ -3 & 4 & 9 \\ 0 & 0 & 3 \end{bmatrix}$ (CO5,L4)	(7M)
5.d)	Explain State-space models of linear discrete-time systems? (CO5,L2)	(7M)

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BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

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

ADVANCED DATA STRUCTUERES (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)	Explain the concept of dictionaries and hash tables.	(7M)
1.b)	Explain the search and update operations on skip lists.	(7M)
	(OR)	
1.c)	Discuss the Division Method and Multiplication Method of hashing.	(7M)
1.d)	What are skip lists? Explain the structure and operation of a skip list. How does it support faster data retrieval compared to traditional linked lists?	(7M)
	UNIT-II	
2.a)	Derive the formula for the maximum height of an AVL tree. Why is it important to maintain a balanced height in AVL trees?	(7M)
2.b)	Describe the search and update operations on 2-3 trees and analyze their time complexity	(7M)
	(OR)	
2.c)	Derive the maximum height of an AVL tree.	(7M)
2.d)	Explain the 2-3 tree, a self-balancing search tree.	(7M)
	UNIT-III	
3.a)	Explain the binary heap data structure. How are the insert and delete min operations implemented in a binary heap?	(7M)
3.b)	Explain the lazy binomial queue and its advantages	(7M)
	(OR)	
3.c)	Explain the insert and delete-min operations on binary heaps	(7M)
3.d)	Describe the binomial queue data structure.	(7M)
	UNIT-IV	
4.a)	Discuss the algorithm's time complexity and compare it with the Bellman-Ford algorithm.	(7M)
4.b)	Explain the problem of finding minimum-cost spanning trees and describe Prim's algorithm in detail.	(7M)
	(OR)	
4.c)	Explain Prim's algorithm for finding the minimum-cost spanning tree of a weighted graph.	(7M)
4.d)	Discuss the algorithm's time complexity and provide a step-by-step example	(7M)
	UNIT-V	
5.a)	Discuss the lower bound on the time complexity of comparison-based sorting algorithms.	(7M)
5.b)	Explain the concepts of digital search trees, binary tries, Patricia tries, and multi-way tries. Discuss the use cases and advantages of each type of trie.	(7M)
	(OR)	
5.c)	Prove that any comparison-based sorting algorithm requires $\Omega(n \log n)$ time in the average and worst cases.	(7M)
5.d)	Explain the merge sort algorithm. How does the divide-and-conquer approach work in merge sort?	(7M)

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BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

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

ARTIFICIAL INTELLIGENCE (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)	Explain the concept of Artificial Intelligence (AI) and its importance in modern technology.	(7M)
1.b)	Discuss the current trends and advancements in Artificial Intelligence.	(7M)
	(OR)	
1.c)	Demonstrate tic-tac-toe concept with example.	(14M)
	UNIT-II	
2.a)	Discuss heuristic search techniques and their significance in problem solving.	(7M)
2.b)	Explain how alpha-beta pruning improves the efficiency of the min-max algorithm.	(7M)
	(OR)	
2.c)	Describe constraint satisfaction problems with an example.	(7M)
2.d)	Analyse how min-max and alpha-beta pruning are applied in game playing.	(7M)
	UNIT-III	
3.a)	Explain propositional calculus and its components with examples.	(7M)
3.b)	Describe semantic tableau method for propositional logic with an example.	(7M)
	(OR)	
3.c)	Explain the structure and working of a natural deduction system.	(7M)
3.d)	Discuss the importance of resolution refutation as a proof strategy in AI.	(7M)
	UNIT-IV	
4.a)	Describe the various approaches to knowledge representation in AI with example.	(7M)
4.b)	Explain script structure and its use in representing event sequences.	(7M)
	(OR)	
4.c)	Implement the concept of semantic networks with example.	(7M)
4.d)	Discuss case grammars and their role in language understanding.	(7M)
	UNIT-V	
5.a)	Explain the different phases involved in building an expert system.	(7M)
5.b)	Describe about rule based expert systems.	(7M)
	(OR)	
5.c)	Explain the concept of truth maintenance systems and their importance in AI.	(7M)
5.d)	Discuss the importance of expert system shells and tools in development.	(7M)

