Hall Ticket Number :										

R-14

Code: 4G633

II B.Tech. I Semester Supplementary Examinations October 2020

Fluid Mechanics

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

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

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UNIT–I

1. a) U-tube manometer containing mercury was used to find the negative pressure in the pipe containing water. The right limb was open to the atmosphere. Find the vaccum pressure in the pipe if the difference of mercury level in the two limbs was 100mm and height of water in the left limb from the centre of the pipe was found to be 40 mm below.

   b) What is Pascal's law? Also prove the same.

OR

2. Define total pressure and centre of pressure. Also derive the expressions for the same for an inclined immersed surface.

UNIT–II

3. a) Explain the types of flows.

   b) A 30 cm diameter pipe, conveying water, branches into two pipes of diameters 20 cm and 15 cm respectively. If the average velocity in the 30 cm diameter pipe is 2.5 m/s, find the discharge in this pipe. Also determine the velocity in 15 cm pipe if the average velocity in 20cm diameter pipe is 2 m/s.

OR

4. a) State and prove the Bernoulli's Equation.

   b) A 300 mm diameter pipe carries water under a head of 20 m with a velocity of 3.5m/s. If the axis of the pipe turns through 450 find the magnitude and direction of the resultant force at the bend.

UNIT–III

5. a) Explain major and minor energy losses.

   b) Derive expressions for calculating loss of energy in a pipe flow during sudden expansion in the pipe and sudden contraction in the pipe.

OR

6. a) Differentiate pipes are in parallel and series.

   b) Derive Darcy-Weisbach equation for turbulent flows.

UNIT–IV

7. a) Derive an expression for coefficient of discharge by using venture meter.

   b) A rectangular notch of crest width 0.4 m is used to measure the flow of water in a rectangular channel 0.6m wide and 0.45m deep. If the water level in the channel is 0.225m above the weir crest, find the discharge in the channel. For the notch assume cd=0.63and take velocity of approach into account

OR

8. Derive Hagen-Poiseullie equation from basics.

UNIT–V

9. Water is flowing through a pipe of diameter 30 cm at a velocity of 4m/s. Find the velocity of oil flowing in another pipe of diameter 10 cm if the condition of dynamic similarity is satisfied between the two pipes. The viscosity of water and oil is given as 0.01 poise and 0.025 poise. Take 'G' of oil as 0.8.

OR

10. a) What is dimensional analysis? Explain Buckingham's pi theorem.

    b) Explain Dimensionless numbers.

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Hall Ticket Number :										

R-14

Code: 4G631

II B.Tech. I Semester Supplementary Examinations October 2020

Strength of Materials-I

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

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

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UNIT–I

1. a) Draw the stress strain diagram for mild steel and explain the salient points. 7M

   b) A rod of diameter 30 mm and length 400 mm was found to elongate 0.35 mm when it was subjected to a load of 65 kN. Compute the modulus of elasticity of the material of this rod. 7M

OR

2. a) A steel rod of 50mm diameter is enclosed by a copper tube of 50mm external diameter and 25mm internal diameter. The ends are closed by rigid metal plates. If the temperature of the assembly is raised by 600C, find the stresses in the steel and copper rods and the combined expansion of the assembly.

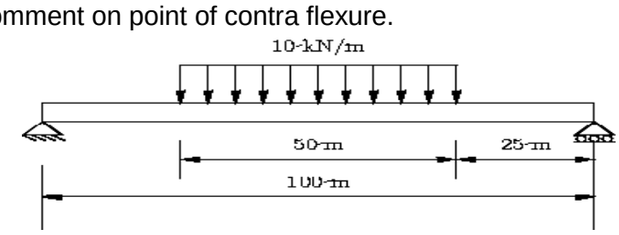
   Take ES = 2 x 105 N/ mm2 and EC = 1 x 105 N/ mm2;

   αS = 1.2 x 10-5 per 0C and αC = 1.6 x 10-5 per 0C 8M

   b) Define strain energy? Derive the formula for the strain energy when a gradual load is applied? 6M

UNIT–II

3. Draw shear force and bending moment diagram for the beam shown below. Mark all salient values on them. Comment on point of contra flexure.



14M

OR

4. A simply supported beam AB of span 10 m is subjected to a uniformly distributed load of 30KN/m over the left half of span and a concentrated moment of 50 KN-m acting at a distance of 6 m from left support A. Draw the shear force and bending moment diagrams. Also find the position and magnitude of maximum bending moment. 14M

UNIT–III

5. A simply supported beam of rectangular cross section 100mm x 200mm deep carries an udl on an effective span of 4 m. If the allowable stress in bending is 10 N/ mm^2 and in shear is 1 N/ mm^2, what is the safe value of the udl that can be placed on the beam? Find the maximum stresses in shear and bending, if a udl of 10 KN/m is applied 14M

OR

6. a) Sketch the shear stress distribution for a circular cross section of dimension ‘d 7M

   b) What are the assumptions in theory of bending 7M

UNIT–IV

7. A cantilever AB of length L is subjected to a concentrated load of W at C which is at a distance of $L/2$ from fixed end A. Using double integration method, determine the deflection at the free end C 14M

