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QUESTION PAPER: (B.Tech/M.Tech/MBA)

Semester: 3rd

Class: SY- B.Tech

Year: FEB - 2025

Department: All Branch

1. Civil Engineering
2. Mechanical Engineering
3. Computer Science and Engineering
4. Electronics and Tel communication Engineering
5. Electrical Engineering
6. AIDS
7. Computer Science And Electronics Engineering

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DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular/Supplementary Winter Examination – 2024

Course: B.Tech **Branch : Civil Engineering** **Semester : III**

Subject Code & Name: (BTCVES302) Mechanics of Solids

Max Marks: 60 **Date:07/02/2025** **Duration: 3 Hr.**

Instructions to the Students:

1. *Each question carries 12 marks.*
2. *Question No. 1 will be compulsory and include objective-type questions.*
3. *Candidates are required to attempt any four questions from Question No. 2 to Question No. 6.*
4. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
5. *Use of non-programmable scientific calculators is allowed.*
6. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Objective type questions. (Compulsory Question)**		**12**
1	The ratio of stress to strain in the linear region of a material's stress-strain curve is: a. Shear modulus / b. Young's modulus / c. Poisson's ratio / d. Bulk modulus	**L1/CO1**	1
2	The unit of strain is: a. Pascal / b. Newton / c. Joule / d. Dimensionless	**L1/CO1**	1
3	Which of the following materials would most likely have a high Young's modulus? a. Rubber / b. Steel / c. Wood / d. Plastic	**L1/CO1**	1
4	Hooke's Law is valid only in the: a. Plastic region / b. Fracture region / c. Elastic region / d. Yield region	**L1/CO1**	1
5	A rod has a length of 2 meters and undergoes an elongation of 0.002 meters when subjected to a tensile load. What is the strain in the rod? a. 0.001 / b. 0.01 / c. 0.1 / d.1	**L2/CO1**	1
6	For a cantilever beam subjected to a point load at the free end, the bending moment at the fixed support is: a. Zero / b. Independent of the load / c. Equal to the shear force / d. Maximum	**L2/CO2**	1

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7	Which assumption is valid in the derivation of the torsion formula for circular shafts?				L2/CO4	1
	a. Shaft material is homogeneous and isotropic	b. Plane sections before torsion remain plane after torsion	c. Shear stress is directly proportional to the radius	d. All of the A, B, and C		
8	The power transmitted by a shaft is proportional to:				L2/CO4	1
	a. The applied torque only	b. The rotational speed only	c. The product of torque and rotational speed	d. The square of the rotational speed		
9	Rankine's formula is used for:				L2/CO3	1
	a. Short columns only	b. Long columns only	c. Both short and long columns	d. Columns with one end fixed		
10	Theories of failure are used to predict failure in materials under:				L2/CO4	1
	a. Simple loading conditions	b. Complex, multi-axial loading conditions	c. Static loads only	d. Dynamic loads only		
11	When a shaft is subjected to torsion, the angle of twist (θ) is:				L2/CO4	1
	a. Directly proportional to the length of the shaft	b. Inversely proportional to the polar moment of inertia	c. Inversely proportional to the modulus of rigidity	d. All of the A, B, and C		
12	The axial force in a beam is defined as:				L1/CO2	1
	a. The internal force perpendicular to the cross-section	b. The internal force parallel to the cross-section	c. The internal torque on the beam section	d. The sum of bending and shear stresses		

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DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular/Supplementary Winter Examination – 2024

Course: Second Year B. Tech (Sem-III) **Branch : Civil Engineering** **Semester :III**

Subject Code & Name: BTCVC304 **Hydraulics-I**

Max Marks: 60 **Date:** 12/02/2025 **Duration: 3 Hr.**

Instructions to the Students:

1. *Each question carries 12 marks.*
2. *Question No. 1 will be compulsory and include objective-type questions.*
3. *Candidates are required to attempt any four questions from Question No. 2 to Question No. 6.*
4. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
5. *Use of non-programmable scientific calculators is allowed.*
6. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Objective type questions. (Compulsory Question)**		**12**
1	Which property of a fluid is defined as mass per unit volume?	BL2/CO 2	1
	a) Specific gravity / b) Density / c) Specific weight / d) Compressibility		
2	The phenomenon of a liquid rising in a narrow tube due to surface tension is called	BL2/CO 2	1
	a) Capillarity / b) Adhesion / c) Cohesion / d) Buoyancy		
3	Which fluid property is responsible for spherical shape of droplets?	BL2/CO 2	1
	a) Viscosity / b) Compressibility / c) Surface tension / d) Density		
4	The buoyant force acts through which point on a submerged object?	BL2/CO 2	1
	a) Center of gravity / b) Center of buoyancy / c) Metacenter / d) Any point on the surface		
5	Which of the following is not a type of fluid flow?	BL2/CO 2	1
	a) Steady flow / b) Rotational flow / c) Linear flow / d) Laminar flow		
6	The continuity equation is derived from the law of	BL2/CO 2	1
	a) Conservation of energy / b) Conservation of mass / c) Conservation of momentum / d) Conservation of velocity		
7	In fully developed laminar flow in a pipe, the velocity profile is	BL2/CO 3	1
	a) Linear / b) Uniform / c) Parabolic / d) Exponential		
8	Which of the following is a method of dimensional analysis?	BL2/CO 2	1
	a) Rayleigh's method / b)Froude's method / c) Euler's method / d) Bernoulli's method		
9	The Bernoulli equation is applicable to	BL2/CO 3	1
	a) Compressible and viscous flow / b) Steady and inviscid flow / c) Steady and compressible flow / d) Viscous and turbulent flow		
10	The primary function of a Pitot tube is to measure	BL2/CO 2	1
	a) Pressure difference / b) Flow velocity / c) Fluid density / d) Fluid viscosity		
11	Which of these fluids is an example of a Newtonian fluid?	BL2/CO 2	1

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	a) Blood	b) Paint	c) Water	d) Toothpaste	
12	What is the unit of surface tension in the SI system?				BL2/CO2
	a) N/m²	b) N/m	c) Pa	d) kg/m	
Q. 2	**Solve the following.**				
A)	Define the term i) Surface tension ii) Viscosity iii) Density or mass density				BL2/CO 2
B)	Describe the capillarity phenomenon and derive the equation for the height of capillary rise.				BL2/CO2
Q.3	**Solve the following.**				
A)	The right limb of a simple U – tube manometer containing mercury is open to the atmosphere, while the left limb is connected to a pipe in which a fluid of sp.gr.0.9 is flowing. The centre of pipe is 12cm below the level of mercury in the right limb. Find the pressure of fluid in the pipe, if the difference of mercury level in the two limbs is 20 cm.				BL3/CO1
B)	Derive an expression for the force exerted on a submerged inclined plane in the liquid.				BL3/CO2
Q. 4	**Solve Any Two of the following.**				
A)	Derive Bernoulli's equation for the flow.				BL3/CO2
B)	What is a Venturimeter? Derive an expression for the discharge through Venturimeter.				BL3/CO1
C)	A horizontal venturimeter with inlet and throat diameters 30 cm and 15 cm respectively is used to measure the flow of water. The reading of differential manometer connected to the inlet and throat is 20 cm of mercury. Determine the rate of flow. Take Cd=0.98				BL4/CO3
Q.5	**Solve Any Two of the following.**				
A)	Derive the velocity profile for fully developed laminar flow between two stationary parallel plates.				BL2/CO3
B)	Find the head lost due to friction in a pipe of diameter 300 mm and length 50 m, through which water is flowing at a velocity of 3m/s using i) Darcy formula ii) Chezy's formula for which C = 60.				BL3/CO3
C)	Derive an expression for the loss of head due to sudden enlargement of pipe.				BL3/CO3
Q. 6	**Solve Any Two of the following.**				
A)	What are the methods of dimensional analysis? Explain in detail Rayleighs method.				BL2/CO3
B)	Explain with neat sketch concept of boundary layer.				BL3/CO4
C)	Explain the difference between distorted and undistorted models with examples.				BL4/CO4
	***** End *****				

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DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular/Supplementary Winter Examination – 2024

Course: B.Tech. **Branch: Civil Engineering** **Semester: III**

Subject Code & Name: BTCVC305 Surveying

Max Marks: 60 **Date: 21/02/2025** **Duration: 3 Hr.**

Instructions to the Students:

1. *Each question carries 12 marks.*
2. *Question No. 1 will be compulsory and include objective-type questions.*
3. *Candidates are required to attempt any four questions from Question No. 2 to Question No. 6.*
4. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
5. *Use of non-programmable scientific calculators is allowed.*
6. *Assume suitable data wherever necessary and mention it clearly.*

					(Level/CO)	Marks
Q. 1	Objective type questions. (Compulsory Question)					12
1	Which of the following is NOT a part of a chain surveying instrument?				L2, CO1	1
	a. Ranging rod	b. Prismatic compass	c. Chain	d. Peg		
2	Inaccurate ranging leads to:				L2, CO1	1
	a. Reduction in chaining time	b. Increase in chaining accuracy	c. Errors in measured distance	d. None of the above		
3	In compass surveying, the angle measured clockwise from the north is called:				L2, CO1	1
	a. Reduced bearing	b. Whole circle bearing	c. Magnetic declination	d. Azimuth		
4	The instrument used to sight objects in plane table surveying is:				L2, CO2	1
	a. Dumpy Level	b. Alidade	c. Theodolite	d. Cross Staff		
5	The primary objective of leveling is to determine:				L2, CO2	1
	a. Horizontal distances	b. Differences in elevation	c. Angular measurements	d. Contours of land		
6	Leveling is widely used in:				L2, CO2	1
	a. Highway construction	b. Earthwork calculation	c. Contour mapping	d. All of the above		
7	The least count of a Vernier theodolite is typically:				L2, CO3	1
	a. 20 seconds	b. 20 minutes	c. 20 degrees	d. 20 radians		
8	If the horizontal circle reading of the theodolite is 30° for one station and 90° for another, the angle between the two stations is:				L2, CO3	1
	a. 30°	b. 60°	c. 90°	d. 120°		
9	Which of the following is NOT a type of engineering survey?				L2, CO3	1
	a. Route survey	b. Hydrographic survey	c. Geological survey	d. Astronomical survey		
10	Aerial surveys are typically conducted using:				L2, CO3	1
	a. Drones, planes, and satellites	b. Theodolites and leveling instruments	c. Dumpy levels	d. Handheld compasses		
11	For construction of dams, which type of survey is most important?				L2, CO3	1
	a. Geological survey	b. Route survey	c. Astronomical survey	d. Astrologic survey		

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12	Which of the following is a key application of engineering surveys?				L2, CO3
	a. Land subdivision	b. Urban infrastructure planning	c. Irrigation system design	d. All of the above	
Q. 2	Solve the following.				
A)	Describe the equipment used in chain surveying.				L2, CO1
B)	Explain the procedure of chain surveying.				L2, CO1
Q.3	Solve the following.				
A)	What are the advantages and disadvantages of compass surveying?				L2, CO1
B)	What are the accessories used in plane table surveying, and their functions?				L2, CO2
Q. 4	Solve Any Two of the following.				
A)	Explain the temporary adjustments of a leveling instrument.				L2,CO2
B)	What is the difference between the height of instrument (HI) and rise and fall methods?				L4,CO2
C)	The following readings were taken during leveling using the Height of Instrument (HI) method. The instrument was shifted after the 3rd and 6th readings. The first reading was taken on a benchmark (BM) with an RL of 100.00 m. Calculate the Reduced Levels (RL) of all points and check for arithmetic correctness.				L3, CO2
	Stn	BS	IS	FS	
	1	1.500			
	2		1.200		
	3		0.800	0.500	
	4	1.400			
	5		1.000		
	6		0.600	0.800	
	7	1.600		0.500	
Q.5	Solve Any Two of the following.				
A)	A theodolite is used to measure the horizontal angle between two lines AB and BC. The observations are: Angle between AB and BC = 75° 30' 40", Bearing of line AB = 120° 45' 00" Calculate the bearing of line BC.				L3, CO3
B)	Write short notes on: Traversing by theodolite, Angle measurement.				L3, CO3
C)	What are the sources of errors in theodolite surveying? How can they be minimized?				L3, CO3
Q. 6	Solve Any Two of the following.				
A)	What is the importance of engineering surveys in construction projects?				L4, CO3
B)	How do engineering surveys contribute to urban planning?				L4, CO3
C)	Write a Note on Geodetic Surveying.				L3, CO3

*** End ***

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DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular/Supplementary Winter Examination – 2024

Course: B. Tech Branch : Mechanical Engineering /Mechanical Engineering (Sandwich) /Mechanical and Automation Semester : III

Subject Code & Name: BTMC303 Thermodynamics

Max Marks: 60 Date: 10/02/2025 Duration: 3 Hr.