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BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

II-B. Tech I-Semester Supplementary Examinations (BR20), Nov 2025
FLUID MECHANICS & HYDRALIC MACHINES (CE&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)	State and explain Newton's law of viscosity.	(7M)
1.b)	Convert a pressure head of 100 m of water to (i) kerosene of specific gravity 0.81 (ii) carbon tetrachloride of specific gravity 1.6.	(7M)
	(OR)	
1.c)	Explain the working of (i) piezometer (ii) differential u-tube manometer with neat sketches.	(14M)
	UNIT-II	
2.a)	What is stream line, path line and streak line?	(7M)
2.b)	State Bernoulli's theorem and derive the equation.	(7M)
	(OR)	
2.c)	Explain the working of a Pitot tube with a neat sketch.	(7M)
2.d)	The stream function for a two-dimensional flow is given by $\psi = 2xy$, calculate the velocity at the point P (2,3). Find the velocity potential function φ.	(7M)
	UNIT-III	
3.a)	Derive Darcy Weisback equation and list out the minor losses in closed conduit flow and discuss their significance.	(14M)
	(OR)	
3.c)	A main pipe divides into two parallel pipes which again forms one pipe as shown in fig. The length and diameter for the first parallel pipe are 2000 m and 1.0 m respectively, while the length and diameter of second parallel pipe are 2000 m and 0.8 m. Find the rate of flow in each parallel pipe, if total flow in the main is 3.0 m^3 /s. The co-efficient of friction for each parallel pipe is same and equal to 0.005.	(14M)
	UNIT-IV	
4.a)	Show that force exerted by a jet of water on a inclined fixed plate in the direction of the jet given by: $F_x = \rho A V^2 \sin\alpha$.	(14M)
	(OR)	
4.c)	Define and explain hydraulic efficiency, mechanical efficiency and overall efficiency of a turbine.	(7M)
4.d)	What is a draft-tube? Describe with neat sketch two different types of draft tubes.	(7M)
	UNIT-V	
5.a)	Draw and discuss characteristic curves of hydraulic turbines.	(7M)
5.b)	A centrifugal pump is to discharge 0.118m^3/ sec at a speed of 1450 rpm against a head of 25m. The impeller diameter at outlet is 250mm and its width at outlet is 50mm and manometric efficiency is 75%. Determine vane angle at outer periphery of the impeller.	(7M)
	(OR)	
5.c)	Explain the working of i) single-stage centrifugal pump and ii) single acting Reciprocating Pump with sketches.	(14M)

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Course Code: **20EE3102**

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

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

ELECTRICAL MACHINES-I (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 from first principles, an expression for the EMF generated in the armature winding of a DC machine.	(7M)
1.b)	Calculate the number of conductors on the armature of a 4 pole motor to generator has an EMF of 480V at 750rpm. The flux per pole is 0.018 wb and the armature winding has two parallel paths.	(7M)
	(OR)	
1.c)	Discuss the various types of excitations in DC generators.	(7M)
1.d)	Sketch the OCC of a DC shunt generator and explain the possible causes for the failure of the machine to build up EMF.	(7M)
	UNIT-II	
2.a)	Derive an expression for the back EMF in a DC Motor.	(7M)
2.b)	What are the applications of a DC shunt and series motors?	(7M)
	(OR)	
2.c)	How does a DC motor differ from DC generator in construction?	(7M)
2.d)	Find the ratio of no-load to full load speeds of DC shunt motor drawing 4A on no load and 100A on full load at 220. Its armature and field resistances are 0.05 ohm and 220 ohm respectively.	(7M)
	UNIT-III	
3.a)	Draw a neat diagram of the 3-point starter used for DC shunt motor.	(7M)
3.b)	Explain the necessity of Starter in a DC motor.	(7M)
	(OR)	
3.c)	Briefly describe the test for separating the losses of a DC machine into its various components. Explain how the separation is done.	(7M)
3.d)	A 240V DC motor brake teat takes 52A when run at 1500 rpm. The spring balance at the end of the 75 cm brake arm reads 10 Kg. Determine the efficiency.	(7M)
	UNIT-IV	
4.a)	From first principles, derive the EMF equation of a transformer.	(7M)
4.b)	Develop an equivalent circuit for a single phase two winding Transformer.	(7M)
	(OR)	
4.c)	A 220V/440V single phase transformer has the following test results : OC Test: 220V, 1A, 70W on LV side. SC Test: 20V, 12A, 100W on HV side. Draw the equivalent circuit of the Transformer referred to i) LV side and ii) HV side and fill in the values of circuit parameters.	(14M)
	UNIT-V	
5.a)	Explain the various types of three phase transformer connections.	(7M)
5.b)	Write short notes on auto transformer.	(7M)
	(OR)	
5.c)	A 6.6 KV/440V/220V, star/star/Delta connected three phase transformer has a no-load load of 5.1 A at 0.2 pf and a balanced load of 800 KVA at 0.8 pf lag on the secondary and 160 KVA at 0.9 pf leading on the tertiary. Find the value of primary current and its power factor.	(14M)

