

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE		
Supplementary Examination – Summer 2024		
Course: B. Tech.	Branch: Common to all Branches	Semester : III
Subject Name & Code: Engineering Mathematics – III (BTBS301/BTES301)		
Max Marks: 60	Date:29/06/2024	Duration: 3 Hrs.
Instructions to the Students:		
<ol style="list-style-type: none"> 1. All the questions are compulsory. 2. Use of non-programmable scientific calculators is allowed. 3. Assume suitable data wherever necessary and mention it clearly. 		
		Marks
Q.1	Solve Any Two of the following.	12
A)	Find the Laplace transform of $\frac{\sin 2t}{t}$.	6
B)	Find the Laplace transform of $\int_0^t \left(\frac{e^{-at} - e^{-bt}}{t} \right) dt$.	6
C)	Find the Laplace transform of $\text{erf}(\sqrt{t})$.	6
Q.2	Solve Any Two of the following:	12
A)	Find the inverse Laplace transform of $\log\left(1 + \frac{1}{s^2}\right)$	6
B)	Using Partial Fraction method, find the inverse Laplace Transform $\frac{s}{(s^2+1)(s^2+4)}$	6
C)	Find the inverse Laplace transform of $\frac{4s+15}{16s^2-25}$	6
Q.3	Solve any Two of the following:	12
A)	Find the Fourier transform of $f(x) = \begin{cases} 1, & \text{for } x < 1 \\ 0, & \text{for } x > 1 \end{cases}$. Hence evaluate that $\int_0^\infty \frac{\sin x}{x} dx$.	6
B)	Find the Fourier sine transform of $e^{- x }$, and hence show that $\int_0^\infty \frac{x \sin mx}{1+x^2} dx = \frac{\pi e^{-m}}{2}$, $m > 0$.	6
C)	Evaluate the integral $\int_0^\infty \frac{dx}{(a^2+x^2)(b^2+x^2)}$.	6
Q.4	Solve any Two of the following:	12
A)	Form the partial differential equation by eliminating the arbitrary function from $z = f(x^2 - y^2)$.	6
B)	The partial differential equations by eliminating the arbitrary constant $z = (x^2 + a)(y^2 + b)$	6
C)	Solve the following partial differential equations $p + 3q = 5z + \tan(y - 3x)$ where the symbols have got their usual meanings.	6
Q.5	Solve any Two of the following:	12
A)	Show that $u = x^3 - 3xy^2 + 3x^2 - 3y^2 + 1$ is a harmonic function and hence determine the corre-	6

	sponding analytic function	
B)	Evaluate $\oint_C \frac{e^{-z}}{z+1} dz$ where C is the circle $ z = 2$ and $ z = \frac{1}{2}$	6
C)	Use Cauchy's integral formula to evaluate $\oint_C \frac{e^{2z}}{(z+1)^4} dz$, where C the circle is $ z = 2$.	6
	END	

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DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Supplementary Summer Examination – 2024

Course: B. Tech. Branch: Civil / Civil & Infra. / Civil & Environmental Engineering

Subject Code & Name: BTCEC305 / BTCVC305 / BTCIC305 Surveying

Max Marks: 60

Date: 09/07/2024

Semester: III

Duration: 3 Hr.

Instructions to the Students:

1. All the questions are compulsory.
2. 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.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

	(Level/CO)	Marks
Q. 1 Solve Any Two of the following.		12
A) Define surveying. Write down applications of surveying. State the principles of Surveying.	CO1	6
B) What is meant by Ranging? Explain the methods of ranging in detail.	CO1	6
C) Explain in detail Errors in Chaining.	CO1	6
Q.2 Solve Any Two of the following.		12
A) Define the following terms:	CO2	6
i) True Meridian ii) Magnetic Bearing iii) Magnetic Meridian		
iv) True Bearing v) Arbitrary Meridian vi) Local Attraction		
B) Convert the following WCB's to QB's	CO2	6
a. WCB of AB = 45°30'		
b. WCB of CD = 108°45'		
c. WCB of GH = 75°50'		
d. WCB of HK = 145°20'		
e. WCB of ML = 340°10'		
f. WCB of DE = 60°10'		
C) Enlist the different methods of Plane Table and Explain any two in detail.	CO2	6
Q. 3 Solve Any Two of the following.		12
A) Write down the characteristics of contour lines.	CO3	6
B) During a levelling work started from a BM of known R.L.=100m. The following staff readings were obtained: 0.850, 1.555, 1.725, 0.455, 1.800, 1.750, 0.950, 1.555 The instrument was shifted after 3rd and 6th readings. Enter correctly all the readings in a field book page and determine the reduced levels of all stations showing calculations by Rise and Fall method. Apply usual arithmetic check.	CO3	6