Instructions to the Students:

1. *Each question carries 12 marks.*
2. *Question No. 1 will be compulsory and include objective-type questions.*
3. *Candidates are required to attempt any four questions from Question No. 2 to Question No. 6.*
4. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
5. *Use of non-programmable scientific calculators is allowed.*
6. *Assume suitable data wherever necessary and mention it clearly.*

					(Level/CO)	Marks
Q. 1	Objective type questions. (Compulsory Question)					12
1	A system in which energy can crosses the boundary of the system but the mass cannot is known as				1/CO- 1	1
	a. open system	b. Closed system	c. Isolated System	d. None of These		
2	Which of the following is an intensive property of a thermodynamic system?				2/CO- 1	1
	a. mass	1/CO- 1	c. enthalpy	d. density		
3	When two bodies are in thermal equilibrium with a third body, they are also in thermal equilibrium with each other. This statement is called _____ of thermodynamics				2/CO- 1	1
	a. Zeroth Law	b. First law	c. second law	d. third law		
4	First law of thermodynamics deals with _____				2/CO- 2	1
	a.Conservation of mass	1/CO- 1	c.Conservation of energy	d.Conservation of pressure		
5	An increase in enthalpy leads to an increase in _____				1/CO- 2	1
	a. Increase in pressure	b. Increase in internal energy	c. Increase in volume	d. Increase in mass		
6	SI unit of enthalpy is_____				2/CO- 3	1
	a. Joule/kg	1/CO- 1	c. Joule/K	d. K/kg		
7	In Carnot cycle the heat receive at.... Temperature.				2/CO- 3	1
	a. Lower	1/CO- 1	c. constant	d. None of the above		

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8	Gases of the same volume contain the same number of molecules. This is the description of				2/CO-4	1
	a. Boyle's law	b. Dalton's law	c. Charles' law	d. Avogadro's law		
9	The throttling process is _____ process.				2/CO-3	1
	a. reversible	b. irreversible	c. reversible or irreversible	d. None of these		
10	Which of the following is not true about ideal gas molecules?				3/CO-4	1
	a. They have negligible size	b. They do not have attractive forces	C .They do not apply pressure	d. They move in random motion		
11	The value of pressure of water at a critical point is in bar...				4/CO-5	1
	a. 223.5 bar	b. 212.25 bar	c. 235.5 bar	d. 221.2 bar		
12	With the decrease in pressure the latent heat of steam is....				2/CO-5	1
	a. Decreases	b. increases	c. Constant	d. Increases or decreases		
Q.2	Solve the following.					12
A)	Explain Intensive and Extensive properties with suitable examples.				2/CO-1	6
B)	Explain 'Thermodynamic equilibrium' of a system and state its significance.				2/CO-1	6
Q.3	Solve the following.					12
A)	Explain the first law of thermodynamics for (i) closed system undergoing a cycle (ii) closed system a change of state.				2/CO-2	6
B)	A gas undergoes a thermodynamic cycle consisting of the following processes: (i) Process 1-2: Constant pressure p = 1.4 bar, V_1 = 0.028 m^3, W_{1-2} = 10.5 KJ. (ii) Process 2-3: Compression with pV= constant, $U_3 = U_2$ (iii) Process 3-1: Constant volume U_1-U_3 == -26.4KJ. There are no significant changes in KE and PE. (a) Sketch the cycle on p-V diagram. (b) Calculate the net work for the cycle in KJ. (c) Calculate the net heat transfer for the process 1-2 (d) Show that $\sum_{cycle} Q = \sum_{cycle} W$				3/CO-2	6
Q. 4	Solve Any Two of the following.					12
A)	Define the term COP as applied to a refrigerator and heat pump. Show: $COP_{HP} = COP_{REF} + 1$				4/CO-3	6

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B)	A cyclic heat engine operates between a source temperature of 1000°C and sink temp of 40°C. Find the least rate of heat rejection per KW net output of the engine?	4/CO-3	6
C)	Show that Entropy changes in reversible process is Zero	4/CO-3	6
Q.5	Solve Any Two of the following.		12
A)	State 'Avagadro's Hypothesis' and from it determine the value of Universal gas constant.	1/CO-4	6
B)	Define specific heats. Derive relationship between C_p and C_v.	2/CO-4	6
	Derive expression for work done during polytropic process for a non-flow system	4/CO-4	6
Q. 6	Solve Any Two of the following.		12
A)	What is pure substance? Give suitable example. What is saturation pressure and saturation temperature? Explain it on T-S diagram.	2/CO-5	6
B)	A vessel having a capacity of 0.04 m^3 contains a mixture of saturated water and saturated steam at a temperature of 250° C. The mass of steam present is 9 kg. Find the following i. The Pressure ii. The mass iii. The specific enthalpy iv. the specific volume v. the specific entropy vi. The specific internal volume	4/CO-5	6
	Draw a P-T (Pressure-Temperature) diagram of Pure substance (Water) and explain sublimation curve and Fusion curve	4/CO-5	6
	*** End ***		

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DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular/Supplementary Winter Examination – 2024

Course: B. Tech. Branch : Mechanical Engineering/Mechanical Engineering(Sandwich)/Mechanical and Automation

Subject Code & Name: Fluid Mechanics (BTMC302) Semester :III

Max Marks: 60 Date:07/02/2024 Duration: 3 Hr.

Instructions to the Students:

1. *Each question carries 12 marks.*
2. *Question No. 1 will be compulsory and include objective-type questions.*
3. *Candidates are required to attempt any four questions from Question No. 2 to Question No. 6.*
4. *The level of question/expected answer as per QBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
5. *Use of non-programmable scientific calculators is allowed.*
6. *Assume suitable data wherever necessary and mention it clearly.*

					(Level/CO)	Marks
Q. 1	**Objective type questions. (Compulsory Question)**					**12**
1	The resultant of hydrostatic force acts through a point known as				Understanding/1	1
	a. Centre of buoyancy	b. Centre of gravity	c. Centre of Pressure	d. None of the above		
2	For a floating body, if metacenter is above the centre of gravity, the equilibrium is called				Understanding/1	1
	a. Stable	b. Neutral	c. Unstable	d. None of the above		
3	Surface tension is caused by				Understanding/1	1
	a. Viscosity	b. Gravitational forces	c. Cohesion between fluid molecules	d. Temperature gradients		
4	Velocity components in 'x' and 'y' direction in terms of velocity potential (ϕ) are				Understanding/2	1
	a. $u=-\frac{\partial\phi}{\partial x}, v=\frac{\partial\phi}{\partial y}$	b. $u=-\frac{\partial\phi}{\partial y}, v=-\frac{\partial\phi}{\partial x}$	c. $u=\frac{\partial\phi}{\partial y}, v=\frac{\partial\phi}{\partial x}$	d. $u=-\frac{\partial\phi}{\partial x}, v=-\frac{\partial\phi}{\partial y}$		
5	In the Lagrangian method, fluid motion is studied by,				Understanding/2	1
	a. Observing fixed points in space	b. Tracking individual fluid particles	c. Measuring fluid velocity at specific locations	d. Analyzing streamlines		
6	Moody's diagram is used to determine				Understanding/3	1
	a. Velocity of fluid in a pipe	b. Friction factor for flow in a pipe	c. Reynolds number of the flow	d. Pressure drop across a valve		
7	The velocity distribution across a section of two fixed parallel				Understanding/3	1

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	plates(Separated by distance 'B')having viscous flow is				
	a. $u=\frac{1}{2\mu}\left(-\frac{\partial p}{\partial x}\right)\times (B^2-y^2)$	b. $u=\frac{1}{2\mu}\left(\frac{\partial p}{\partial x}\right)\times (y-By)$	c. $u=-\frac{1}{2\mu}\left(\frac{\partial p}{\partial x}\right)\times (By-y^2)$	d. $u=-\frac{1}{2\mu}\left(\frac{\partial p}{\partial x}\right)\times (B-y^2)$	
8	For laminar flow between two fixed parallel plates, the relation between the maximum velocity (V_{max}) and average velocity (V_{avg})is				Understanding/3
	a. $v_{max}=\frac{1}{2}v_{avg}$	b. $v_{max}=\frac{3}{2}v_{avg}$	c. $v_{max}=2v_{avg}$	d. $v_{max}=2.5v_{avg}$	
9	Boundary layer separation takes place if,				Understanding/3
	a. Pressure gradient is positive	b. Pressure gradient is negative	c. Pressure gradient is zero	d. None of the above	
10	Drag is defined as the force exerted by flowing fluid on a solid body				Understanding/3
	a. perpendicular to the direction of flow	b. in the direction of flow	c. at an angle 45^0 with the direction of flow	d. None of the above	
11	If in physical phenomenon is defined by 'a' six variables and three fundamental dimensions, how many (π) terms exist as per Buckingham-π theorem.				Understanding/3
	a. 4	b. 6	c. 3	d. 2	
12	The ratio of viscous force to the inertia force is known as,				Understanding/3
	a. Euler Number	b. Froude Number	c. Mach Number	d. Reynold Number	
Q. 2	**Solve the following.**				
A)	Define the following terms Viscosity, hydrostatic law, centre of buoyancy, total pressure				Understanding/1
B)	Calculate the capillary rise and depression 'h' if a glass tube 0.3 mm in diameter is immersed in water and mercury container at 20°C respectively. At a temperature 20°C, the surface tension of water and mercury in contact with water is 0.07 N/m and 0.37 N/m respectively. Take angle of contact θ = 0° for water and 125° for mercury.				Apply/5

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Q.3	**Solve the following.**		**12**
A)	Explain in detail any two of the following Steady and Unsteady flow, compressible and incompressible flow, stream function and flow net.	Understanding/2	6
B)	Write a short note on a pitot tube and derive the equation for a velocity measurement by using a pitot tube.	Apply/4	6
Q. 4	**Solve Any Two of the following.**		**12**
A)	Explain in detail the major and minor losses in the case of flow through pipes.	Understanding/3	6
B)	For Laminar flow of an oil having dynamic viscosity μ = 1.766 Pa.s in a 0.3 m diameter pipe, the velocity distribution is parabolic with a maximum point velocity of 3 m/s at the centre of the pipe. Calculate the shearing stresses at the pipe wall.	Apply/5	6
C)	Obtain the condition for maximum efficiency in transmission of power through a pipeline?	Apply/4	6
Q.5	**Solve Any Two of the following.**		**12**
A)	Explain the following terms Lift, Drag, Boundary layer thickness, Magnus effect	Understanding/3	6
B)	Discuss the various methods of controlling the boundary layer.	Understanding/3	6
C)	Explain the cases of drag force on a flat plate held parallel and perpendicular to the flow.	Understanding/3	6
Q. 6	**Solve Any Two of the following.**		**12**
A)	List the different dimensionless numbers and define any one dimensionless number and derive it.	Understanding/3	6
B)	Write the steps in the Buckingham-π theorem method of dimension analysis.	Understanding/3	6
C)	A horizontal venturimeter with inlet and throat diameters 25 cm and 15 cm respectively is used to measure the flow of the oil having specific gravity 0.9. The reading of differential manometer connected to the inlet	Apply/5	6

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	and the throat is 25 cm of mercury. Determine the rate of flow of oil .Take Cd=0.97.	
	*** End ***	

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DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Supplementary Winter Examination – 2024

Course: BTech | Branch : Mechanical Engineering | Semester :III

Subject Code & Name: Fluid Mechanics BTMEC303_Y19

Max Marks: 60 | Date:10/02/2025 | Duration: 3 Hr.

Instructions to the Students:

1. *Each question carries 12 marks.*
2. *Question No. 1 will be compulsory and include objective-type questions.*
3. *Candidates are required to attempt any four questions from Question No. 2 to Question No. 6.*
4. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
5. *Use of non-programmable scientific calculators is allowed.*
6. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Objective type questions. (Compulsory Question)**		12
1	The weight per unit volume of a liquid at a standard temperature and pressure is called...	Remembering CO1	1
	a. specific weight / b. mass density / c. specific gravity / d. none of these		
2	If the dynamic viscosity of a fluid is 0.5 poise and specific gravity is 0.5, then the kinematic viscosity of that fluid in stokes is...	Apply CO1	1
	a. 0.25 / b. 0.50 / c. 1.0 / d. none of the above		
3	The metacentric heights of two floating bodies A and B are 1 m and 1.5 m respectively. Select the correct statement.	Apply CO2	1
	a. The bodies A and B have equal stability / b. The body A is more stable than body B / c. The body B is more stable than body A / d. The bodies A and B are unstable		
4	If a body floating in a liquid returns back to its original position, when given a small angular displacement, the body is said to be in...	Remembering CO2	1
	a. neutral equilibrium / b. stable equilibrium / c. unstable equilibrium / d. none of these		
5	A flow in which the volume of a fluid and its density does not change during the flow is called _____ flow.	Remembering CO3	1
	a.incompressible / b.compressible / c. laminar / d. turbulent		
6	Equation of continuity is based on the principle of conservation of...	Understanding CO3	1
	a. mass / b. energy / c. momentum / d. none of the above		
7	The discharge through a V- notch varies as...	Remembering CO4	1
	a. $H^{1/2}$ / b. $H^{3/2}$ / c. $H^{5/2}$ / d. $H^{5/4}$		
8	The pressure of liquid at throat in a Venturimeter is _____ than that at inlet.	Understanding CO4	1
	a. Higher / b. Lower / c. Same / d. None of these		
9	The major loss of energy in long pipes is due to...	Remembering CO5	1
	a. sudden enlargement / b. sudden contraction / c. gradual contraction / d. friction		