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Course Code: 20EC3102

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

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

DIGITAL SYSTEM DESIGN (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) Convert the following. (6M)
i) 10001.1010 into hexadecimal
ii) $(AB)_{16} = (\ )_{10}$
iii) $(1234)_8 = (\ )_2$

1.b) A 7 bit Hamming code is received as 1110101. Is there any error? If yes, locate the position of the error bit. Parity checks are created by odd parity. (8M)

(OR)

1.c) Perform the subtraction using 1's complement and 2's complement methods. (6M)
i) 11010 – 10000
ii) 11010 – 1101
iii) 100 – 110000

1.d) Realize the XOR and XNOR gates using NAND gates. (8M)

UNIT-II

2.a) Represent and draw the following Boolean functions using minimum number of basic gates. (6M)
i) (AB + AB') (AB)'
ii) [(ABD(C + D + E)) + (A +DBC)'] (ABC + (CAD)').

2.b) Simplify the Boolean function together with the don't care conditions using K-map method: $F(A,B,C,D)=\Sigma(3,4,13,15)+d(1,2,5,6,8,10,12,14)$. (8M)

(OR)

2.c) Obtain the dual and complement of the Boolean functions: (4M)
i) B'C'D+(B+C+D)'+B'C'D'E
ii) AB+(AC)'+(AB+C).

2.d) Obtain the minimal expression using the tabular method (10M)
$F = \pi M (6, 7, 8, 9)+d (10, 11, 12, 13, 14, 15)$.

UNIT-III

3.a) Design and implement full adder. (7M)

3.b) Construct a 16 x 1 MUX with 4 x 1 MUX. (7M)

(OR)

3.c) With neat sketch explain Excess 3 adder circuit. (7M)

3.d) With neat sketch explain 4-bit digital comparator. (7M)

UNIT-IV

4.a) Implement the following multiple output functions using PROM. (7M)

$F_1 = \Sigma m\ (0, 1, 4, 7, 12, 14, 15)$ $F_3 = \Sigma m\ (2, 3, 7, 8, 10)$

$F_2 = \Sigma m\ (1, 3, 6, 9, 12)$ $F_4 = \Sigma m\ (1, 3, 5)$.

4.b) Design a BCD to seven segment decoder using PAL. (7M)

(OR)

4.c) Implement the following functions using PROM with three inputs and two outputs. (7M)

$F_1\ (A, B, C) = \Sigma m\ (3, 5, 6, 7)$

$F_2\ (A, B, C) = \Sigma m\ (0, 2, 4, 7)$.

