

Code: 7G631

II B.Tech. I Semester Supplementary Examinations August 2021

Building Materials and Construction

(Civil Engineering)

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit (5 x 14 = 70 Marks)

UNIT-I

- | | Marks | CO | Blooms Level |
|--|-------|-----|--------------|
| 1. a) Briefly discuss properties of the good building stones for structural requirement of a residential building? | 7M | CO1 | L2 |
| b) What are the various methods of burning of bricks? | 7M | CO1 | L2 |

OR

- | | | | |
|--|----|-----|----|
| 2. a) What is the composition of good brick earth? Briefly explain function of each component. | 7M | CO1 | L2 |
| b) What are the precautions to be taken while blasting of stones? | 7M | CO1 | L2 |

UNIT-II

- | | | | |
|---|----|-----|----|
| 3. a) What are the characteristics and uses of roofing tiles? | 7M | CO2 | L2 |
| b) State the general properties and uses of aluminium? | 7M | CO2 | L2 |

OR

- | | | | |
|--|----|-----|----|
| 4. a) Briefly explain various ingredients of cement? | 7M | CO2 | L2 |
| b) List out the classification of lime? Explain the use of each type in construction work? | 7M | CO2 | L2 |

UNIT-III

- | | | | |
|---|----|-----|----|
| 5. a) What do you mean by wood? What are its advantages for building construction? | 7M | CO3 | L2 |
| b) What are the alternative materials of wood for building construction briefly explain the properties of any one material? | 7M | CO3 | L2 |

OR

- | | | | |
|--|----|-----|----|
| 6. a) Differentiate between (i) natural seasoning and artificial seasoning of timber (ii) Soft wood and hard wood? | 7M | CO3 | L2 |
| b) Explain characteristics of good timber? | 7M | CO3 | L2 |

UNIT-IV

- | | | | |
|--|----|-----|----|
| 7. a) Differentiate between English bond and Flemish bond with the help of sketches? | 7M | CO4 | L2 |
| b) What do you understand by rubble and ashlar masonry? Briefly explain. | 7M | CO4 | L2 |

OR

- | | | | |
|--|----|-----|----|
| 8. a) Differentiate between spread and mat foundation? | 7M | CO4 | L2 |
| b) List various types of masonry walls and Explain their uses? | 7M | CO4 | L2 |

UNIT-V

- | | | | |
|---|----|-----|----|
| 9. a) Explain the following items with reference to roofs (i) Lean-to-Roof (ii) Coupled Roofs (iii) Trussed roofs | 7M | CO5 | L2 |
| b) Differentiate between lintel and arches for a buildings with neat sketch? | 7M | CO5 | L2 |

OR

- | | | | |
|---|----|-----|----|
| 10. a) What is pointing? Discuss the purposes of (i) pointing (ii) formwork and (iii) scaffolding for building works? | 7M | CO5 | L2 |
| b) Sketch following types of stairs cases and explain their uses for buildings (i) Dog legged staircase (ii) Spiral staircases? | 7M | CO5 | L2 |

Hall Ticket Number :

R-17

Code: 7G537

II B.Tech. I Semester Supplementary Examinations August 2021

Electrical and Mechanical Technology

(Civil Engineering)

Max. Marks: 70

Time: 3 Hours

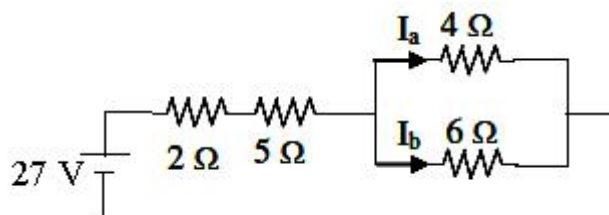
Answer all five units by choosing one question from each unit (5 x 14 = 70Marks)

Use separate booklets for Part-A & Part-B

PART-A

UNIT-I

1. a) State and explain Kirchhoff's laws with examples.
- b) Find the currents I_a and I_b in the following circuit. What is the total power loss in the circuit?



OR

2. a) Explain the Principle of Operation of DC Generator.
- b) A 4-pole wave connected DC generator having 60 slots on its armature with 6 conductors per slot, run at 750 rpm and generate an open circuit voltage of 230V. Find the useful flux per pole.

UNIT-II

3. a) Derive the expression for emf equation for 1-ϕ Transformer.
- b) A single phase transformer has 500 primary and 1000 secondary turn. The net cross sectional area of the core is 50cm². If the primary winding is connected to a 50 HZ supply at 400v. Calculate the peak value of the flux density in the core and voltage induced in the secondary winding.

OR

4. a) Discuss about regulation, losses and efficiency of a transformer.
- b) What is meant by 'slip' in an induction motor? Discuss about torque-slip characteristics of an induction motor.