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			or enlargement			
10	Which of the following statement is correct about the shear stress distribution in circular pipes with laminar flow?				Understanding CO5	1
	a. It is linear with maximum value at the center	b. It is parabolic with maximum value at the center	c. It is parabolic with zero value at the center	d. It is linear with zero value at the center		
11	The dimension of coefficient of viscosity is...				Understanding CO6	1
	a. $M^1L^{-2}T^{-1}$	b. $M^{-1}L^1T^{-1}$	c. $M^{-1}L^1T^1$	d. $M^{-1}L^{-1}T^1$		
12	A drag force is produced by the deviation or difference in .....between the fluid and the object.				Understanding CO7	1
	a. friction	b. gap	c. speed	d. velocity		
Q. 2	**Solve the following.**					12
A)	Describe the terms: 1) Density, 2) Viscosity, 3) Specific Gravity				Remembering CO1	6
B)	A 400 mm diameter shaft is rotating at 200 r.p.m. in a bearing of length 120 mm. If thickness of oil film is 1.5 mm and the dynamic viscosity of the oil is 0.7 N.s/m^2,determine: 1) Torque required to overcome friction in bearing; 2) Power utilized in overcoming viscous resistance.				Apply CO1	6
Q. 3	**Solve the following.**					12
A)	Distinguish between Steady and Unsteady flow.				Remembering CO2	6
B)	Define and explain following terms 1) Metacenter 2) Metacentric height.				Remembering CO2	6
Q. 4	**Solve Any Two of the following.**					12
A)	Difference between Venturimeter and Orifice meter.				Understanding CO4	6
B)	Derive Bernoulli's equation by using Euler's equation and mention the assumptions made.				Apply CO4	6
C)	A horizontal venturimeter with inlet diameter 200 mm and throat diameter 100 mm is used to measure the flow of oil of sp.gr 0.8. The discharge of oil through venturimeter is 60 liters/sec. Find reading of the oil – mercury differential manometer. The value of Cd as 0.98.				Apply CO4	6
Q. 5	**Solve Any Two of the following.**					12
A)	Write a short note on following terms: a) Major energy losses b) Minor energy losses.				Remembering CO5	6
B)	Prove that max velocity in a circular pipe for viscous flow is equal to two times the average velocity of the flow.				Apply CO5	6
C)	Three pipes of lengths 800 m, 500 m and 400 m and of diameters 500 mm, 400 mm and 300 mm respectively are connected in series. These pipes are to be replaced by a single pipe of length 1700 m. Find the diameter of the single pipe.				Apply CO5	6

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Q. 6	Solve Any Two of the following.		12
A)	What do you mean by dimensionless numbers? Name any four dimensionless numbers.	Remembering CO6	6
B)	Define the following terms: a) Boundary Layer b) Boundary layer thickness	Understanding CO7	6
C)	A flat plate 1.5 m x 1.5 m moves at 50 km/hour in stationary air of density 1.15 Kg/m^3. If the coefficient of drag and lift are 0.15 and 0.75 respectively, determine: a) The lift force b) The drag force c) Resultant force	Apply CO7	6
	*** End ***		

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DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Supplementary Winter Examination – 2024

Course: B.TECH. Branch : MECHANICAL ENGINEERING Semester : III

Subject Code & Name: BTMEC302_Y19 MATERIALS SCIENCE AND METALLURGY

Max Marks: 60 Date: 07/02/2025 Duration: 3 Hr.

Instructions to the Students:

1. *Each question carries 12 marks.*
2. *Question No. 1 will be compulsory and include objective-type questions.*
3. *Candidates are required to attempt any four questions from Question No. 2 to Question No. 6.*
4. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
5. *Use of non-programmable scientific calculators is allowed.*
6. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Objective type questions. (Compulsory Question)**		**12**
1	Line Defects are also known as ….		1
	a. Stacking Fault / b. Point Defect / c. Volume Defect. / d. Dislocations		
2	Rise in stress during plastic deformation is called ….		1
	a. Toughness / b. Hardness / c. work Hardening / d. Stress Relieving		
3	Hardness test may give the information about ….		1
	a. wear Resistance / b. Machinability / c. Effectiveness of the heat treatment / d. All of these		
4	The failure that happen due to cyclic loading is called….		1
	a. Creep Failure / b. Fatigue Failure / c. Shears Failure / d. Tensile Failure		
5	Phase diagram is obtained by		1
	a. Very Fast Cooling / b. Very Fast Heating / c. Very Slow Cooling / d. Initially Cooling and then Heating		
6	According to the Hume Ruther which factor does not govern solid solubility?		1
	a. Crystal Structure / b. Relative Size / c. Relative Density / d. Relative Valency		
7	Which of the following constituents of steels is softest and least strong……		1
	a. Austenite / b. Pearlite / c. Cementite / d. Ferrite		
8	Which type of test is mostly used for detecting surface defects in crane hooks		1
	a. Magnaflux / b. Ultrasonic / c. Radiography / d. None of these		

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9	Water proof Emery papers are used for				
	a. Dry Polishing	b. Wet Polishing	c. Fine Polishing	d. Electrolytic Polishing	
10	Powder Metallurgy is most suitable method for ---------- Hardened Materials.				
	a. Dispersion	b. Age	c. Strain	d. Precipitation	
11	Quenching is not required in ----------				
	a. Carburizing	b. Nitriding	c. Carbonitriding	d. Hardening	
12	Which one may be used as a material for Transducer in Ultrasonic Test?				
	a. Steel	b. Qurtz	c. Polymer	d. None of these	
Q. 2	**Solve the following.**				12
A)	Derive the Expressions for planar atomic on (100), (110) and (111) planes of both BCC and FCC crystal structures.				6
B)	Discuss Induction hardening process w.r.t. principle of working process details advantages and limitations.				6
Q. 3	**Solve the following.**				12
A)	Explain dispersion strengthening w.r.t. basic mechanisms, critical factors advantages and commercial examples.				6
B)	Explain the principle of working of optical metallurgical Microscope. Compare it with electron microscope.				6
Q. 4	**Solve Any Two of the following.**				12
A)	Describe the procedure of specimen preparation of microscopy.				6
B)	What is the importance of T-T-T diagrams? Explain the procedure to determine these diagrams with the help of schematic diagrams				6
C)	Explain the principle of magnetic particle testing (magna flux) and what are the methods of magnetization? state advantages and disadvantages of demagnetization				6
Q. 5	**Solve Any Two of the following.**				12
A)	Define heat treatment and give its objective. Give the names of two different heat treatment processes along with the major objective of each.				6
B)	Draw Fe-Fe3 equilibrium diagram and explain various phases and critical temperatures present in it.				6
C)	Discus Sulphur print test w.r.t. purposes, significance, procedure, and chemical reactions.				6

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Q. 6	**Solve Any Two of the following.**		12
A)	Describe ultrasonic inspection technique w.r.t principle of working types, and applications		6
B)	Discuss Vickers Hardness tests w.r.t. principle of working, indenter details, formula, advantages and limitations.		6
C)	Explain Slip Mechanism of Plastic Deformation w.r.t. conceptual meaning its occurrence due to the movement of edge and screw dislocations and comparison with twinning.		6
	***** End *****		

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SY-Mechanical

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular/Supplementary Winter Examination – 2024

Course: B.Tech. **Branch :** Mechanical Engineering/Mechanical Engineering (Sandwich)

Subject Code & Name: BTMES304; Materials Science and Metallurgy **Semester :** III

Max Marks: 60 **Date:** 12/02/2025 **Duration:** 3 Hr.

Instructions to the Students:

1. *Each question carries 12 marks.*
2. *Question No. 1 will be compulsory and include objective-type questions.*
3. *Candidates are required to attempt any four questions from Question No. 2 to Question No. 6.*
4. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
5. *Use of non-programmable scientific calculators is allowed.*
6. *Assume suitable data wherever necessary and mention it clearly.*

					(Level/CO)	Marks
Q. 1	**Objective type questions. (Compulsory Question)**					**12**
1	There are fourteen atoms in a unit cell of				CO1	1
	a. BCC	b. FCC	c. HCP	d. none of these		
2	The elastic stress strain behavior of rubber is				CO1	1
	a. Linear	b. Non-linear	c. Plastic	d. No fixed relationship		
3	Substitution of a foreign atom in the site of parent atom in the crystal is a				CO1	1
	a. Vacancy defect	b. Substitution impurity	c. Volume imperfection	d. Line imperfections		
4	Gibbs phase rule is ....., when no chemical reaction occurs				CO3	1
	a. $F - C + P = 2$	b. $F + C - P = 2$	c. $F + C + P = 2$	d. $F - C - P = 2$		
5	The percentage of carbon in cast iron varies from...				CO2	1
	a. 0.1 to 0.5	b. 0.5 to 1	c. 0.5 to 1	d. 2 to 4.5		
6	Steel containing 0.8 to 1.5% carbon, is known as...				CO2	1
	a. mild steel	b. dead mild steel	c. medium carbon steel	d. high carbon steel		
7	A given component cracked after heat treatment. What can be the possible reason?				CO4	1
	a. It was heated	b. It was not	c. It was	d. It was slowly		

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	for long time	properly cleaned before heating	suddenly cooled in brine	cooled in air		
8	The process of producing a component with tough and ductile core and a hard outer surface is known as...				CO4	
	a. Hardening	b. Case Hardening	c. Tempering	d. Annealing		
9	The study of metallographic includes.....				CO5	
	a. alloy constituents	b. failure analysis	c. metal structure	d. all of the above		
10	In order to observe the grain size of steel samples under microscope, the magnification should be the order of....				CO5	
	a. 2	b. 20	c. 1500	d. 100		
11	Dye penetrant method is generally used to locate...				CO6	
	a. core defects	b. surface defects	c. superficial defects	d. temporary defects		
12	During radiography test, which region absorbs less radiation and transmits more?				CO6	
	a. Low and high density regions absorb and transmit same amount of radiation	b. High density region	c. Low density region	d. None of the above		
Q. 2	**Solve the following.**					
A)	Explain stress strain curves for different materials with figures.				CO2	
B)	Explain Imperfections in crystals.				CO1	
Q.3	**Solve the following.**					
A)	Draw neat and complete Iron-iron carbide equilibrium diagram, showing phases, temperatures.				CO3	
B)	Describe classifications, and applications of different steels.				CO3	

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Q. 4	**Solve Any Two of the following.**		12
A)	Explain tensile testing method with stress-strain curve and necessary formulas.	CO2	6
B)	Describe the normalizing heat treatment process with neat figure.	CO4	6
C)	Describe the nitriding heat treatment process with neat figure.	CO4	6
Q. 5	**Solve Any Two of the following.**		12
A)	Explain in brief how to prepare specimen for metallography testing.	CO5	6
B)	Describe Spark test with figures.	CO5	6
C)	Draw CCT diagram for steel and write its importance.	CO3	6
Q. 6	**Solve Any Two of the following.**		12
A)	Differentiate between destructive testing and non-destructive testing.	CO6	6
B)	Explain ultrasonic inspection with neat figure.	CO6	6
C)	Explain any one Strengthening method for metals.	CO6	6
	*** End ***		

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SY-computer-6

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE
Regular/Supplementary Winter Examination – 2024

Course: B.Tech **Branch : AIDS & Allied/ Computer Science and Engg (AIDS)** **Semester :III**

Subject Code & Name: (BTAIC302) An Introduction to Artificial Intelligence

Max Marks: 60 **Date:07/02/2025** **Duration: 3 Hr.**

Instructions to the Students:

1. *Each question carries 12 marks.*
2. *Question No. 1 will be compulsory and include objective-type questions.*
3. *Candidates are required to attempt any four questions from Question No. 2 to Question No. 6.*
4. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in [ ] in front of the question.*
5. *Use of non-programmable scientific calculators is allowed.*
6. *Assume suitable data wherever necessary and mention it clearly.*

					Level/CO)	Marks
Q. 1	**Objective type questions. (Compulsory Question)**					**12**
1	Which of the following is NOT a characteristic of AI?				**L1/CO1**	**1**
	a) Learning from experience	b) Solving problems	c) Requiring constant human input	d) Making decisions		
2	Which AI stage focuses on task-specific intelligence?				**L2/CO1**	**1**
	a) Artificial General Intelligence	b) Artificial Narrow Intelligence	c) Artificial Super Intelligence	d) Artificial Specific Intelligence		
3	Who developed the Turing Test?				**L1/CO1**	**1**
	a) John McCarthy	b) Alan Turing	c) Marvin Minsky	d) Geoffrey Hinton		
4	Which component enables agents to interact with their environment?				**L2/CO1**	**1**
	a) Sensors	b) Actuators	c) Both a and b	d) Neither a nor b		
5	Which of the following search techniques is most likely to get stuck in a local maximum?				**L3/CO2**	**1**
	a. Best-First Search	b.Hill Climbing	c.Beam Search	d. Tabu Search		
6	In Best-First Search, the evaluation function f(n) typically combines which two components?				**L3/CO2**	**1**
	a.Depth and branching factor	b. Cost so far g(n) and heuristic estimate h(n)	c.Path cost and depth	d. Heuristic estimate h(n) and local maxima		
7	What does "Depth Bounded DFS" mean?				**L2/CO2**	**1**
	a) DFS with a restriction on the maximum depth it can explore	b) DFS that explores all depths	c) A variant of BFS with depth limitations	d) DFS that prioritizes lower costs		
8	In Genetic Algorithms, what does the term "mutation" mean?				**L2/CO3**	**1**
	a) Swapping two genes randomly	b) Changing the value of a gene	c) Removing solutions from the population	d) Creating an entirely new solution		
9	What is the key difference between A and Dijkstra's algorithm?				**L2/CO4**	**1**
	a) A* uses a heuristic to guide the search	b) Dijkstra's guarantees the shortest path while A* does not	c) Dijkstra's uses random exploration	d) A* works only on unweighted graphs		