4.d) Compare the PROM, PAL and PLA. (7M)

UNIT-V

5.a) Draw and explain positive edge triggered JK flip-flop with NAND gates and how race around condition is eliminated? (7M)

5.b) Write the conversion procedure of the flip-flops. Convert T flip-flop to JK flip-flop. (7M)

(OR)

5.c) Compare combinational and sequential logic circuits. (7M)

5.d) Draw and explain 4-bit universal shift register. (7M)

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Course Code: 20ES3T04

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)
II-B.Tech I-Semester Supplementary Examinations (BR20), NOV-2025
PYTHON PROGRAMMING (CSE and 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 major features of Python that distinguish it from other programming languages.	(7M)
1.b)	Explain how indentation is used to define code blocks in Python.	(7M)
	(OR)	
1.c)	Write a short Python setup guide explaining PATH setup and script execution.	(7M)
1.d)	Differentiate between identifiers and keywords with examples.	(7M)
	UNIT-II	
2.a)	Write a program to show multiple assignment and variable swapping in Python.	(7M)
2.b)	Explain the difference between identity (is) and equality (==) operators with examples.	(7M)
	(OR)	
2.c)	Discuss how Python handles dynamic typing compared to other languages.	(7M)
2.d)	Demonstrate with example program how membership operators (in, not in) work with sequences.	(7M)
	UNIT-III	
3.a)	Write a program to determine whether a student has passed or failed based on marks using an if statement.	(7M)
3.b)	Compare for loop and while loop in terms of flexibility and readability.	(7M)
	(OR)	
3.c)	Analyse the role of logical operators (and, or, not) in multiple decision conditions.	(7M)
3.d)	Discuss how break, continue, and pass affect loop control flow.	(7M)
	UNIT-IV	
4.a)	Explain slicing methods on List with examples.	(7M)
4.b)	Implement string slicing and indexing with examples.	(7M)
	(OR)	
4.c)	Use Python sets to demonstrate operations like creation, addition, removal, union, intersection, and difference with simple examples.	(14M)
	UNIT-V	
5.a)	Describe variable-length arguments with the help of *args and **kwargs.	(7M)
5.b)	Write a class that calculates factorial using a method.	(7M)
	(OR)	
5.c)	Explain how anonymous functions (lambda functions) differ from normal functions.	(7M)
5.d)	Write a program to demonstrate garbage collection using __del__() method.	(7M)

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BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

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

Python Programming (AIML & 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 type conversion and expressions in Python with suitable examples.	(7M)
1.b)	Discuss about numeric data types and string data types in Python with examples.	(7M)
	(OR)	
1.c)	Discuss the role of functions and modules in Python program development.	(7M)
1.d)	Explain the if, if-else, and if-elif-else statements with syntax and suitable example.	(7M)
	UNIT-II	
2.a)	Differentiate between definite iteration (for loop) and conditional iteration (while loop) with suitable examples.	(7M)
2.b)	What is a string in Python? How can you access individual characters and substrings? Give suitable example.	(7M)
	(OR)	
2.c)	Explain data encryption using strings with a simple example.	(7M)
2.d)	Write a Python program to count the number of uppercase and lowercase characters in a string.	(7M)
	UNIT-III	
3.a)	What is a dictionary in Python? Explain how to create access, modify, and delete dictionary elements with examples.	(7M)
3.b)	What is a recursive function? Write a factorial program using python as an example.	(7M)
	(OR)	
3.c)	Explain the difference between modules and packages with suitable examples.	(7M)
3.d)	What are higher-order functions? Discuss their importance in functional programming design.	(7M)
	UNIT-IV	
4.a)	Explain the working of write () and write lines () functions in Python with example.	(7M)
4.b)	Discuss the concept of inheritance in Python with examples for single and multilevel inheritance.	(7M)
	(OR)	
4.c)	Explain the concept of operator overloading in Python. Write a program to overload the + operator for adding two objects.	(7M)
4.d)	Explain structuring classes using inheritance and polymorphism with an example.	(7M)
	UNIT-V	
5.a)	Explain the concept of exception handling in Python. Write a sample program.	(7M)
5.b)	Discuss about clean-up actions. Illustrate with a program.	(7M)
	(OR)	
5.c)	Differentiate between terminal-based programs and GUI-based programs in Python. Give examples of each.	(7M)
5.d)	Explain how variables and operators are used in Scratch to create interactive programs.	(7M)

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BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