C) What are the types of levelling operations explain with neat sketch. **CO3** **6**

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

A) What are the different methods of traversing Explain any one in detail. **CO4** **6**

B) Explain Bowditch Rule and Transit Rule. **CO4** **6**

C) Define (any three): **CO4** **6**

1. Transiting of Theodolite
2. Swinging
3. Line of Collimation
4. Telescope Normal
5. Face left
6. Face right

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

A) Explain the Steps involved in survey of Waterways. **CO4** **6**

B) Explain the steps involved while carrying out Engineering Survey. **CO4** **6**

C) Write a short note on Reconnaissance. **CO1** **6**

***** End *****

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DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Supplementary Examination – Summer 2024

Course: B. Tech.

Branch : Civil Engineering

Semester : III

Subject Code & Name: BTCVC303 Building Construction & Drawing

Max Marks: 60

Date: 04/07/2024

Duration: 3 Hr.

Instructions to the Students:

1. All the questions are compulsory.
2. 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.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.
5. All drawings shall be in the form of proportionate free hand sketch.

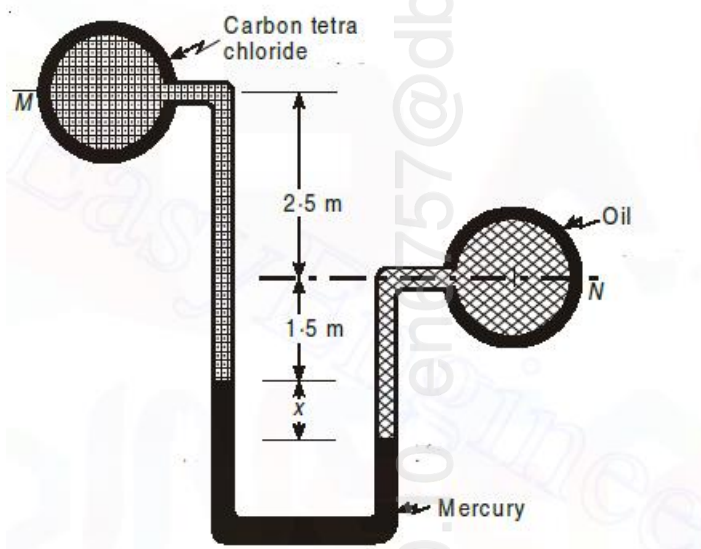
	(Level/CO)	Marks
Q. 1 Solve Any Two of the following.	CO 1	12
A) Draw a plan of 1 ½ Brick thick wall ('L'shape) in single Flemish bond?		6
B) What are the general principles to be observed in brick masonry?		6
C) Describe any two types of partition wall with sketch?		6
Q.2 Solve Any Two of the following.	CO 2	12
A) What are the properties of fresh & hardened concrete?		6
B) Draw a plan & section of typical column showing reinforcement?		6
C) Describe properties of ingredients of concrete?		6
Q. 3 Solve Any Two of the following.	CO 3	12
A) Draw a sketch of semicircular arch showing all its parts?		6
B) Describe RCC lintels with sketch?		6
C) Draw a sketch of formwork used for RCC work?		6
Q.4 Solve Any Two of the following.	CO 3	12
A) Draw a typical elevation & section of frame & paneled door?		6
B) Draw a labelled sketch of king post truss?		6
C) Explain any three types of flooring?		6
Q. 5 Solve Any Two of the following.	CO 4	12
A) Draw a section of dog legged staircase?		6
B) Describe advantages & disadvantages of pre cast structures?		6
C) Explain erection & transportation process of pre cast structures?		6

*** End ***

Instructions to the Students:

1. All the questions are compulsory.
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3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