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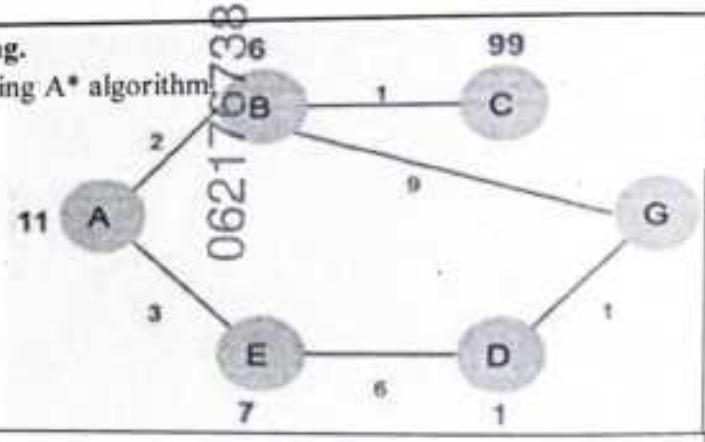
	In Ant Colony Optimization, how do artificial ants simulate the process of natural ants finding the shortest path?	L2/CO1
10	a) By generating random paths and selecting the shortest one / b) By depositing and following pheromones on paths / c) By using depth-first search to explore all possible paths / d) By employing genetic algorithms to evolve better solutions	
	Which strategy improves the backtracking algorithm by looking ahead?	L2/CO5
11	a) Forward Checking / b) Beam Search / c) Random Restart / d) Simulated Annealing	
	What is "constraint satisfaction" in the broader context of AI?	L2/CO5
12	a) Solving problems by systematically satisfying all constraints / b) Randomizing domain values / c) Optimizing heuristics without constraints / d) Generating all possible solutions without pruning	
Q. 2	**Solve the following.**	
A)	Explain PEAS representation with example.	L3/CO1
B)	Differentiate between BFS and DFS	L2/CO2
Q.3	**Solve the following.**	
A)	Draw suitable diagram and describe following issues of Hill Climbing Algorithm:- a) Local Maxima b) Plateaus	L2/CO2
B)	Explain Dijkstra Algorithm in detail	L2/CO3
Q. 4	**Solve Any Two of the following.**	
A)	Solve the following problem using A* algorithm. **Start Node : A** **Goal Node : G**  ***Note: The value mentioned above node is the heuristic value. The cost of the edge is given between the two nodes.***	L4/CO4
B)	Explain Recursive Best First Search.	L2/CO4
C)	Illustrate the concept of Ant Colony Optimization with neat explanation	L2/CO3
Q.5	**Solve Any Two of the following.**	
A)	Explain the concept of Branch and Bound Algorithm	L3/CO3
B)	Explain Beam Search	L2/CO3
C)	Explain genetic algorithm.	L2/CO4
Q. 6	**Solve Any Two of the following.**	
A)	What is Neural Network, Explain in Detail	L2/CO4
B)	Explain Constraint Satisfaction Problem with it's various components.	L2/CO5
C)	Define i) Lookahead strategies ii) Strategic retreat	L2/CO5

*** End ***

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DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular/Supplementary Winter Examination – 2024

Course: B. Tech **Branch : AIDS/AI(AI & DS)/CSE(AI&DS)** **Semester :III**

Subject Code & Name: BTAIC303 Data Structure and Algorithm using Python

Max Marks: 60 **Date: 10/02/2025** **Duration: 3 Hr.**

Instructions to the Students:

1. *Each question carries 12 marks.*
2. *Question No. 1 will be compulsory and include objective-type questions.*
3. *Candidates are required to attempt any four questions from Question No. 2 to Question No. 6.*
4. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
5. *Use of non-programmable scientific calculators is allowed.*
6. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Objective type questions. (Compulsory Question)**		**12**
1	How is a code block indicated in Python? a. Brackets | b. Indentation | c. Key | d. None	**(L1/CO1)**	1

2	What will be the output of the following code ?
	`a=3`
	`b=1`
	`print(a,b)`
	`a,b=b,a`
	`print(a,b)`
	a. 3 1 1 3 | b. 3 1 3 1 | c. 1 3 1 3 | d. 1 3 3 1
		(L3/CO1)	1

3	Which of the following blocks will always be executed whether an exception is encountered or not in a program? a. try | b. except | c. finally | d. catch	**(L2/CO2)**	1
4	What is fruitful function in Python a. function which will return value | b. function which will not return value | c. function which will send value | d.none	**(L4/CO2)**	1
5	What will be the Postfix expression for (a+b+c)*d a. ab+c+d* | b. ab+cd+* | c. abc++cd* | d. None	**(L5/CO3)**	1
6	Data Structure is Classified into : a. Linear | b. Non-Linear | c. Non-Primitive | d. All of these	**(L1/CO3)**	1

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7	What is a hash table?				(L1/CO4)	1
	a. A structure that maps values to keys	b. A structure that maps keys to values	c. A structure used for storage	d. A structure used to implement stack and queue		
8	Which of the following is not a collision resolution technique?				(L2/CO4)	1
	a. Separate chaining	b. Linear probing	c. Quadratic probing	d. Hashing		
9	For a binary search algorithm to work, it is necessary that the array (list) must be				(L2/CO5)	1
	a. Sorted	b. Unsorted	c. In heap	d. Popped out of stack		
10	Binary Search can be categorized into which of the following?				(L2/CO5)	1
	a. Brute Force technique	b. Divide-and-conquer	c. Greedy method	d. Dynamic programming		
11	Which sorting is also called divide and conquer sorting				(L2/CO5)	1
	a. Quick sort	b. Bubble sort	c. Merge sort	d. Both a & c		
12	What will be the output of the following code. dict1 = {'first' : 'sunday', 'second' : 'monday'} dict2={1:3, 2:4} dict1.update(dict2) print(dict1)				(L3/CO1)	1
	a. { 'first': 'sunday', 'second': 'monday', 1:3, 2:4}	b. {'first': 'sunday', 'second': 'monday'}	c. {1:3, 2: 4}	d. None of these		
Q. 2	**Solve the following.**					12
A)	Explain features of Python in detail.				(L1/CO1)	6
B)	Explain concept of stack with its operations.				(L2/CO3)	6
Q. 3	**Solve the following.**					12
B)	Define tree data structure. Explain different types of tree with examples				(L1/CO4)	6
	Write an algorithm for bubble sort? Sort following elements with bubble sir 45,67,23,13,20,10				(L2/CO5)	6
Q. 4	**Solve Any Two of the following.**					12
A)	Explain concept of Inheritance and its types in python with syntax.				(L2/CO2)	6

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B)	Construct a Binary search tree for following data and perform in order, preorder and postorder 20,3,13,16,30,56,10,24,56	(L3/CO4)	6
C)	Write a python program to search element using Binary search method	(L2/CO5)	6
Q.5	**Solve Any Two of the following.**		12
A)	Write an algorithm for quick sort and insertion sort method.	(L2/CO5)	6
B)	Write a python program to construct BST and perform Preorder tree traversal.	(L3/CO4)	6
C)	Explain following a. Abstraction b. encapsulation c. class	(L1/CO2)	6
Q.6	**Solve Any Two of the following.**		12
A)	Convert following infix expression to postfix : a. (x+y)^2 + (a+b)^2 b. (p + q – r) * (s + t)	(L3/CO3)	6
B)	Explain Linked list and its types with representation.	(L2/CO3)	6
C)	Write a python program to perform arithmetic operations using function.	(L2/CO2)	6
	*** End ***		

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DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular/Supplementary Winter Examination – 2024

Course: B.Tech Branch: AIDS Engg/Computer Science and Engg(AIDS) Semester: III

Subject Code & Name: Computer Architecture and Operation Systems (BTESC304_AIDS)

Max Marks: 60 Date: 12/02/2025 Duration: 3 Hr.

Instructions to the Students:

1. *Each question carries 12 marks.*
2. *Question No. 1 will be compulsory and include objective-type questions.*
3. *Candidates are required to attempt any four questions from Question No. 2 to Question No. 6.*
4. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in () in front of the question.*
5. *Use of non-programmable scientific calculators is allowed.*
6. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Objective type questions. (Compulsory Question)**		**12**
1	What is computer organization? a) Structure and behavior of a computer system as observed by the user. b) Structure of a computer system as observed by the developer. c) Structure and behavior of a computer system as observed by the developer. d) Structure of a computer system as observed by the developer.	L1/CO1	1
2	The bitwise complement of 0 is _____ a) 00000001 b) 10000000 c) 11111111 d) 11111110	L3/CO	1
3	Operation code field is present in: a) Programming language instruction b) Assembly language instruction c) Machine language instruction d) Low level language Instruction	L2/CO1	1
4	Arrange the following from fastest to slowest in speed. A. DRAM B. SRAM C. CPU Registers D. Magnetic tapes E. Hard disk Choose the correct answer from the options given below: a) A, B, C, D, E b) C, B, A, E, D c) C, D, B, A, E d) B, C, D, A, E	L3/CO	1
5	Which one of the following is the address generated by CPU? a) Physical address b) Absolute address c) Logical address d) None of the mentioned	L1/CO2	1
6	To convert linear addresses into physical addresses, the mechanism that	L2/CO52	1

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	the paging unit uses is :- a) Linear conversion mechanism b) One level table mechanism c) Physical conversion mechanism d) Two level table mechanism	
7	What does MAR stand for? a) Main Address Register b) Memory Access Register c) Main Accessible Register d) Memory Address Register	L1/CO3
8	In memory-mapped I/O _____ a) The I/O devices and the memory share the same address space b) The I/O devices have a separate address space c) The memory and I/O devices have an associated address space d) A part of the memory is specifically set aside for the I/O operation	L1/CO4
9	What is an operating system? a) Interface between the hardware and application programs b) Collection of programs that manages hardware resources c) System service provider to the application programs d) All of the mentioned	L1/CO4
10	The interval from the time of submission of a process to the time of completion is termed as _____ a) Waiting time b) Turnaround time c) Response time d) Throughput	L2/CO4
11	When several processes access the same data concurrently and the outcome of the execution depends on the particular order in which the access takes place is called _____ a) Dynamic condition b) Race condition c) Essential condition d) Critical condition	L2/CO4
12	A deadlock avoidance algorithm dynamically examines the _____ to ensure that a circular wait condition can never exist. a) Resource allocation state b) System storage state c) Operating system d) Resources	L2/CO4

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Q. 2	**Solve the following.**		**12**
A)	Difference between Computer Architecture and Computer Organization.	L4/CO1	6
B)	Explain RISC and CISC architecture with net diagram.	L2/CO1	6
Q.3	**Solve the following.**		**12**
A)	List and Explain RAID levels with diagram.	L1/CO2	6
B)	Describe Optimal page replacement algorithm and consider the page references 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 3 with 4-page frame. Find number of page fault using Optimal Page Replacement Algorithm.	L3/CO	6
Q. 4	**Solve Any Two of the following.**		**12**
A)	Describe Microprogrammed control unit with diagram.	L2/CO3	6
B)	Explain the interrupt process from Interrupt driven I/O.	L2/CO3	6
C)	Define micro-operations of control unit.	L2/CO3	6
Q.5	**Solve Any Two of the following.**		**12**
A)	Explain Objectives and Functions of Operating system.	L2/CO	6
B)	List the different types of operations that can be performed on a process.	L1/CO	6
C)	What are the average waiting and turnaround times for the round-robin scheduling algorithm (RR) with a time quantum of 2 units?	L3/CO	6

Process ID	Arrival Time	Brust Time
P1	0	5
P2	1	4
P3	2	2
P4	4	1

Q. 6	**Solve Any Two of the following.**		**12**
A)	Explain Critical section problem with its solution.	L2/CO	6
B)	Explain Thread in Operating Systems with its types.	L2/CO	6
C)	Define Deadlock? explain the four methods for handling deadlocks.	L2/CO	6

*** End ***

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DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular/Supplementary Winter Examination – 2024

Course: B.Tech **Branch :**Computer Engineering/Computer Science Engineering(AIDS) and Allied

Subject Code & Name: BTCOC304 & Computer Architecture & Organization Semester :III

Max Marks: 60 **Date:12/02/2025** **Duration: 3 Hr.**

Instructions to the Students:

1. *Each question carries 12 marks.*
2. *Question No. 1 will be compulsory and include objective-type questions.*
3. *Candidates are required to attempt any four questions from Question No. 2 to Question No. 6.*
4. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
5. *Use of non-programmable scientific calculators is allowed.*
6. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Objective type questions. (Compulsory Question)**		**12**
1	Which component acts as the "brain" of a computer and is responsible for executing instructions?	1	1
	a. Memory / b. CPU / c. ALU / d. Hard Disk		
2	The part of the CPU responsible for performing arithmetic and logical operations is	1	1
	a. Control Unit / b. Arithmetic Logic Unit (ALU) / c. Register / d. Cache Memory		
3	Which of the following is NOT a type of addressing mode?	2	1
	a. Immediate / b. Direct / c. Indirect / d. Inline		
4	The process of fetching, decoding, and executing an instruction is called	2	1
	a. Instruction Cycle / b. Machine Cycle / c. Fetch Cycle / d. Execute Cycle		
5	The binary equivalent of the decimal number 13 is:	2	1
	a. 1011 / b. 1101 / c. 0010 / d. 1111		
6	Which of the following is NOT a positional number system?	2	1
	a. Binary / b. Decimal / c. Roman / d. Octal		
7	In binary arithmetic, what is the 2's complement of 1010?		1

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	a. 0101	b. 0110	c. 1010	d. 0110		
8	n IEEE 754 single-precision format, how many bits are allocated for the exponent?				2	
	a. 8	b. 10	c. 23	d. 32		
9	The data transfer method where CPU is involved in the transfer is called:				3	
	a. DMA	b. Programmed I/O	c. Interrupt-driven I/O	d. Cache I/O		
10	Which of the following is a secondary storage device?				3	
	a. Cache	b. SSD	c. DRAM	d. Registers		
11	Microprogramming is a technique used to design				4	
	a. Memory Hierarchy	b. Control Units	c. ALU	d. Registers		
12	The Control Unit generates which of the following signals?				5	
	a. Control Signals	b. Arithmetic Signals	c. Data Transfer Signals	d. Machine Language Signals		
Q. 2	**Solve the following.**					12
A)	Explain briefly main structural components of computer				1	6
B)	Define concept Computer organization and Computer Architecture, Structure and Function				1	6
Q.3	**Solve the following.**					12
A)	List Addressing modes with example				2	6
B)	Differentiate RISC Vs CISC Architecture				2	6
Q. 4	**Solve Any Two of the following.**					12
A)	Calculate 1's and 2's Complement of following a) 12 b) 18 c) 27 d)9				3	6
B)	Perform Multiplication Using Booths Algorithm i) 12 x 13 ii) -14 x 15				3	6
C)	Write Steps of Binary Division restoring algorithm with example				3	6
Q.5	**Solve Any Two of the following.**					12

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A)	Explain Cache Memory with Property "Locality of reference" and replacement algorithm.	4	6
B)	What is mapping function? explain Direct mapping method with neat diagram.	4	6
C)	Write Short Note on Magnetic Disk, Magnetic Tape and Optical Memory.	4	6
Q.6	**Solve Any Two of the following.**		12
A)	Explain Microprogrammed control Unit with neat diagram.	5	6
B)	Write a short note on I/O channels, Direct Memory Access (DMA) and I/O Module.	5	6
C)	List the phases of Microinstruction Execution.	5	6
	*** End ***		

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DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular/Supplementary Winter Examination – 2024

Course:B.Tech Branch: Computer Engg/Comp. Science &Engg(AI) & Allied Semester : 3rd

Subject Code: BTCOC305A Object Oriented Programming in C++

Max Marks: 60 Date:21/02/2025 Duration: 3 Hr.

