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 )
*********

|  |  |  | Marks | CO | Blooms Level |
|---|---|---|---|---|---|

### UNIT–I

| 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 |

*****

**Code: 5GC31**

II B.Tech. I Semester Supplementary Examinations August 2021
## Engineering Mathematics-III
( Common to CE & ME )

Max. Marks: 70                                                                                              Time: 3 Hours
Answer *any five* full questions by choosing one question from each unit ( 5x14 = 70 Marks )
*********

### UNIT–I

1. Find the values of for which the equations

   ( -1)x+(3 +1)y+2 z=0; ( -1)x+(4 -2)y+( +3)z=0; 2x+(3 +1)y+3( -1)z=0 are consistent and find the ratios of x:y:z when has the smallest of these values. What happens when has the greatest of these values?

**OR**

2. Find the characteristic of the matrix A= $\begin{bmatrix} 1 & 1 & 3 \\ 1 & 3 & -3 \\ -2 & -4 & -4 \end{bmatrix}$ and hence find its inverse

### UNIT–II

3. a) Find a real root of the equation $x^3-2x-5=0$ by the method of false position correct to three decimal places.

   b) Find the cubic polynomial which takes the following values:

| x | 0 | 1 | 2 | 3 |
|---|---|---|---|---|
| f(x) | 1 | 2 | 1 | 10 |

**OR**

4. Evaluate $\int_0^6 \frac{dx}{1+x^2}$ by using (i) Trapezoidal rule, (ii) Simpson's 1/3 rule (iii) Simpson's 3/8 rule.

### UNIT–III

5. Employ Taylor's method to obtain approximate value of y at x=0.2 for the differential equation $dy/dx=2y+3e^x$, y(0)=0.Compare the numerical solution obtained with the exact solution.

**OR**

6. Using Runge-Kutta method of order 4, find y for x=0.1,0.2,0.3 given that $dy/dx=xy+y^2$, y(0)=1.Continue the solution at x=0.4 using Milne's method.

### UNIT–IV

7. Obtain the Fourier series for $f(x)=x$ in the interval $-f<x<f$

**OR**

8. Find the half range sine and cosine series of $f(x)=x$ in $0<x<2$

### UNIT–V

9. Determine p such that the function $f(z)=\frac{1}{2}\log(x^2+y^2)+i\tan^{-1}\left(\frac{px}{y}\right)$ be an analytic function

**OR**

10. Evaluate $\int_c \frac{e^z}{(z^2+f^2)^2}dz$ where c is $|z|=4$

***

**Code: 5G633**

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 sessional 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 Cd = 0.64                             8M

### UNIT–IV

7.  Distinguish between hydrodyanamically 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 $1.8 X10^{-4}$ poise.                         14M

***

**Code: 5G631**

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 dimesional 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?
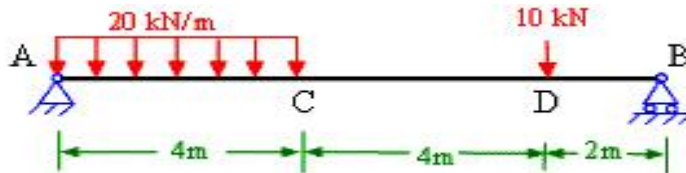


**OR**

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: 200×10 mm, bottom flange : 150×10 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 = 1.25m, 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/mm2. Take E = 2 ×105 N/mm2.

### 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/mm2, 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: 5G632**

R-15

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 $38^0 15'$ in an old map, when the declination was $15^0 45'$ E. to what bearing should it be set now if the present magnetic declination is $6^0 15'$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       | $181^0 18'$ |
| BC   | ?         | $90^0 00'$ |
| CD   | 408       | $357^0 36'$ |
| 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 $\angle PAB = 40^0 24'$, $\angle PBA = 30^0 36'$ and the distance AB = 320m. 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

***