PART-B

UNIT-III

5. a) List the advantages and disadvantages of a gas welding over arc welding process.
- b) Illustrate the formation of neutral, oxidizing and reducing flames in a welding torch of a gas welding.

OR

6. a) Describe the working of the following welding methods and with their specific applications:
 - i. TIG Welding
 - ii. MIG Welding

UNIT-IV

7. a) Mention the necessity of lubrication. State the main functions of a lubricating system in an I.C. Engine.
b) Write a brief note on pressure lubrication system.

OR

8. a) List the important equipment and machinery used in earth moving.
b) Explain the factors which are taken into consideration in the selection of earth moving machinery.

UNIT-V

9. a) Explain any three refrigerants used in refrigeration systems with their properties.
b) Sketch the layout of an air conditioning system and explain the functions of each component in it.

OR

10. a) What is air-conditioning? Explain comfort air-conditioning system with a neat sketch.
b) Describe a simple vapour compression refrigeration system with a flow diagram.

*****END*****

Hall Ticket Number :

R-17

Code: 7GC32

II B.Tech. I Semester Supplementary Examinations August 2021

Engineering Mathematics-III

(Common to All Branches)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

UNIT-I

1. a) Using the bisection method, find a real root of the equation $\cos x = x e^x$ correct to three decimal places. 7M
- b) Apply fourth order Runge-Kutta method to $\frac{dy}{dx} = 3x + \frac{1}{2}y$, $y(0) = 1$ determine $y(0.1)$ correct to four decimal places. 7M

OR

2. Find the real root of the equation $x e^x = 3$ by Regular-falsi method. 14M

UNIT-II

3. Using Lagrange formula find $f(4)$. Given

x	0	2	3	6
y	-4	2	14	158

14M

OR

4. Evaluate $\int_0^1 \sqrt{1+x^3} dx$ taking $h = 0.1$ Using (i) Simpson's 1/3 rd rule (ii) Trapezoidal rule. 14M

UNIT-III

5. Fit a second degree parabola to the following data by the method of least squares

x	10	12	15	23	20
y	14	17	23	25	21

14M

OR

6. Form a partial differential equation from $z = f(x+y)$. 14M

UNIT-IV

7. Obtain the Fourier series for $f(x) = x - x^2$ in the interval $[-f, f]$. Hence show that

$$\frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \frac{1}{5^2} - \frac{1}{6^2} + \dots = \frac{f^2}{12}$$

14M

OR

8. Find the half range cosine series for the function $f(t) = t - t^2$, in $0 < t < 1$ 14M

UNIT-V

9. Find the Fourier cosine transform of $f(x) = e^{-ax}$ ($x > 0, a > 0$). 14M

OR

10. Find the Fourier transform of $f(x)$ given by $f(x) = \begin{cases} 1, & \text{for } |x| < 1 \\ 0, & \text{for } |x| > 1 \end{cases}$ hence evaluate $\int_0^\infty \frac{\sin x}{x} dx$ 14M

Hall Ticket Number :										
----------------------	--	--	--	--	--	--	--	--	--	--

R-17

Code: 7G632

II B.Tech. I Semester Supplementary Examinations August 2021

Fluid Mechanics

(Civil Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

UNIT-I

1. Define manometer. Classify the manometers. Describe the differential manometer with neat sketch? 14M

OR

2. An open cylindrical tank of height 4m and cross sectional area 0.1m^2 contains water upto a height of 2.5m and above it an oil of specific gravity 0.8 for a depth of 1m. Find the pressure intensity of (i) surface of oil (ii) the interface between the two liquids (iii) the base of the tank. 14M

UNIT-II

3. a) State the Bernoulli's theorem write its assumptions. 6M
 b) The diameters of a pipe at the sections 1 and 2 are 12cm and 17cm respectively. Find the discharge through the pipe if the velocity of water flowing through the pipe at section 1 is 6m/s. Determine also the velocity at section 2. 8M

OR

4. State the momentum equation. Explain how you will apply momentum equation for determining the force exerted by a flowing liquid on a pipe bend. 14M

UNIT-III

5. Derive Darcy-Weisbach equation for turbulent flows. 14M

OR

6. a) Classify the various types of orifice? 6M
 b) A square orifice 1.5 m long is provided in a tank. The water level on one side of the orifice is 1 m above the top edge of the orifice and 0.5 m below the top edge on the other side of the orifice. Find the discharge through the orifice, if $C_d = 0.64$ 8M

UNIT-IV

7. Distinguish between hydrodynamically smooth and rough boundaries. 14M

OR

8. Derive the equation for the laminar flow behavior between two parallel plates when one plate is at rest and the other plate is moving. 14M

UNIT-V

9. Explain different model laws. 14M

OR

10. The pressure drop in an aeroplane model of size $1/40$ of its prototype is 80N/cm^2 . The model is tested in water. Find the corresponding pressure drop in the prototype. Take density of air as 1.25kg/m^3 and viscosity of air as 1.8×10^{-4} poise. 14M