Instructions to the Students:

1. *Each question carries 12 marks.*
2. *Question No. 1 will be compulsory and include objective-type questions.*
3. *Candidates are required to attempt any four questions from Question No. 2 to Question No. 6.*
4. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
5. *Use of non-programmable scientific calculators is allowed.*
6. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Objective type questions. (Compulsory Question)**		12
1	**Information hiding can be achieved through_____.** a) Encapsulation, Inheritance b) Overloading b) Encapsulation, Abstraction d) Encapsulation, Polymorphism	CO1	1
2	**Which of the following features of OOP is used to derive a class from another?** a) Encapsulation b) Inheritance c) Data hiding d) Polymorphism	CO1	1
3	**Which of the following may not be an integral part of an object?** a) State b) behavior c) Protected data members d) All of given	CO1	1
4	**What is a constructor?** a) A class automatically called whenever a new object of this class is created. b) A class automatically called whenever a new object of this class is destroyed. c) A function automatically called whenever a new object of this class is created. d) A function automatically called whenever a new object of this class is destroyed.	CO1	1
5	**Data items in a class must be private. Select correct option:** a) True b) False	CO2	1
6	**Suppose there is an object of type Person, which of the following can be considered as one of its attributes Select correct option:** a) Name b) Age c) Work d) Both Name and Age	CO2	1
7	**If MyClass has a destructor what is the destructor named?** a) MyClass b) ~MyClass c) My~Class d) MyClass~	CO2	1
8	**When class B is inherited from class A, what is the order in which the constructers of those classes are called** a) Class A first Class B next b) Class B first Class A next C) Class B's only as it is the child class d) Class A's only as it is the parent class	CO2	1
9	**Which of the following types of binding used in C++?** a) Static binding b) Dynamic binding c) Pointer binding d) Inheritance binding	CO3	1

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10	**What will be the output of the following C++ code?**
	`#include <iostream>`
	`using namespace std;`
	`int main()`
	`{`
	`char c = 74;`
	`cout << c;`
	`return 0;`
	`}`
	a) I b) J c) A d) N
		CO1

11	**Which of the following is used to create an output stream?** a) of stream b) if stream c) iostream d) fstream	CO4
12	**By default, what a program does when it detects an exception?** a) Continue running b) Results in the termination of the program c) Calls other functions of the program d) Removes the exception and tells the programmer about an exception	CO5
Q. 2	**Solve the following.**	
A)	**Define the following terms:** i) Object ii) Class iii) Abstraction iv) Constructor v) Inheritance VI) Encapsulation	CO1
B)	**Differentiate between:** i) POP and OOP ii) Class & Object	CO1
Q.3	**Solve the following.**	
A)	Elaborate any five special characteristics of a Constructor.	CO2
B)	Explain the five forms of inheritances with neat diagram.	CO2
Q. 4	**Solve Any Two of the following.**	
A)	What is polymorphism? Explain its types with neat diagram.	CO3
B)	Explain virtual function with suitable example.	CO3
C)	What is the difference between a friend function and a member function?	CO3
Q.5	**Solve Any Two of the following.**	
A)	Compare compile time polymorphism and run time polymorphism with suitable real time application.	CO4
B)	What is the application of this pointer? Explain with help of C++ program.	CO4
C)	Write a C++ program to declare class mobile having data members as price and model number. Accept and display this data for five objects.	CO4
Q. 6	**Solve Any Two of the following.**	
A)	What is an exception? How is an exception handle in C++ ? What are the advantages of using exceptions handling mechanism in a program?	CO5
B)	What are the components of STL. Explain In detail.	CO5
C)	Write the following any two short notes. (i) Iterators (ii) Container adaptors (iii) Vector	CO5
	***** End *****	

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SY- Computer

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular/Supplementary Winter Examination – 2024

Course:B.tech **Branch : AIDS/AI(AI & DS)/CSE(AIDS)** **Semester :III**

Subject Code & Name:BTESC305 Digital Logic & Signal Processing

Max Marks: 60 **Date:21/02/2025** **Duration: 3 Hr.**

Instructions to the Students:

1. *Each question carries 12 marks.*
2. *Question No. 1 will be compulsory and include objective-type questions.*
3. *Candidates are required to attempt any four questions from Question No. 2 to Question No. 7.*
4. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
5. *Use of non-programmable scientific calculators is allowed.*
6. *Assume suitable data wherever necessary and mention it clearly.*

					(Level/CO)	Marks
Q. 1	**Objective type questions. (Compulsory Question)**					**12**
1	The gate which is used to reverse the output obtained is				CO1	1
	a.NAND	b. NOR	c.NOT	d. XOR		
2	Which of the following expressions is in the sum-of-products form?				CO1	1
	a.(A+B)(C+D)	b. (A*B)(C*D)	c.A*B *(CD)	d. A*B + C*D		
3	How is discrete time convolution represented?				CO1	1
	a.x[n] + h[n]	b. x[n] – h[n]	c.x[n] * h[n]	d.x[n-1] + h[n]		
4	If x (-t) = -x (t) then the signal is said to be				CO1	1
	a.Even signal	b. Odd signal	c. Periodic signal	d.Non periodic signal		
5	What is the value of d[0], such that d[n] is the unit impulse function?				CO1	1
	a.0	b. 1	c. 0.5	d. 1.5		
6	The decimal equivalent of the binary number (1011.011)2 is				CO1	1
	a.(11.375)10	b.(10.123)10	c. (11.175)10	d. (9.23)10		
7	The representation of octal number (532.2)8 in decimal is				CO1	1
	a.(346.25)10	b. (532.864)10	c. (340.67)10	d. (531.668)10		
8	What is the circular convolution of the sequences X1(n)={2,1,2,1} and x2(n)={1,2,3,4}?				CO1	1
	a.14,14,16,16	b. 16,16,14,14	c. 2,3,6,4	d.14,16,14,16		
9	Energy spectral density defines				CO1	1
	a.Signal energy per unit area	b.Signal energy per unit bandwidth	c.Signal power per unit area	d. Signal power per unit bandwidth		
10	Autocorrelation is a function which matches				CO1	1
	a.Two same signals	b. Two different signal	c. One signal with its delayed version	d. None of the mentioned		
11	2's complement of 11001011 is				CO1	1
	a.01010111	b. 11010100	c. 00110101	d. 11100010		

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12	What is the z-transform of the following finite duration signal? x(n)={2,4,5,7,0,1}? ↑ a. $2 + 4z + 5z^2 + 7z^3 + z^4$ b. $2 + 4z + 5z^2 + 7z^3 + z^5$ c. $2 + 4z^{-1} + 5z^{-2} + 7z^{-3} + z^{-5}$ d. $2z^2 + 4z + 5 + 7z^{-1} + z^{-3}$	CO1
Q. 2	**Solve the following.**	
A)	What are the difference between basic gate and universal gate? Implement the basic gate by using universal gate.	CO2
B)	Convert the following Decimal: 33 Binary: 1110101 Hex: AF	CO2
Q.3	**Solve the following.**	
A)	Explain the following terms of operation on signals 1) Time Scaling 3)Time Reversal 2) Time Shifting	CO2
B)	Check the signal is time variant or time invariant 1) y(t)=x(-t) 2)y(t)=t.x(t)	CO2
Q. 4	**Solve Any Two of the following.**	
A)	Perform linear convolution using graphical method x(n)={1,0,-1,3} and h(n)={1,2,3,2} where x(0)=-1 and h(0)=1	CO3
B)	Find 4 point DFT of x(n)={1,2,3,4}	CO3
C)	What is the difference between DFT & FFT? Explain the properties of DFT	CO3
Q.5	**Solve Any Two of the following.**	
A)	What is ROC? Explain its properties	CO4
B)	Find Z transform of the following and indicate the ROC 1) x(n)={ 1,2,3,4} 3) $X(n)=0.5^n u(n-1)$ 2) X(n)= u(n)	CO4
C)	Find inverse Z transform $X(Z)= Z/(3Z^2 -4Z+1)$	CO4
Q. 6	**Solve Any Two of the following.**	
A)	What is correlation? Explain the properties of cross correlation with example.	CO5
B)	What is ESD? Explain the properties of ESD with example	CO5
C)	Find the auto correlation of x(n)={1,2,2,1}	CO5
	***** End *****	

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SY-Electronics-A

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular/Supplementary Winter Examination – 2024

Course: B. Tech **Branch: Common to all branches** **Semester: III**

Subject Code & Name: (BTBS301) Engineering Mathematics - III (BTBS301/BTES301/BTLOG301)

Max Marks: 60 **Date: 05/02/2025** **Duration: 3 Hr.**

Instructions to the Students:

1. *Each question carries 12 marks.*
2. *Question No. 1 will be compulsory and include objective-type questions.*
3. *Candidates are required to attempt any four questions from Question No. 2 to Question No. 6.*
4. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
5. *Use of non-programmable scientific calculators is allowed.*
6. *Assume suitable data wherever necessary and mention it clearly.*

					(Level/CO)	Marks
Q.1	**Objective type questions. (Compulsory Question)**					**12**
1	If $L[f(t)] = \frac{e^{-as}}{s^3}$ then $L[f(3t)]$ is equal to				**Understand CO1**	1
	a. $\frac{e^{-s}}{\left(\frac{s}{a}\right)^3}$	b. $\frac{e^{-s}}{\left(\frac{s}{3}\right)^3}$	c. $\frac{27e^{-as}}{s^3}$	d. None		
2	Laplace transform of the function $f(t) = e^{-3t}\cos 4t$ is,				**Understand CO1**	1
	a. $\frac{s+3}{s^2+16}$	b. $\frac{s+3}{s^2+3}$	c. $\frac{s+3}{s^2+6s+25}$	d. None		
3	Laplace transform of the function $f(t) = t\sinh at$ is,				**Understand CO1**	1
	a. $\frac{2as}{(s^2-a^2)^2}$	b. $\frac{2s}{(s^2-a^2)^2}$	c. $\frac{2as}{s^2-a^2}$	d. None		
4	Inverse Laplace transform of the function $f(t) = \frac{15}{s^2+4s+13}$ is,				**Understand CO2**	1
	a. $e^{-2t}\sin 3t$	b. $5e^{-2t}\sin 3t$	c. $e^{-t}\sin 3t$	d. None		
5	Inverse Laplace transform of the function $f(t) = \frac{1}{\sqrt{s+4}}$ is				**Understand CO2**	1
	a. $e^{-4t}\frac{1}{\sqrt{\pi t}}$	b. $e^{-t}\frac{1}{\sqrt{\pi t}}$	c. $e^{-4t}\frac{1}{\sqrt{t}}$	d. None		
6	The inverse Laplace transform of the function $f(t) = \frac{1}{s^2+9}$ is				**Understand CO2**	1
	a. $\frac{1}{9}\sin 3t$	b. $\frac{1}{3}\sin 3t$	c. $\sin 3t$	d. None		
7	The Fourier cosine transform of e^{-x} is				**Understand CO3**	1
	a. $\frac{1}{s^2+1}$	b. $\frac{1}{s^2+1}$	c. $\frac{s}{s^2-1}$	d. None		
8	The Fourier sine transform of e^{-ax} is				**Understand CO3**	1
	a. $\frac{a}{a^2+s^2}$	b. $\frac{a}{a^2-s^2}$	c. $\frac{s}{a^2+s^2}$	d. None		
9	The partial differential equation obtained by eliminating a & b from $z = ax + by + ab$ is				**Understand CO4**	1
	a. $z = xp + yq - pq$	b. $z = xp + yq + pq$	c. $z = xp - yq - pq$	d. None		
10	The Lagrange's linear partial differential equation is of the form				**Understand C04**	1
	a. $Pp - Qq = R$	b. $Pp + Qq = 0$	c. $Pp + Qq = R$	d. None		