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

BUILDING MATERIALS & CONCRETE TECHNOLOGY (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)	Discuss the importance of seasoning of timber? What are the methods of seasoning and explain any two methods?	(7M)
1.b)	Recall the composition of good brick and various methods of manufacturing of brick with neat sketches.	(7M)
	(OR)	
1.c)	What is meant by seasoning of stones? Why is it necessary?	(7M)
1.d)	What is distemper? How its application is more economical as compare with other types of paint?	(7M)
	UNIT-II	
2.a)	Write the procedure of sieve analysis of aggregate.	(7M)
2.b)	What is particle shape and texture of aggregate?	(7M)
	(OR)	
2.c)	Describe in detail how lime is manufactured?	(7M)
2.d)	Explain any two laboratory test for cement?	(7M)
	UNIT-III	
3.a)	What are the various tests of concrete?	(7M)
3.b)	Define workability. Write the factors influencing the workability.	(7M)
	(OR)	
3	Design a concrete mix for RCC construction. The specified characteristic strength is 25MPa at 28 days. Standard deviation can be taken as 4MPa. The specific gravity of FA and C.A. are 2.66 and 2.78 respectively. The dry rodded bulk density of C.A. is 1600 kg/m3 , and fineness modulus of FA is 2.80. Ordinary Portland cement (TypeI) will be used. A slump of 100 mm is necessary. C.A. is found to be absorptive to the extent of 2% and free surface moisture in sand is found to be 4 per cent. Assume any other essential data.	14M
	UNIT-IV	
4.a)	Discuss about the static and dynamic modulus of elasticity of concrete.	(7M)
4.b)	What is Shrinkage and explain about different types of shrinkage occurs in concrete?	(7M)
	(OR)	
4.c)	Discuss any two tests carried out on the hardened concrete.	(7M)
4.d)	Write about creep of concrete and the factors affecting creep of concrete.	(7M)
	UNIT-V	
5.a)	What are the various Non-destructive methods of testing concrete?	(7M)
5.b)	What are different types of polymer concrete? What are the properties of polymer concrete?	(7M)
	(OR)	
5.c)	What are the different metallic and non metallic fibers used to prepare fiber reinforced concrete (FRC) and discuss their influence on FRC properties?	(7M)
5.d)	Write short notes on no fines concrete and their applications.	(7M)

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BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

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

ELECTRICAL CIRCUITS ANALYSIS (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) The voltage of a circuit is v = 200 sin (300) and the current is i = 50 sin(+ 600). Determine i) The average power, reactive power and apparent power. ii) The circuit elements if $\omega = 100\pi$ rad /sec. (7M)

1.b) A series RC circuit with R = 2kΩ andC = 0.1μF. Determine total impedance Z, current I, phase angle. (7M)

(OR)

1.c) Derive the relationship between line and phase voltage in a 3-phase balanced delta connected system. (14M)

UNIT-II

2.a) An unbalanced four-wired star –connected load has a balanced supply voltage of 400V.the load impedances are Z_R =4+j8; Z_Y=3+j4; and Z_B =15+j20;calculate the line currents, neutral current and the total power. (7M)

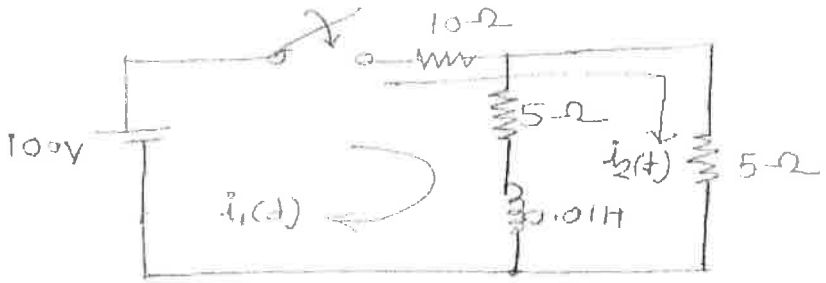
2.b) Prove that two watt meters are sufficient to measure 3 phase power. (7M)

(OR)

2.c) A 400 V, three-phase supply feeds an unbalanced three-wire, star-connected load. The branch impedances of the load are Z_R=4+j8, Z_Y=3+j4, Z_B=15+j20. Find the line currents and voltage across each phase using Millman's Method. Assume RYB phase sequence. (14M)