	(Level/CO)	Marks
Q. 1 Solve Any Two of the following.		12
A) Calculate the capillary rise in a glass tube of 2 mm diameter when immersed in (a) water, (b) mercury. Both the liquids being at 20°C and the values of the surface tensions for water and mercury at 20°C in contact with air are respectively 0.0075 kg(f)/m and 0.052 kg(f)/m.	CO1	6
B) Explain the different applications in Hydraulics Engineering.	Remember	6
C) As shown in the accompanying figure, pipe M contains carbon tetra chloride of specific gravity 1.594 under a pressure of 1.05 kg (f)/cm ² and pipe N contains oil of specific gravity 0.8. If the pressure in the pipe N is 1.75 kg (f)/cm ² and the manometric fluid is mercury of specific gravity 13.6, find the difference x between the levels of mercury.	CO1	6



Q.2 Solve Any Two of the following.		12
A) Derive a three dimensional general continuity equation in Cartesian coordinates.	CO2	6

B)	Prove that the center of pressure of a vertical plane surface is always below the center of gravity.	CO2	6
C)	Discuss about stability of unconstrained bodies.	CO2	6
Q. 3	Solve Any Two of the following.		12
A)	Derive an expression for Euler's equation of motion.	Remember	6
B)	Explain Methods of Drawing Flow Nets.	Remember	6
C)	For a two dimensional flow $\phi = 3xy$ and $\psi = \frac{3}{2}(y^2 - x^2)$. Determine the velocity components at the points (1, 3) and (3, 3). Also find the discharge passing between the streamlines passing through the points given above.	CO4	6
Q.4	Solve Any Two of the following.		12
A)	Two parallel plates kept 0.1 m apart have laminar flow of oil between them with a maximum velocity of 1.5 m/s. Calculate the discharge per metre width, the shear stress at the plates, the difference in pressure in pascals between two points 20 m apart, the velocity gradient at the plates and velocity at 0.02 m from the plate. Take viscosity of oil to be 2.453 N.s/m ² .	CO3	6
B)	What is Prandtl mixing length theory? Find an expression for shear stress due to Prandtl.	Remember	6
C)	Write a short note on Boundary Layer Theory.	Remember	6
Q. 5	Solve Any Two of the following.		12
A)	What is meant by geometric, kinematic and dynamic similarities?	Remember	6
B)	What is Siphon? Explain its working with neat sketch.	CO3	6
C)	Define and explain below Dimensionless Numbers- a) Reynolds Number, b) Froude Number, c) Euler Number, d) Mach Number, e) Weber Number	Remember	6

*** End ***

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Supplementary Summer Examination – 2024

Course: B. Tech.

Branch: Civil Engineering

Semester: III

Subject Code & Name: BTCVC304

Hydraulics-I

Max Marks: 60

Date: 06/07/2024

Duration: 3 Hr.

Instructions to the Students:

1. All the questions are compulsory.
2. 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.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

	(Level/CO)	Marks
Q. 1 Solve Any Two of the following.		12
A) Define following fluid properties with short explanation:- specific weight, specific volume, specific gravity, viscosity, surface tension, capillarity.	CO2	6
B) State and prove Pascal's law with neat diagram.	CO2	6
C) Define buoyancy and metacentric height. Derive an expression for the metacentric height of a floating body.	CO2	6
Q.2 Solve Any Two of the following.		12
A) The velocity components in a two-dimensional flow field for an incompressible fluid are expressed as $u = 2x + \frac{y^3}{3} - yx^2 ; v = -2y - \frac{x^3}{3} + xy^2$	CO1	6
(a) Obtain an expression for stream function Ψ		
(b) Obtain an expression for velocity potential Φ		
B) Derive Euler's equation of motion. Explain how this is integrated to get Bernoulli's equation.	CO1	6
C) Discuss briefly the different methods of drawing the flow net.	CO1	6
Q. 3 Solve Any Two of the following.		12
A) Derive an expression for mean velocity for laminar flow (i) through a pipe, (ii) between two parallel plates-both plates at rest.	CO4	6
B) Write a short note on Nikuradse's experiment.	CO4	6
C) Explain the boundary layer theory.	CO4	6
Q.4 Solve Any Two of the following.		12
A) Explain methods of dimensional analysis.	CO4	6

B) Explain different types of similarities that must exist between a prototype and its model.	CO4	6
C) Explain the terms: distorted models and undistorted models. What is the use of distorted models?	CO4	6
Q. 5 Solve Any Two of the following.		12
A) What is syphon? Explain on what principle it works?	CO3	6
B) Discuss the concept of Water Hammer and Surge Tank.	CO3	6
C) Explain the Nomogram and Moody's chart.	CO3	6

***** End *****

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Supplementary Summer Examination – 2024

Course: B. Tech.