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11	If $f(Z) = u + iv$ in Polar form is analytic then $\frac{\partial u}{\partial r}$ is equal to				Understand CO1
	a. $\frac{\partial v}{\partial \theta}$	b. $r\frac{\partial v}{\partial \theta}$	c. $\frac{1}{r}\frac{\partial v}{\partial \theta}$	d. None	
12	If $f(z)$ is an analytic function with constant modulus, then $f(z)$ is a				Understand CO1
	a. constant function	b. harmonic function	c. Orthogonal	d. None	
Q. 2	**Solve the following.**				
A)	Find the Laplace Transform of $F(t) = \frac{e^t - \cos t}{t}$				Apply/CO1
B)	Find the Laplace transform of $\int_0^t t e^{-t} \sin 4t \, dt$				Apply/CO1
Q.3	**Solve the following.**				
A)	Using Partial Fraction method, find the inverse Laplace Transforms $\frac{5s+3}{(s-1)(s^2+2s+5)}$				Apply/CO2
B)	Solve $\frac{dy}{dt} + 2y = e^{-3t}, y(0) = 1$				Apply/CO2
Q. 4	**Solve any TWO of the following.**				
A)	Find the Fourier transform of $f(x) = \begin{cases} 1, & \text{for } \lvert x \rvert < 1 \\ 0, & \text{for } \lvert x \rvert > 1 \end{cases}$. Hence evaluate that $\int_0^\infty \frac{\sin x}{x} dx$.				Apply/CO3
B)	Find the Fourier cosine transform of $f(x) = \frac{1}{1+x^2}$. Hence derive the Fourier sine transform of $\phi(x) = \frac{x}{1+x^2}$.				Apply/CO3
C)	Using Parseval's identity, show that $\int_0^\infty \frac{t^2}{(4+t^2)(9+t^2)} dt = \frac{\pi}{10}$.				Apply/CO3
Q.5	**Solve any TWO of the following.**				
A)	Partial differential equation by eliminating the arbitrary function $z = x + y + f(xy)$				Understand CO4
B)	Solve $p(\tan x) + q(\tan y) = \tan z$				Apply /CO4
C)	Use the method of separation of variables to solve the equation $\frac{\partial^2 u}{\partial x^2} - 2\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} = 0$.				Apply /CO4
Q. 6	**Solve any TWO of the following.**				
A)	Find the analytic function whose imaginary part is $\frac{1}{2}\log(x^2 + y^2)$				Apply/CO5
B)	Show that function $v = \sinh x \cos y$ is harmonic function. Also find its harmonic conjugate function.				Remember CO5
C)	Apply Cauchy's integral Formula to evaluate $\oint_c \frac{\sin^2 z}{(z-\frac{\pi}{6})^3} dz$ where $C: \lvert z \rvert = 1$				Apply/CO5
	******End******				

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DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular/Supplementary Winter Examination – 2024

Course: B. Tech. Branch : Electronics/ Electronics and Telecommunication/ Electronics and Communication Engineering **Semester : III**

Subject Code & Name: BTETC302/ BTEXC302 & Electronic Devices and Circuits

Max. Marks: 60 **Date: 07/02/2025** **Duration: 3 Hr.**

Instructions to the Students:

1. *Each question carries 12 marks.*
2. *Question No. 1 will be compulsory and include objective-type questions.*
3. *Candidates are required to attempt any four questions from Question No. 2 to Question No. 6.*
4. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
5. *Use of non-programmable scientific calculators is allowed.*
6. *Assume suitable data wherever necessary and mention it clearly.*

					(Level/CO)	Marks
Q.1	**Objective type questions. (Compulsory Question)**					**12**
1	Which region of the transistor is highly doped?				CO1	1
	a. Emitter	b. Base	c. Collector	d. Both Emitter & Collector		
2	What is the use of coupling capacitors in CE amplifier?				CO2	1
	a. Block DC	b. Pass AC	c. Reduce distortion	d. Pass AC and Block DC		
3	What is the correct phase shift in CE amplifier?				CO1	1
	a. 45 Degrees	b. 60 Degrees	c. 120 Degrees	d. 180 Degrees		
4	What is the main advantage of FET which makes it more useful in industrial applications?				CO2	1
	a. Voltage controlled operation	b. Less cost	c. Small size	d. Semiconductor device		
5	N channel Depletion MOSFET is known as				CO1	1
	a. Normally ON then OFF	b. Normally OFF then ON	c. Normally ON	d. Normally OFF		
6	P channel Enhancement MOSFET is known as				CO2	1
	a. Normally ON then OFF	b. Normally OFF then ON	c. Normally ON	d. Normally OFF		
7	Power amplifier directly amplifies _____				CO1	1

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	a. Voltage of signal	b. Current of the signal	c. Power of the signal	d. All of the mentioned		
8	Where does the Q point lie for class B amplifier?				CO2	
	a. Active	b. Cut off	c. Saturation	d. Between saturation and active		
9	Bandwidth due to negative feedback amplifier				CO2	
	a. Increases	b. Decreases	c. Remains same	d. Partially changes		
10	Gain due to negative feedback amplifier				CO1	
	a. Increases	b. Decreases	c. Remains same	d. Partially changes		
11	According to Barkhausen criteria of oscillation total phase shift should be-----Degrees				CO1	
	a. 0 or 360	b. 180	c. 270	d. 90		
12	Which pin number is the input for 7905 IC				CO2	1
	a. 1	b. 2	c. 3	d. 4		
Q.2	**Solve the following.**					12
A)	Explain need of biasing and voltage divider biasing method				CO1	6
B)	Explain in detail effects of bypass and coupling capacitor				CO2	6
Q.3	**Solve the following.**					12
A)	Explain JFET and its characteristics, explain the FET as VVR.				CO2	6
B)	Explain in detail D MOSFET and E MOSFET				CO1	6
Q. 4	Solve Any Two of the following.					12
A)	Explain class A power amplifier and derive expression for efficiency				CO2	6
B)	Explain class B push pull power amplifier and derive expression for efficiency				CO1	6
C)	Explain crossover distortion and need of heat sink, its design				CO1	6
Q.5	Solve Any Two of the following.					12
A)	Derive expression for voltage gain with feedback for both positive as well as negative feedback amplifier				CO3	6
B)	Explain with block diagram types of feedback amplifier				CO1	6

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C)	Explain effect of negative feedback amplifier on input, output impedance, voltage gain, current gain, bandwidth, noise and distortion	CO2	6
Q. 6	Solve Any Two of the following.		12
A)	Explain Barkhausen criteria of oscillation and RC phase shift oscillator	CO1	6
B)	Explain and derive expression for oscillation frequency of Wien bridge oscillator	CO2	6
C)	Explain in detail transistorized series voltage regulator	CO2	6
	*** End ***		

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DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular and Supplementary Winter 2024

Course: B.TECH **Semester : III**

Branch : Electronics & Telecommunication Engineering /Electronics Engineering

Subject Code & Name: BTETC303/BTEXC303 - Digital Electronics

Max Marks: 60 **Date: 10/02/2025** **Duration: 3 Hr.**

Instructions to the Students:

1. *Each question carries 12 marks.*
2. *Question No. 1 will be compulsory and include objective-type questions.*
3. *Candidates are required to attempt any four questions from Question No. 2 to Question No. 6.*
4. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
5. *Use of non-programmable scientific calculators is allowed.*
6. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Objective type questions. (Compulsory Question)**		**12**
1	Which number system is used in digital electronics? Decimal / Binary / Octal / Hexadecimal	Apply	1
2	What is the decimal equivalent of the binary number 101? 5 / 7 / 4 / 3	Understand	1
3	Which numbering system uses digits and letters (A-F)? Decimal / Binary / Octal / Hexadecimal	Understand	1
4	Which gate is called a universal gate? AND / XOR / NAND / NOT	Analyze	1
5	How many bits are there in a nibble? 2 / 4 / 6 / 8	Understand	1
6	Which of the following is a combinational circuit? FLIPFLOP / Multiplexer / COUNTER / FSM	Analyze	1
7	Which circuit converts binary data to decimal? Encoder / Decoder / Multiplexer / Demultiplexer	Understand	1
8	What does a truth table represent? Circuit design / Logical operations / Voltage levels / Input-output relationship	Apply	1
9	In a JK flip-flop, what happens when both J and K inputs are HIGH?	Understand	1

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	Set	Reset	Toggle	No change	
10	What is the basic building block of a digital circuit?				Apply
	Logic Gate	Resistor	Resistor	Encoder	
11	How many select lines are needed for a 16-to-1 multiplexer?				
	3	4	5	6	
12	What is the minimum number of NAND gates required to implement an XOR gate?				Apply
	3	4	5	6	

Q. 3 Solve the following.

A) What is universal gates? Explain how NAND and NOR gates can be used to implement basic logic gates. — Analyze — 6

B) Prove the following identities using Boolean algebra: — Apply — 6

i) A(A+B)= A

ii) A+AB'+AB=A+ B

Q. 4 Solve the following.

A) Minimize the following Boolean function using K-map and draw the logic circuit: — Analyze

F(A,B,C,D)=A'B'C'D+AB'C'D'+ABC'D'+AB'CD+ABC'D

B) What is Full adder? Design Full adder using half adder. — Apply — 6

Q. 4 Solve Any Two of the following. — 12

A) What is a multiplexer? Explain the working of a 4-to-1 multiplexer. — Analyze — 6

B) Convert S-R flip-flop to J-K flip-flop. — Understand

C) Explain characteristics CMOS logical family. How CMOS can be realized as inverter? — Apply

Q.5 Solve Any Two of the following.

A) Design 3-bit Synchronous Down counter using D Flip Flop. — Understand — 6

B) Write a note on registers. Explain in brief the classification of registers with diagrams — Apply — 6

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C)	Implement a 2-bit magnitude comparator using basic gates. Provide the truth table and circuit diagram		Analyze	6

Q. 6 Solve Any Two of the following. **12**

A)	Draw and explain the block diagram of BCD to 7 segment display and write the truth table. Also derive the expression for any two outputs using k-map .	Analyze	6
B)	Construct a state table for a sequence detector that detects the binary sequence '101'.	Apply	6
C)	Define following terms for digital ICs. i) Speed of operation/ Propagation delay ii) Power of dissipation iii) Figure of merit iv) Fan in v) Fan out vi) Noise immunity	Understand	6

*** End ***

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9DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular and Supplementary Winter Examination – 2024

Course: B. Tech **Semester : III**

Branch : Electronics Engineering/ Electronics and Telecommunication Engineering

Subject Code & Name: Electronic Devices & Circuits/ BTEXC303_Y18

Max Marks: 60 **Date:** 10/02/2025 **Duration: 3 Hr**

Instructions to the Students:

1. Each question carries 12 marks.
2. Question No. 1 will be compulsory and include objective-type questions.
3. Candidates are required to attempt any four questions from Question No. 2 to Question No. 6.
4. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
5. Use of non-programmable scientific calculators is allowed.
6. Assume suitable data wherever necessary and mention it clearly.

		(Level/CO)	Marks
Q. 1	**Objective type questions. (Compulsory Question)**		**12**
1	What does JFET stand for? a) Junction Field-Effect Transistor. b) Junction Frequency-Effect Transistor. c) Junction Forward-Effect Transistor. d) Junction Feedback-Effect Transistor.	CO1	1
2	What is the pinch-off voltage in a JFET? a) The voltage at which the channel is fully closed and no current flows. b) The voltage at which the JFET starts conducting. c) The voltage at which the JFET breaks down. d) The voltage at which the JFET enters the saturation region.	CO1	1
3	What is the purpose of biasing in a JFET? a) To set the operating point in the desired region. b) To increase the gain of the JFET. c) To reduce the input impedance. d) To decrease the output impedance.	CO2	1
4	What is the primary function of the gate in a MOSFET? a) To control the flow of current between the source and drain. b) To provide power to the MOSFET. c) To act as a heat sink. d) To connect the MOSFET to the ground.	CO3	1

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5 What is the threshold voltage in an E-MOSFET? CO3
a) The minimum gate-to-source voltage required to form a conductive channel.
b) The maximum drain-to-source voltage.
c) The voltage at which the MOSFET breaks down.
d) The voltage at which the MOSFET enters the saturation region.

6 In which region does a MOSFET operate when used as a switch? CO3
a) Cut-off region.
b) Ohmic region.
c) Saturation region.
d) Breakdown region.

7 Which of the following amplifiers is designed to amplify weak signals with minimal addition of noise? CO4
a) Power Amplifiers
b) Low Noise Amplifiers
c) Voltage Amplifiers
d) Operational Amplifiers

8 What is the primary purpose of a power amplifier? CO4
a) To amplify weak signals
b) To drive loudspeakers or high-power loads
c) To filter noise
d) To provide high-frequency gain

9 Which of the following oscillators is most commonly used for audio frequency generation? CO4
a) Hartley Oscillator
b) Colpitts Oscillator
c) Wein Bridge Oscillator
d) Crystal Oscillator

10 The Barkhausen criterion is used in the analysis of which type of circuits? CO4
a) Amplifiers
b) Oscillators
c) Filters
d) Attenuators

11 What is the main feature of a monostable multivibrator? CO5
a) It has two stable states and produces a square wave.
b) It has one stable state and produces a single pulse when triggered.
c) It has no stable states.
d) It operates with a fixed frequency.

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12 A Switch Mode Power Supply (SMPS) is more efficient than a linear power supply because: CO5 1

a) It generates no heat.
b) It uses a low-frequency transformer.
c) It switches on and off, reducing power loss.
d) It operates without feedback.