UNIT-III

3.a) For the circuit given below in Figure, determine the currents $i_1(t)$ and $i_2(t)$ when the switch is closed at t=0. (14M)



(OR)

3.c) Derive the transient response for series RL circuit for DC excitation using laplace equation approach. (14M)

UNIT-IV

4.a) What is a transfer function? Explain the necessary conditions for transfer functions. (7M)

4.b) Derive the transient response for series RLC circuit for AC excitation using differential equation approach. (7M)

(OR)

4.c) Derive the transient response for RC series circuit with AC excitation. (14M)

UNIT-V

5.a) The transform voltage V(s) of a network is given by V(s) =s/(s+2)(s2+2s+2) plot its pole-zero diagram and hence obtain v(t). (7M)

5.b) Differentiate between Foster and Cauer forms and also write down the steps to obtain Foster-I and Foster-II forms. (7M)

(OR)

5.c) How the function can be identified as a positive real function? Explain with a suitable example. (7M)

5.d) Determine the Foster Forms of realization of the RC impedance function. (7M)

$$Z(s)= \frac{2(s+2)(s+4)}{(s+1)(s+3)}$$

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BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

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

METALLURGY & MATERIALS SCIENCE (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 process of crystallization in metals.	(7M)
1.b)	What are the differences between slip and twinning.	(7M)

(OR)

1.c)	Explain the different types of solid solutions.	(7M)
1.d)	Explain the elastic and plastic behaviour of a ductile material like mild steel.	(7M)

UNIT-II

2.a)	Draw and label the important areas in the phase diagram when two metals are completely miscible in liquid state and partly soluble in solid state. Explain two alloys.	(7M)
2.b)	Show how the room temperature structure would be of a 0.8% carbon iron alloy would be along with a neat sketch of the iron-iron carbide equilibrium diagram.	(7M)

(OR)

2.c)	What are the various copper alloys? Elaborate about bronzes.	(7M)
2.d)	How are aluminium alloys designated?	(7M)

UNIT-III

3.a)	Differentiate annealing and normalizing with neat diagram.	(7M)
3.b)	Explain the process of constructing TTT diagram with neat sketch.	(7M)

(OR)

3.c)	Differentiate between Hardening and Tempering.	(7M)
3.d)	Explain surface hardening process with neat sketch.	(7M)

UNIT-IV

4.a)	Discuss the significance of non-metallic materials in modern industries.	(7M)
4.b)	Discuss the differences between thermoplastic and thermosetting polymers.	(7M)

(OR)

4.c)	Describe the classification of ceramics and their basic properties.	(7M)
4.d)	Discuss in detail slip casting, extrusion and injection moulding.	(7M)

UNIT-V

5.a)	Summarize the classification, processing methods, and applications of PMCs, MMCs, and CMCs in a comparative table.	(7M)
5.b)	Illustrate with diagrams and detailed explanations the morphology of reinforcements used in composites.	(7M)

(OR)

5.c)	Explain the processing techniques for ceramic matrix composites (CMCs).	(7M)
5.d)	Describe the various processing methods used for manufacturing metal matrix composites (MMCs).	(7M)