Branch: Civil Engineering

Semester: III

Subject Code & Name: BTCVC304_Y18 Surveying-I

Max Marks: 60

Date: 06/07/2024

Duration: 3 Hr.

Instructions to the Students:

1. All the questions are compulsory.
2. 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.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

	(Level/ CO)	Marks
Q. 1 Solve Any Two of the following.		12
A) Enlist the various types of accessories uses for linear measurement. Explain with neat labelled diagram.	CO1	6
B) What is meant by Ranging? Explain the methods of ranging in detail.	CO1	6
C) Explain various classification of surveying.	CO1	6
Q.2 Solve Any Two of the following.		12
A) Compare Prismatic Compass and Surveyor's Compass.	CO2	6
B) What are the advantages and Disadvantages of Plane Table?	CO2	6
C) Enlist the different methods of Plane Table and Explain any two in detail.	CO2	6
Q. 3 Solve Any Two of the following.		12
A) Write down the characteristics of contour lines.	CO3	6
B) Describe working of Dumpy level with neat labelled diagram.	CO3	6
C) What are the types of levelling operations explain with neat sketch.	CO3	6
Q.4 Solve Any Two of the following.		12
A) Write down working of Planimeter. Write down types of planimeter.	CO4	6
B) The following consecutive readings were taken with a levelling instrument on continuously sloping ground at interval of 20m. 2.375,1.730,0.615,3.450,2.835,2.070,1.835,0.985,0.435,1.630,2.255 and 3.630. The instrument was shifted after 4th and 8th reading. The last reading was taken on a BM of RL 200.400 m Find RLs of all the points. Apply usual Checks.	CO4	6
C) What are the different methods of traversing Explain any one in detail.	CO4	6
Q. 5 Solve Any Two of the following.		12

- | | | |
|---|------------|----------|
| A) State the functions of following parts of Theodolite: 1. Eyepiece 2. Bubble tube
3. Lower Tangent screw 4. Index Frame 5. Telescope | CO4 | 6 |
| B) Write a Short note on Mine Surveying. | CO4 | 6 |
| C) Write a short note on Reconnaissance. | CO1 | 6 |

***** End *****

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Supplementary End Semester Examination – Summer 2024

Course: B. Tech.

Branch: Civil Engineering

Semester: IIIrd

Subject Code & Name: BTCVC306_Y19 Engineering Geology

Max Marks: 60

Date: 11/07/2024

Duration: 3.00 Hr.

Instructions to the Students:

- 1. All the questions are compulsory.*
- 2. 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.*
- 3. Draw a suitable diagram wherever necessary.*

Marks

Q. 1 Solve Any Two of the following.

- A) Write short notes on: - **6**
- Denudation
 - Relict mountains
 - Lahars
- B) Write a note on the interior of the earth with a neat labelled diagram. **6**
- C) Describe any three depositional and erosional features developed by the river. **6**

Q.2 Solve Any Two of the following.

- A) Write a short note on: - **6**
- Mohs scale of hardness
 - Sill
 - Granite
- B) Write a detailed note on agents of metamorphism with their role in metamorphism. **6**
- C) Define sedimentary rock and classification based on grain size and origin. **6**

Q. 3 Solve Any Two of the following.

- A) Write a short note on: - **6**
- Horst and graben
 - Unconformity
 - Aquiclude
- B) Explain various methods of dressing building stones. **6**
- C) Define the term “unconformity” and describe its various types. **6**

Q.4 Solve Any Two of the following.