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Q. 2 Solve the following. **12**

A) Determine I_{DQ}, V_{GSQ}, V_D, V_S, V_{DS} and V_{DG} for the network of figure 1. CO1 6

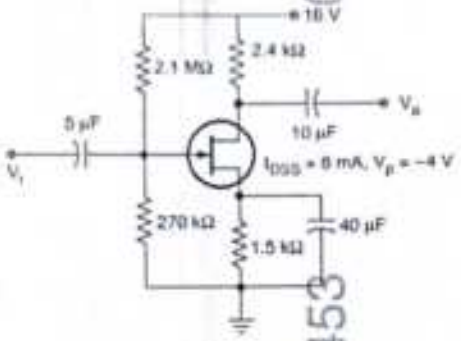

Figure 1

B) Compare BJT, FET and MOSFET with different parameters. CO1 6

Q.3 Solve the following. **12**

A) Explain the drain characteristics and transfer characteristics of N-channel depletion type MOSFET. CO1 6

B) Determine the d.c bias point for the EMOSFET circuit shown in figure 2. Assume k=0.4mA/V^2, V_T=3V. CO1/CO2 6

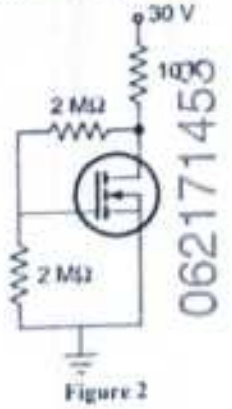

Figure 2

Q. 4 Solve Any Two of the following. **12**

A) With a neat circuit diagram explain the working of a MOSFET as a switch. CO3 6

12

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B)	Explain the classification of power amplifiers in detail.	CO3	6
C)	What is a feedback amplifier? Explain the types of feedback amplifiers.	CO3	6

Q.5 Solve Any Two of the following. 12

A)	With a neat circuit diagram derive the expression of frequency of oscillations for a Colpitts oscillator.	CO3/CO4	6
B)	State and explain Barkhausen criterion of Oscillations.	CO4	6
C)	Explain the concept of frequency stability of Oscillators.	CO4	6

Q. 6 Solve Any Two of the following. 12

A)	What is a multivibrator. Explain the operation of monostable multivbrator using IC555 timer.	CO4	6
B)	With a neat block diagram explain the IC555 timer.	CO5	6
C)	Draw the block diagram of SMPS and also describe its operation.	CO5	6

*** End ***

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DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular and Supplementary Winter Examination – 2024

B. Tech **Semester: III**

: Electronics and Telecommunication Engg. / Electronics and Communication Engineering

Code & Name: BTES304 Electrical Machines and Instruments

ırks: 60 **Date:12/02/2025** **Duration: 3 Hr.**

ions to the Students:

ıch uestion carries 12 marks.
uestion No. 1 is compulsory.
tempt any four questions from Question No. 2 to Question No. 6.
ıe level of question/expected answer as per OBE or the Course Outcome (CO) on which the question based is mentioned in ( ) in front of the question.
se of non-programmable scientific calculators is allowed.
ssume suitable data wherever necessary and mention it clearly.

	(Level/CO)	Marks
)bjective type questions. (Compulsory Question)		**12**
Vhich part of a DC machine is responsible for generating EMF? . Stator b. Rotor c. Commutator d. Armature	**Level 1**	1
n a DC generator, the role of the commutator is to: . Convert AC o DC b. Convert DC to AC c. Increase voltage d. Reduce losses	**Level 2**	1
f the speed of a DC generator is doubled, the generated EMF will: . Remain constant b. Double c. Reduce by half d. Increase four times	**Level 3**	1
Which DC motor has the best speed regulation? a. Series motor b. Shunt motor c. Compound motor d. None of the above	**Level 2**	1
If the load on a DC motor increases, the back EMF: a. Increases b. Decreases c. Remains constant d. Becomes zero	**Level 3**	1
A three-point starter is generally used for: a. DC series motor b. DC shunt motor c. DC compound motor d. All of the above	**Level 1**	1
Increasing the field resistance in a DC shunt motor results in: a. Increase in speed b. Decrease in speed c. No effect on speed d. Increase in current	**Level 3**	1
The slip of an induction motor at no load is approximately: a. 100% b. 0% c. 50% d. 2%	**Level 1**	1
The main working principle of a hysteresis motor is based on a. Induction heating b. Residual magnetism c. Variable reluctance d. Eddy currents	**Level 2**	1

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10 Hall Effect transducers are primarily used for measuring: Level 3
a. Temperature b. Pressure c. Magnetic field d. Displacement

11 The output of an LVDT is: Level 1
a. Digital b. AC voltage c. DC voltage d. Resistance change

12 Which of the following instruments is used for measuring rotational speed in RPM Level 1
a. Sound level meter b. Tachometer c. Optical oscillograph d. X-Y plotter

Q.2 Solve the following.

A) With a neat diagram, explain the construction and working of a DC generator. Level 2

B) What are the different methods of speed control of a DC motor? Explain any two. Level 3

Q.3 Solve the following.

A) Describe the construction, working principle, and types of synchronous motors with neat diagrams. Level 2

B) Explain the construction and working principle of a three-phase induction motor. Also Derive the torque equation of an induction motor. Level 3

Q.4 Solve Any Two of the following.

A) Explain the construction and working of a servo motor. How is it controlled in automation systems? Level 3

B) Explain the hysteresis motor in detail. Why is it preferred in applications requiring noiseless operation? Level 2

C) Explain in detail the construction, working, and applications of a stepper motor. Level 2

Q.5 Solve Any Two of the following.

A) What are the different types of temperature transducers? Explain any two in detail. Level 3

B) Describe the working principle and applications of strain gauges. Level 3

C) Explain the working principle of proximity sensors and classify them. Level 2

Q.6 Solve Any Two of the following.

A) Discuss the principle and applications of X-Y plotters and optical oscillograph Level 2

B) Explain the methods of vibration measurement and their industrial applications. Level 3

C) What is a VAW meter? Explain its working and applications in power systems. Level 3

***** End *****

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DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Supplementary Winter Examination – 2024

Course: B Tech Branch: Electronics & Telecom/Electronics and Comm Eng (Sandwich)

Semester : III

Subject Code & Name: Network Analysis (BTEXC304_Y18)

Max Marks: 60 **Date: 12/2/2025** **Duration: 3 Hr.**

Instructions to the Students:

1. *Each question carries 12 marks.*
2. *Question No. 1 will be compulsory and include objective-type questions.*
3. *Candidates are required to attempt any four questions from Question No. 2 to Question No. 6.*
4. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
5. *Use of non-programmable scientific calculators is allowed.*
6. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Objective type questions. (Compulsory Question)**		**12**
1	Which of the following is NOT a passive element? a. Resistor b. Capacitor c. Transistor d. Inductor	CO 1	1
2	Kirchhoff's Current Law (KCL) is based on: a. Law of conservation of energy b. Law of conservation of charge c. Ohm's Law d. Superposition principle	CO 1	1
3	At resonance in a series RLC circuit, the impedance is: a. Maximum b. Minimum c. Zero d. Infinite	CO 1	1
4	In a series resonant circuit, at resonance: a. The impedance is maximum. b. The impedance is minimum. c. The current is minimum. d. The circuit behaves as an open circuit.	CO 1	1
5	The purpose of an attenuator is to: a. Increase signal strength. b. Match impedance in a circuit. c. Reduce signal strength without distorting the waveform. d. None of the above.	CO 1	1

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6	A Low-Pass Filter (LPF) allows:				CO 1	1
	a. Only high frequencies to pass.	b. Only low frequencies to pass.	c. Frequencies within a certain band to pass.	d. No frequencies to pass		
7	A low-pass filter can be used in:				CO 1	1
	a. Audio systems to block noise.	b. Power supplies to smooth voltage.	c. Communication systems to filter high-frequency noise.	d. All of the above.		
8	In an R-L circuit with a DC supply, the inductor initially acts as:				CO 1	1
	a. A short circuit.	b. An open circuit.	c. A resistor.	d. A capacitor.		
9	The steady-state current in a DC R-L circuit is determined by:				CO 1	1
	a. The inductor's reactance.	b. The resistance only.	c. Both resistance and inductance.	d. None of the above.		
10	he ABCD parameters are primarily used for:				CO 1	1
	a. long transmission line analysis.	b. Power system stability.	c. Noise reduction in circuits.	d. Motor control.		
11	For a reciprocal network, the ABCD parameters satisfy:				CO 1	1
	a. A·D−B·C=1.	b. A+D=1.	c. B=0.	d. A=D.		
12	Source transformation is a technique that involves replacing:				CO 1	1
	a. A voltage source with a current source	b. A current source with a voltage source	c. A capacitor with an inductor	d. A resistor with a capacitor		

Q. Solve the following. **12**

2

A) Using source transformation, find the current through **CO1** **6**

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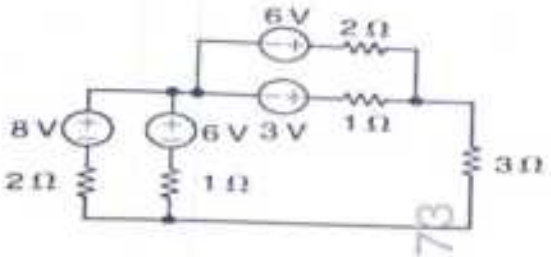
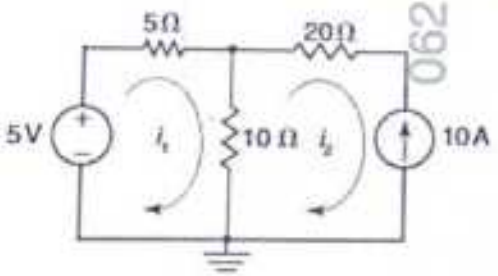
the 3 Ω resistor shown in Fig



B) Find the mesh currents in the circuit i_1, i_2 CO 1 6



Q.3 Solve the following. 12

A) A series RLC circuit consists of a resistance of 1 k, an inductance of 10 mH and a capacitance of 100 μF. For a supply voltage of 100 V, determine the following CO 3 6

(a) resonant frequency,

(b) maximum current in the circuit,

B) A coil of 1-H inductance and 10- resistance is connected in parallel with a 100- F capacitor. If the supply voltage is 200 V, find the resonant frequency and the current at resonance. CO 3 6

Q. 4 Solve Any Two of the following. 12

A) Define Neper and Decibel. Derive the relation between Neper and Decibel. CO 4 6

B) What are Band Pass and Band Stop filters? Explain their applications. CO 2 6

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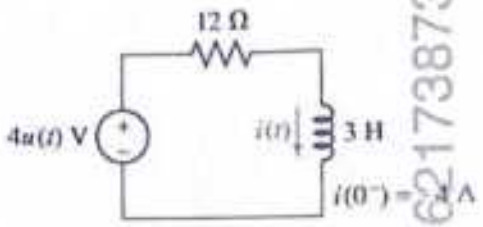
C) What is an attenuator? Why are attenuators used in electronic circuits? CO 2 6

Q.5 Solve Any Two of the following. 12

A) Determine the current i(t) in the circuit CO 3 6

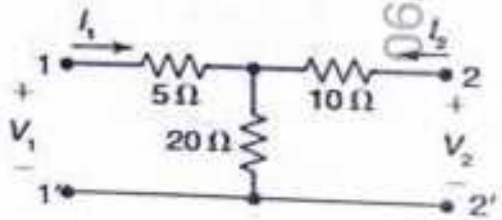


B) Explain different types of transmission lines with examples. CO 4 6

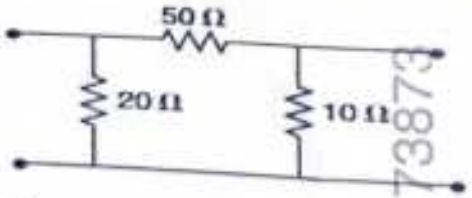
C) What are the primary constants (R, L, G, C) of a transmission line? Define each parameter. CO 3 6

Q. 6 Solve Any Two of the following. 12

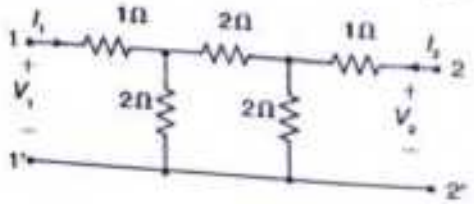
A) Determine the z-parameters for the network shown in Fig CO3 6



B) Find the y-parameters for the network shown in Fig CO3 6



C) For the network shown Fig, determine the ABCD parameters. CO3 6



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DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE
Regular/Supplementary Winter Examination – 2024

urse: B. Tech **Branch: Common to all branches** **Semester: III**

bject Code & Name: (BTBS301) Engineering Mathematics - III (BTBS301/BTES301/BTLOG301)

ax Marks: 60 **Date: 05/02/2025** **Duration: 3 Hr.**

ctions to the Students:
Each question carries 12 marks.
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Assume suitable data wherever necessary and mention it clearly.