OR

8. A simply supported beam AB of span 6 m is subjected to a uniformly distributed load of 30 KN/m over the whole span and a concentrated load of 72 KN acting at a distance of 2 m from the left end A. Determine i. slope of the left support A, and ii. The position and magnitude of maximum deflection. Take E = 200 GPa and I = 16000 cm^4. 14M

UNIT–V

9. a) The normal stress in two mutually perpendicular directions is 500 N/mm2 and 100 N/mm2 both are tensile the complimentary shear stresses in these directions are the intensity 400 N/mm2. Find the normal and tangential stresses in the two planes which are equally inclined to the planes carrying tthe normal stresses mentioned above 8M

   b) Explain the Mohr’s circle of stresses 6M

OR

10. State the significance and application of theories of failure. Derive an expression for distortion energy theory of failure. 14M

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Hall Ticket Number :										

R-14

Code: 4G632

II B.Tech. I Semester Supplementary Examinations October 2020

Surveying

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

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

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UNIT–I

1. a) Define Surveying? Explain primary divisions of surveying. 7M

   b) Classify the surveying based on purpose and instruments used. 7M

OR

2. Explain the principle, working and uses of optical square with neat sketch. 14M

UNIT–II

3. a) Define and explain the terms contour interval and horizontal equivalent? 7M

   b) The consecutive readings taken during a levelling operation are as follows:0.685, 1.315, - 1.825, - 0.635, 1.205, 1.235, 2.631, 1.355, - 2.015. The instrument was shifted after the third and sixth readings. The third reading was taken on a benchmark of assumed elevation 100.000m. Find the reduced levels of all other points. 7M

OR

4. a) Explain the method of a computation of volume of earthwork from the contour plan. 7M

   b) An embankment has side slopes 1.5:1 and is level in the transverse direction. The depths at the centre at 20-m intervals are 1.8m, 2.4m, 3.0m, and 3.6m. Find the volume by trapezoidal formula. 7M

UNIT–III

5. How many fundamentals lines are there in theodolite and what are they? Explain briefly the temporary adjustments of theodolite? 14M

OR

6. Explain the main parts of a theodolite with neat diagram? 14M

UNIT–IV

7. a) State the advantages and disadvantages of plane tabling in survey. 7M

   b) Explain the methods in practice to solve a three point problem. 7M

OR

8. Derive the condition of Anallactic lens for horizontal angles. 14M

UNIT–V

9. Draw a simple circular curve, write their elements and derive the formulas of each element? 14M

OR

10. a) What is meant by Degree of curve? Derive its relationship with radius of curve? 9M

    b) Explain the principle of EDM. 5M

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Code: 4GC31

II B.Tech. I Semester Supplementary Examinations October 2020

Mathematics-II

(Common to CE & ME)

Max. Marks: 70 Time: 3 Hours

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

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UNIT–I

1. a) Test for consistency and solve 5x+3y+7z=4; 3x+26y+2z=9; 7x+2y+10z=5 8M

   b) Show that the Eigen values of diagonal matrix are just the diagonal elements of the matrix 6M

OR

2. a) Find the rank of the matrix $\begin{bmatrix} 1 & 2 & 3 & 0 \\ 2 & 4 & 3 & 2 \\ 3 & 2 & 1 & 3 \\ 6 & 8 & 7 & 5 \end{bmatrix}$ by reducing into Echelon form 7M

   b) Find the Eigen values and eigenvectors of $A = \begin{bmatrix} 5 & 4 \\ 1 & 2 \end{bmatrix}$ 7M

UNIT–II

3. a) Find the Cubic polynomial which takes the values. $y(0)=1$, $y(1)=0$, $y(2)=1$ and $y(3)=10$ 7M

   b) Using Newton-Raphson Method, compute $\sqrt{41}$ correct to four decimal places 7M

OR

4. Evaluate $\int_0^6 \frac{1}{1+x}dx$ by using

   Trapezoidal rule (ii) Simpson's 1/ 3 rule (iii) Simpson's 3/ 8 rule. 14M

UNIT–III

5. Using Euler's Method, find an approximate value of y corresponding to $x=1$, given $\frac{dy}{dx} = x+y$ and $y=1$ when x=0. 14M

OR

6. Use Runge-Kutta method to evaluate $y(0.1)$ and $y(0.2)$ given that $y' = x+y$, $y(0)=1$ 14M

UNIT–IV

7. Find the half range sine and cosine series of $f(x)=x$ in $0<x<2$ 14M

OR

8. a) Find the Fourier series expansion for $f(x)=e^x$ in $0<x<2$® 10M

   b) Form the partial differential equations (by eliminating the arbitrary constants and arbitrary functions) from $z = ax+by+a^2+b^2$ 4M

UNIT–V

9. a) Apply C-R conditions to $f(z)=z^2$ and show that the function is analytic everywhere. 7M

   b) Evaluate $\int_c \frac{1}{(z-1)(z-3)}dz$ with C: $|z|=2$ using Cauchy's Integral Formula 7M

OR

10. 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 14M

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