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Course Code: **20EC3T03**

BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)
II-B.Tech I-Semester Supplementary Examinations (BR20), NOV-2025
ANALOG COMMUNICATIONS (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 classification of systems based on linearity, time-invariance, and causality.	(7M)
1.b)	Explain the function of each block of communication system.	(7M)
	(OR)	
1.c)	Explain how an AM wave can be detected using square law detector.	(7M)
1.d)	A 400W carrier is modulated on a depth of 50%. Calculate the total power transmitted power and sideband power.	(7M)
	UNIT-II	
2.a)	What is DSB-SC modulator? Explain the ring modulator for generation of DSB-SC.	(7M)
2.b)	With neat sketch explain the principle of operation of Costa's loop.	(7M)
	(OR)	
2.c)	How is SSB signal generated by Frequency weavers method? Explain with neat sketch.	(7M)
2.d)	With neat sketch explain the Envelope detection of a VSB wave pulse carrier.	(7M)
	UNIT-III	
3.a)	Define angle modulation? Explain different types of angle modulations with mathematical expressions.	(7M)
3.b)	Explain in detail about NBFM and WBFM. Derive the expression for bandwidth of wideband FM	(7M)
	(OR)	
3.c)	Explain the generation of FM using Reactance modulator.	(7M)
3.d)	Discuss the process of Detection of FM Waves by Phase locked loop.	(7M)
	UNIT-IV	
4.a)	Explain the effect of Noise in SSB system	(7M)
4.b)	Explain in detail about the threshold effect in Angle Modulation System.	(7M)
	(OR)	
4.c)	With block diagram explain the generation of PWM signals.	(7M)
4.d)	Explain about demodulation of PWM signal.	(7M)
	UNIT-V	
5.a)	Illustrate the effect of feedback on performance of AM transmitter.	(7M)
5.b)	Discuss the frequency stability in FM transmitter.	(7M)
	(OR)	
5.c)	Draw the block diagram of a Super Heterodyne receiver, and explain the operation of each stage of the receiver.	(7M)
5.d)	List out the advantages and disadvantages of TRF receiver.	(7M)

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BONAM VENKATA CHALAMAYYA ENGINEERING COLLEGE::ODALAREVU
(AUTONOMOUS)

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

DIGITAL LOGIC DESIGN

(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)	Convert the decimal numbers 250.5, 12.0625, 673.23 to binary & base 8.	(7M)
1.b)	Explain any two non-weighted codes with example	(7M)
	(OR)	
1.c)	Subtract the following numbers using 9's complement. i) 5250 – 321 ii) 753 – 864 iii) 3570 – 2100 iv) 20 – 100	(7M)
1.d)	Convert the following: i) $(163.789)_{10} = (\ )_8$ ii) $(101101110001.00101)_2 = (\ )_8$ iii) $(292)_{16} = (\ )_2$	(7M)
	UNIT-II	
2.a)	Reduce the following boolean expression to 3 literals. [(C'D'+A')'] + A+CD+AB	(7M)
2.b)	Express the following function in sum of minterms and product of maxterms F(A,B,C,D) = B'D+ A'D+BD	(7M)
	(OR)	
2.c)	Obtain the simplified expression in SOP form of F(a,b,c,d,)= $\sum$(1,2,4,7,12,14,15) using K-maps.	(7M)
2.d)	Obtain the simplified expression in sum of products for the following Boolean function. a) F(A,B,C,D) = $\sum$(2,3,12,13,14,15). b) BDE+B'C'D+CDE+A'B'CE+A'B'C+B'C'D'E'	(7M)
	UNIT-III	
3.a)	Reduce the following four variable function to its minimum sum of products form. Y = A'B'CD' + ABCD' + AB'CD' + AB'C'D' + ABC'D' + A'B'CD +A'B'C'D'.	(7M)
3.b)	Simplify the following boolean function using four-variable K- map. F(w,x,y,z) = (1,3,7,11,15) + d(0,2,5)	(7M)
	(OR)	
3.c)	Reduce the following function using K-map technique. f(A,B,C,D) = (0,1,4,8,9,10)	(7M)
3.d)	Implement the following boolean function using AND, OR and inverter gates. F = xy+ x'y'+y'z	(7M)
	UNIT-IV	
4.a)	Design and explain about 4-bit priority encoder.	(7M)
4.b)	Implement full subtractor using demultiplexer.	(7M)
	(OR)	
4.c)	Design 4 line to 16 line decoder using 2 line to 4 line decoders.	(7M)
4.d)	Implement the following Boolean function using 8:1 MUX. F(P,Q,R,S) = (0,1,3,4,8,9,15)	(7M)

5.a)	Draw and explain the operation of negative edge triggered JK Flip-Flop.	(7M)
5.b)	Convert a T Flip-Flop to D Flip-Flop.	(7M)
	(OR)	
5.c)	Define a ripple counter. Design a BCD ripple counter.	(7M)
5.d)	Explain the working of 4-bit asynchronous counter.	(7M)

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