					(Level/CO)	Marks
	Objective type questions. (Compulsory Question)					**12**
1	If $\mathbf{L[f(t)] = \frac{e^{-4s}}{s^3}}$ then $\mathbf{L[f(3t)]}$ is equal to				**Understand CO1**	1
	a. $\frac{e^{-s}}{\left(\frac{s}{4}\right)^3}$	b. $\frac{e^{-s}}{\left(\frac{s}{3}\right)^3}$	c. $\frac{27\,e^{\frac{-4s}{3}}}{s^3}$	d. None		
2	Laplace transform of the function $\boldsymbol{f(t) = e^{-3t}\cos 4t}$ is,				**Understand CO1**	1
	a. $\frac{s+3}{s^2+16}$	b. $\frac{s+3}{s^2+3}$	c. $\frac{s+3}{s^2+6s+25}$	d. None		
3	Laplace transform of the function $\boldsymbol{f(t) = t\sin hat}$ is,				**Understand CO1**	1
	a. $\frac{2as}{(s^2-a^2)^2}$	b. $\frac{2s}{(s^2-a^2)^2}$	c. $\frac{2as}{s^2-a^2}$	d. None		
4	Inverse Laplace transform of the function $\boldsymbol{f(t) = \frac{15}{s^2+8s+13}}$ is,				**Understand CO2**	1
	a. $\boldsymbol{e^{-2t}\sin 3t}$	b. $\boldsymbol{5\,e^{-2t}\sin 3t}$	c. $\boldsymbol{e^{-t}\sin 3t}$	d. None		
5	Inverse Laplace transform of the function $\boldsymbol{f(t) = \frac{1}{\sqrt{s+4}}}$ is				**Understand CO2**	1
	a. $\boldsymbol{e^{-4t}\frac{1}{\sqrt{\pi t}}}$	b. $\boldsymbol{e^{-t}\frac{1}{\sqrt{\pi t}}}$	c. $\boldsymbol{e^{-4t}\frac{1}{\sqrt{t}}}$	d. None		
6	The inverse Laplace transform of the function $\boldsymbol{f(t) = \frac{1}{s^2+9}}$ is				**Understand CO2**	1
	a. $\boldsymbol{\frac{1}{9}sin3t}$	b. $\boldsymbol{\frac{1}{3}sin3t}$	c. $\boldsymbol{sin3t}$	d. None		
7	The Fourier cosine transform of $\boldsymbol{e^{-x}}$ is				**Understand CO3**	1
	a. $\frac{s}{s^2+1}$	b. $\frac{1}{s^2+1}$	c. $\frac{s}{s^2-1}$	d. None		
8	The Fourier sine transform of $\boldsymbol{e^{-ax}}$ is				**Understand CO3**	1
	a. $\frac{a}{a^2+s^2}$	b. $\frac{a}{a^2-s^2}$	c. $\frac{s}{a^2+s^2}$	d. None		
9	The partial differential equation obtained by eliminating a & b from $\boldsymbol{z = ax + by + ab}$ is				**Understand CO4**	1
	a. $z = xp + yq - pq$	b. $z = xp + yq + pq$	c. $z = xp - yq - pq$	d. None		
10	The Lagrange's linear partial differential equation is of the form				**Understand C04**	1
	a. $Pp - Qq = R$	b. $Pp + Qq = 0$	c. $Pp + Qq = R$	d. None		

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11	If $f(Z) = u + iv$ in Polar form is analytic then $\frac{\partial u}{\partial r}$ is equal to				Understand CO5
	a. $\frac{\partial v}{\partial \theta}$	b. $r\frac{\partial v}{\partial \theta}$	c. $\frac{1}{r}\frac{\partial v}{\partial \theta}$	d. None	
12	If $f(z)$ is an analytic function with constant modulus, then $f(z)$ is a				Understand CO5
	a. constant function	b. harmonic function	c. Orthogonal	d. None	
Q. 2	**Solve the following.**				**Apply/CO1**
A)	Find the Laplace Transform of $F(t) = \frac{e^t - \cos t}{t}$				**Apply/CO1**
B)	Find the Laplace transform of $\int_0^t t\,e^{-t}\sin 4t\,dt$				
Q.3	**Solve the following.**				**Apply/CO2**
A)	Using Partial Fraction method, find the inverse Laplace Transforms $\frac{5s+3}{(s-1)(s^2+2s+5)}$				**Apply/CO2**
B)	Solve $\frac{dy}{dt} + 2y = e^{-3t}, y(0) = 1$				
Q. 4	**Solve any TWO of the following.**				**Apply/CO3**
A)	Find the Fourier transform of $f(x) = \begin{cases} 1, & \text{for } \lvert x\rvert < 1 \\ 0, & \text{for } \lvert x\rvert > 1 \end{cases}$. Hence evaluate that $\int_0^\infty \frac{\sin x}{x}dx$.				**Apply/CO3**
B)	Find the Fourier cosine transform of $f(x) = \frac{1}{1+x^2}$. Hence derive the Fourier sine transform of $\phi(x) = \frac{x}{1+x^2}$.				**Apply/CO3**
C)	Using Parseval's identity, show that $\int_0^\infty \frac{t^2}{(4+t^2)(9+t^2)}dt = \frac{\pi}{10}$.				
Q.5	**Solve any TWO of the following.**				**Understand CO4**
A)	Partial differential equation by eliminating the arbitrary function $z = x + y + f(xy)$				**Apply /CO4**
B)	Solve $p(\tan x) + q(\tan y) = \tan z$				**Apply /CO4**
C)	Use the method of separation of variables to solve the equation $\frac{\partial^2 u}{\partial x^2} - 2\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} = 0$.				
Q. 6	**Solve any TWO of the following.**				**Apply/CO5**
A)	Find the analytic function whose imaginary part is $\frac{1}{2}\log(x^2 + y^2)$				**Remember CO5**
B)	Show that function $v = \sinh x \cos y$ is harmonic function. Also find its harmonic conjugate function.				**Apply/CO5**
C)	Apply Cauchy's integral Formula to evaluate $\oint_C \frac{\sin^2 z}{(z-\frac{\pi}{6})^2}dz$ where $C: \lvert z\rvert = 1$				
	******End******				

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DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular/Supplementary Winter Examination – 2024

Course: B. Tech **Branch :** Electrical Engineering/Electrical and Electronics Engineering/Electrical and Power/Electronics and Power

Subject Code & Name: BTEEC302 Electrical Machines-I **Semester : III**

Max Marks: 60 **Date: 07/02/2025** **Duration: 3 Hr.**

Instructions to the Students:

1. *Each question carries 12 marks.*
2. *Question No. 1 will be compulsory and include objective-type questions.*
3. *Candidates are required to attempt any four questions from Question No. 2 to Question No. 6.*
4. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
5. *Use of non-programmable scientific calculators is allowed.*
6. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Select the correct alternative (Compulsory Question)**		**12**
1	The constant losses in transformer is/are ----	Remember	1
	a. Copper loss / b. Eddy current loss / c. hysteresis loss / d. both b & c		
2	In a three phase star-delta transformer what is the angle difference between primary and secondary phase voltage?	Remember	1
	a. Delta side lags by -30^0 / b. star side lags by -30^0 / c. star side leads 30^0 / d. delta side leads 30^0		
3	In dc generator if field winding attains the critical resistance____	Understand	1
	a. machine will generate maximum voltage / b. machine will generate maximum power / c. field winding will burn / d. the voltage generated will be zero		
4	Inter pole winding is connected in --------	Remember	1
	a. series with armature / b. series with main pole / c. parallel with armature / d. parallel with main pole		
5	Cross magnetization effect of armature reaction affects which of the following?	Understand	1
	a. commutation / b. reduction of main field flux / c. reduces the terminal voltage / d. both 2 & 3		
6	For starting a dc motor a starter is required to ---	Remember	1

2

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	a. limits the starting current	b. starts the motor	c. limits the speed of the motor	d. none of the above		
7	In a 6 pole dc machine, wave winding is used. The number of parallel paths are -----				Apply	1
	a.6	b. 4	c. 2	d. 1		
8	Maximum power will be developed when back emf is equal to --				Remember	1
	a. supply voltage	b. half of the supply voltage	c. double the supply voltage	d. all of the above		
9	If the field connection of a dc shunt motor is changed then ----				Understand	1
	a. it will run in the same direction by slowly	b. motor will not run	c. it will run in opposite direction	d. it will run in same direction		
10	Transformer core is laminated to reduce -------				Remember	1
	a. eddy current loss	b. hysteresis loss	c. both A & B	d. none of above		
11	Scott connections are used for ----				Apply	1
	a. Single phase to three phase connection	b. Three phase to single phases connection	c. three phase to two phases	d. any of above		
12	If a hybrid stepper motor has a rotor pitch of 36^0 and a step angle of 9^0 the number of its phases must be ---				Evaluate	1
	a.4	b. 2	c. 3	d. 6		
Q. 2	**Solve the following.**					12
A)	Justify "Transformer is a constant flux device."				Remember	6
B)	A 40 KVA transformer has iron loss of 450 Watt and full load copper loss of 850 watt. If the power factor of the load is 0.8 lagging, Find:- i) Full load efficiency ii) The load at which maximum efficiency occurs iii) The maximum efficiency				Evaluate	6
Q.3	**Solve the following.**					12

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A)	Explain the construction of three phase core type transformer.	Understand	6
B)	A 3-phase delta – star step down transformer delivers power to a balanced 3-phase load of 120 KVA at 0.8 power factor. The input line voltage is 11kV and the transformation ratio of the transformer is 0.10. Determine the line voltages, line currents, phase voltages and phase currents on both sides of a transformer.	Evaluate	6
Q. 4	**Solve Any Two of the following.**		**12**
A)	Derive the emf equation of Generator. How it will be implemented to lap and wave connected armature winding?	Apply	6
B)	A DC generator has an armature emf of 100 Volts when the useful flux per pole is 20 mWb and speed is 800 rpm. Calculate the generated emf. i) With the same flux and a speed of 1000 rpm. & ii) With the flux per pole 24 mWb and speed of 900rpm	Evaluate	6
C)	Explain armature reaction? What are its effects?	Understand	6
Q.5	**Solve Any Two of the following.**		**12**
A)	Derive the relation between armature current and armature torque for dc motor. Hence obtain this equation for dc series and shunt motor.	Understand	6
B)	A 250 volt dc shunt motor on no load runs at 1000 rpm and takes 5 amp. from supply. Its armature and shunt field resistances are 0.2Ω and 250 Ω respectively. Calculate the speed when loaded taking a current of 50 amp. The armature reaction weakens the field by 3%.	Evaluate	6
C)	Illustrate the principle of DC motor. What is the significance of back emf?	Apply	6
Q. 6	**Solve Any Two of the following.**		**12**
A)	Explain the construction and working principle of BLDC motor with its applications.	Understand	6
B)	Write a short note on Stepper Motor.	Understand	6
C)	Explain the different types of magnetic system	Understand	6
	***** End *****		

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SY- Electrical

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular and Supplementary Winter 2024

Course: B. Tech **Branch: Electrical Engineering /Electrical & Electronics Engg & Allied**

Subject Code & Name: BTES305 Engineering Material Science **Semester: III**

Max. Marks: 60 **Date: 21/02/2025** **Duration: 3 Hr.**

Instructions to the Students:

1. Each question carries 12 marks.
2. Question No. 1 will be compulsory and include objective-type questions.
3. Candidates are required to attempt any four questions from Question No. 2 to Question No. 6.
4. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
5. Use of non-programmable scientific calculators is allowed.
6. Assume suitable data wherever necessary and mention it clearly.

Q.		(Level/CO)	Marks
1	**Objective type questions. (Compulsory Question)**		**12**
1	Which of the following factors affects the resistivity of metals? A) Crystal structure B) Temperature C) Impurities D) All of the above	CO1	1
2	What is the relationship between conductivity and temperature in metals? A) Conductivity increases with temperature B) Conductivity decreases with temperature C) Conductivity is independent of temperature D) Conductivity is zero at all temperatures	CO2	1
3	What is the key principle of quantum free electron theory in conducting materials? A) Electron-hole generation B) Free electron behavior in a periodic potential C) Ionic bonding D) Superconductivity in high temperatures	CO3	1
4	Which type of polarization is observed in polar dielectrics? A) Electronic polarization B) Ionic polarization C) Orientation polarization D) All of the above	CO3	1
5	The Clausius-Mosotti equation relates which of the following properties? A) Dielectric constant and internal field B) Dielectric loss and leakage current C) Temperature and frequency D) Breakdown voltage and polarization	CO3	1
6	The Einstein relation in semiconductors relates which two parameters?	CO4	1

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		A) Carrier mobility and carrier density	B) Diffusion constant and mobility	C) Recombination rate and generation rate	D) Electron lifetime and diffusion length	CO5
7	What is the primary application of VLSI technology?	A) Enhancing semiconductor mobility	B) Increasing integration density of circuits	C) Improving breakdown voltage	D) Reducing carrier recombination	CO
8	What property differentiates soft magnetic materials from hard magnetic materials?	A) High coercivity	B) Low permeability	C) Low coercivity and high permeability	D) High resistance	
9	Which of the following materials is ferromagnetic?	A) Copper	B) Iron	C) Zinc	D) Aluminum	CO1
10	What happens to ferromagnetic materials above the Curie point?	A) They exhibit diamagnetic properties	B) They lose spontaneous magnetization	C) They retain magnetic properties	D) They become superconductors	CO3
11	Bragg's law is used in which type of material testing?	A) Ultrasonic testing	B) X-ray diffraction	C) Magnetic domain analysis	D) Non-destructive eddy current testing	CO
12	Which of the following is an example of non-destructive testing?	A) Ultrasonic radiography	B) Heat treatment	C) Metal forging	D) Arc welding	CO

Q. Solve the following. 12

2

A) Derive and explain Joule's law. How does it relate to energy dissipation in conducting materials? **CO1** 6

B) Define the following terms **CO** 6

A) Drift velocity B) Mobility C) Collision time

D) Mean free path E) Relaxation time

Q.3 Solve the following. 12

A) Explain the structure of crystalline and amorphous crystals using a suitable diagram and example. **CO** 6

B) What is the definition of polarization in dielectric materials and what is its classification? **CO2** 6

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Q. Solve Any Two of the following. **12**

4

A)	Explain the Einstein relation in semiconductors and its significance in understanding carrier mobility and diffusion.	**CO3**	**6**
B)	What is Semiconductor? Write its properties in detail.	**CO3**	**6**
C)	Explain intrinsic semiconductor and extrinsic semiconductor with suitable examples	**CO3**	**6**

Q.5 Solve Any Two of the following. **12**

A)	Classify magnetic materials and explain the differences between diamagnetic, paramagnetic, and ferromagnetic materials.	**CO4**	**6**
B)	What is curie temperature? And what are the significance of curie temperature/curie point in magnetic material?	**CO4**	**6**
C)	Explain the properties of magnetically soft and hard materials. Discuss their applications in electrical machines and instruments.	**CO4**	**6**

Q. Solve Any Two of the following. **12**

6

A)	Explain Bragg's law and its significance in X-ray crystallography. How does it relate to the interference of X-rays in a crystal lattice?	**CO5**	**6**
B)	What is radioactivity, and how do radioactive materials differ from non-radioactive ones?	**CO5**	**6**
C)	What is ultra-sonic radiography? explain it in detail.	**CO5**	**6**

***** End *****

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