Code: 7G633

II B.Tech. I Semester Supplementary Examinations August 2021

Strength of Materials

(Civil Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

UNIT-I

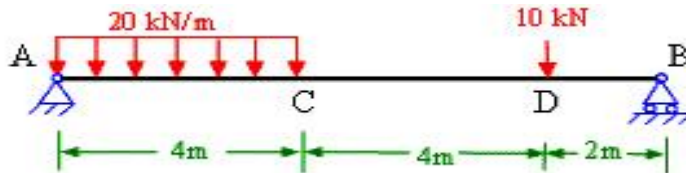
1. a) Explain the stress strain relations in 1, 2 and 3 dimensional system?
- b) Derive the expression for the analysis of uniformly tapered circular rod?

OR

2. Derive the expression for volumetric strain of a rectangular bar subjected to three forces in mutually perpendicular directions?

UNIT-II

3. Draw the shear force and Bending moment diagram, for the beam shown below?

**OR**

4. A beam of span 6m which is simply supported at its edges subjected to concentrated loads of 10kN and 20kN at a distance of 2m and 5m respectively from left support, with an overhanging span of 2m from its right support subjected to UDL of 2kN/m at its overhanging span. Determine the maximum bending moment and shear force.

UNIT-III

5. A rolled steel joist of I section has top flange: 200x10 mm, bottom flange : 150x10 mm, thickness of web 10 mm and overall depth : 400 mm. Find the maximum shear stress across the section if it is subjected to a shear force of 150 kN. Also, sketch the shear stress distribution across the cross section.

OR

6. An I-Section beam 340mmx200mm has a web thickness of 10mm and flange thickness of 20mm. It carries a shear force of 120kN. Sketch the shear stress distribution across the section.

UNIT-IV

7. Determine the maximum deflection of a cantilever beam subjected to uniformly distributed load over the entire span?

OR

8. A girder of uniform section and constant depth of 400 mm is freely supported over a span of 5 m. Calculate the deflection at four quarter junction points(i.e. $x = 1.25\text{m}$, 2.5m and 3.75m) using moment area method for a uniformly distributed load on it such that the maximum bending stress induced will not exceed 120 N/mm^2 . Take $E = 2 \times 10^5 \text{ N/mm}^2$.

UNIT-V

9. Derive the expression for maximum shear strain theory and maximum shear stress theory of failure.

OR

10. A bolt is subjected to an axial pull of 20 kN together with a transverse shear force of 12kN. Elastic limit for the material in tension 250 N/mm^2 , Factor of safety is 3 and Poisson's ratio is 0.3. Determine the diameter of the bolt according to a) Maximum principal stress theory and b) Maximum strain energy theory.

Code: 7G634

II B.Tech. I Semester Supplementary Examinations August 2021

Surveying

(Civil Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

UNIT-I

1. a) What does traverse surveying mean? 7M
b) Distinguish between closed and open traverse. 7M

OR

2. A line was shown to a magnetic bearing of $38^{\circ}15'$ in an old map, when the declination was $15^{\circ}45'$ E. to what bearing should it be set now if the present magnetic declination is $6^{\circ}15'$ W. 14M

UNIT-II

3. Define the following: datum surface, line of collimation, reduced level, bench mark, change point, and parallax. 14M

OR

4. An excavation is to be made for a reservoir 26m long and 15m wide at the bottom, of side slope 2:1. Calculate the volume of excavation if the depth is 4m. Assume that the ground surface is level before excavation. 14M

UNIT-III

5. a) How is the closing error in a traverse balanced? 7M
b) What are the fundamental lines of a theodolite? What should be the relation between them 7M

OR

6. ABCDA is a closed traverse in which the bearing of DA and length of BC have not been recorded. The rest of the field records are as follows:

Line	Length(m)	Bearing
AB	335	$181^{\circ}18'$
BC	?	$90^{\circ}00'$
CD	408	$357^{\circ}36'$
DA	828	?

Find the missing data. 14M

UNIT-IV

7. Derive the expressions for horizontal and vertical distances in the fixed hair method when the staff is held normal to the line of sight and the measured angle is that of elevation. 14M

OR

8. a) What are the errors that may occur in plane tabling? 7M
b) What are the precautions to be taken in plane table surveying? 7M

UNIT-V

9. a) Why is a curve provided? What is the degree of a curve? 7M
b) Derive a relation between the radius and degree of a curve. 7M

OR

10. Two straight lines T_1P and PT_2 are intersected by a third line AB, such that $\angle PAB = 40^{\circ}24'$, $\angle PBA = 30^{\circ}36'$ and the distance $AB = 320$ m. Calculate the radius of the simple curve which will be tangential to the three lines T_1P , AB and PT_2 and the chainages of the point of curve (T_1) and point of tangency (T_2), if the chainage of the point P is 2,625.5m. 14M