- A) Write a short note on: - **6**
a. Makarana marble
b. Suspension bridge
c. Arch dam
- B) Explain various methods of dressing building stones. **6**
- C) Explain the difference between a confined aquifer and unconfined aquifer. **6**

Q. 5 Solve Any Two of the following.

- A) Write a short note on: - **6**
a. Sequential Excavation Method
b. Rotary drilling
c. Sampling techniques
- B) Describe the principle and procedure of the rock quality designation (RQD) method. **6**
- C) What are the geological factors affecting the selection site for the dam? **6**

***** End *****

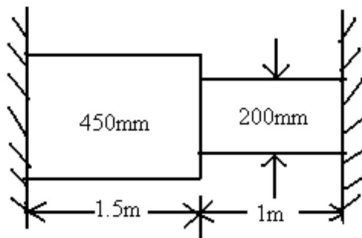
Instructions to the Students:

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	(Level/CO)	Marks
Q.1 Solve Any Two of the following.		12

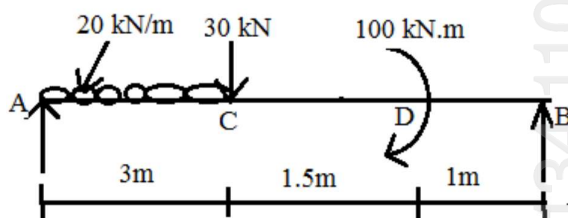
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|---|-----|---|
| <p>A) A M.S bar of 50mm square in size and 150mm long is subjected to an axial thrust of 200kN. Half the lateral strain is prevented by the application of uniform external pressure of certain intensity. If $E = 200 \text{ GPa}$ and Poisson's ratio 0.3. Calculate the change in the length of the bar.</p> | CO1 | 6 |
| <p>B) Write the relationships between bulk modulus, rigidity modulus, young's modulus and poison's ratio.</p> | CO1 | 6 |
| <p>C) Define stress and strain. What are the different types of stresses and strains? Define the terms: Elasticity, Elastic limit, Young's Modulus and Modulus of rigidity.</p> | CO1 | 6 |

A bar of non-uniform diameter, as shown in figure is rigidly fixed. There is no expansion of the ends and there is no stress in the bar at a temperature of 22°C . If the temperature of the bar be raised to 45°C , find the forces applied by the rigid walls on the bar. MOE and coefficient of thermal expansion for the materials are 200 GN/m^2 and $11.7 \times 10^{-6}/^\circ\text{C}$ respectively. Assume no lateral buckling of the bar.



Q.2 Solve Any Two of the following.		12
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- | | | |
|--|-----|---|
| <p>A) Draw the S.F. & B.M. diagrams for simply supported beam of length L carrying a point load W at its middle point.</p> | CO2 | 6 |
| <p>B) What do you mean by section modulus? Find an expression for section modulus for rectangular, circular & hollow circular sections.</p> | CO2 | 6 |
| <p>C) Draw shear force and bending moment diagram for the beam shown in Fig.</p> | CO2 | 6 |



- Q. 3 Solve Any Two of the following.** **12**
- A) Draw the variation of shear stress for a Tee section? Sketch the shear stress distribution for a circular section. Indicate also the layer at which maximum stress occurs? CO2 **6**
- B) A simple beam of span 10m carries a udl of 3kN/m. The section of the beam is a T having a flange of 125x125mm and web 25x175mm. For the critical section obtain the shear stress at the neutral axis and at the junction of flange and the web. Also draw the shear stress distribution across the section. CO2 **6**
- C) A beam of channel section 120x60mm has a uniform thickness of 15mm. Draw the shear stress distribution for a vertical section where the shear force is 50kN. Find the ratio between the maximum and mean shear stress. CO2 **6**
- Q.4 Solve Any Two of the following.** **12**
- A) Derive the Euler's equation for column with two ends fixed. CO3 **6**
- B) What are the assumptions and limitations of Euler's theory for long columns? CO3 **6**
- C) A slender pin ended aluminium column 2.0 m long and of circular cross section it to have an outside diameter of 50 mm. Calculate the necessary internal diameter to prevent failure by buckling if the actual load applied is 12kN and the critical load applied is twice the actual load. Take E for aluminium as 70 GN/m² CO3 **6**
- Q. 5 Solve Any Two of the following.** **12**
- A) Explain maximum principal strain theory. CO4 **6**
- B) Define the terms: Principal planes and Principal stresses. Also explain their uses. Draw the Mohr's circle for a state of pure shear and indicate the principal stresses. CO4 **6**
- C) A body is subjected to direct stresses in two mutually perpendicular directions accompanied by a simple shear stress. Draw the Mohr's circle of stresses and explain how you will obtain the principal stresses and principal planes. CO4 **6**

END