Hall Ticket Number :										

R-11 / R-13

Code: 1G633

II B.Tech. I Semester Supplementary Examinations November 2019

Fluid Mechanics

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

Answer any **five** questions
All Questions carry equal marks (**14 Marks** each)

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1. a) Define and derive Pascal's law

   b) A hydraulic press has a ram of 30cm diameter and a plunger of 5cm diameter. Find the weight lifted by the hydraulic press when the force applied at the plunger is 400N?

2. a) Define 'Total Pressure' and 'Centre of Pressure' 5M

   b) A gate is placed at 60^0 inclined to the horizontal and supported by a hinge at a vertical height of 3 m from the bottom. Find the height *h* of water on the other side of the gate so that the gate tips about the hinge. Take the width of the gate as unity. 9M

3. a) Define uniform and non-uniform; laminar and turbulent flows 7M

   b) Define and distinguish between stream line, path line and streak line. 7M

4. a) Derive the Euler's equation for steady flow along a stream 8M

   b) Define the terms Kinetic energy correction factor and momentum correction factor. 6M

5. a) Derive Darcy-Weisbach equation for turbulent flow. 8M

   b) Explain the terms 'Total Energy line' and 'Hydraulic gradient line'. 6M

6. a) What is the difference between pitot-tube and pitot-static tube? 7M

   b) Pitot-static tube is used to measure the velocity of water in a pipe. The stagnation pressure head is 6m and static pressure head is 5m. Calculate the velocity of flow assuming C_v =0.98. 7M

7. a) Describe Reynolds experiment to demonstrate the two types of flow. 7M

   b) Describe characteristics of Laminar and Turbulent flows? 7M

8. 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. 14M

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Hall Ticket Number :										

R-11 / R-13

Code: 1GC31

II B.Tech. I Semester Supplementary Examinations November 2019

Mathematics-II

(Common to CE & ME)

Max. Marks: 70 Time: 3 Hours

Answer any **five** questions
All Questions carry equal marks (**14 Marks** each)

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1. Find the Eigen values and eigenvectors of the matrix $\begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$ 14M

2. Express $f(x) = x$ as half range sine and cosine series in $0 < x < 2$ 14M

3. a) Form a partial differential equation by eliminating the arbitrary constants $z = ax + by + a^2 + b^2$. 7M

   b) Form a partial differential equation by eliminating the arbitrary functions $f(x)$ and $g(y)$ from $z = y\,f(x) + x\,g(y)$. 7M

4. Using Lagrange is interpolation formula find the value of $f(10)$ from the following table

x	5	6	9	11
y	12	13	14	16

14M

5. Apply Runge –Kutta method to find an approximate value of y for $x = 0.2$ in step of 0.1 if $\frac{dy}{dx} = y^2 + x$, given that $y = 1$, when x=0. 14M

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

   (i) Trapezoidal rule , ii) Simpson's 1/3 rd rule, iii) Simpson's 3/8 rd rule 14M

7. If $f(z)$ regular function of z, prove that $\left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2}\right)\left|f(z)\right|^2 = 4\left|f'(z)\right|^2$ 14M

8. Evaluate $\int_c \frac{e^{2z}}{(z-1)(z-2)}\,dz$ with C: $|z| = 3$ using Cauchy's Integral Formula 14M

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Hall Ticket Number :										

R-11 / R-13

Code: 1G631

II B.Tech. I Semester Supplementary Examinations November 2019

Strength of Materials-I

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

Answer any **five** questions

All Questions carry equal marks (**14 Marks** each)

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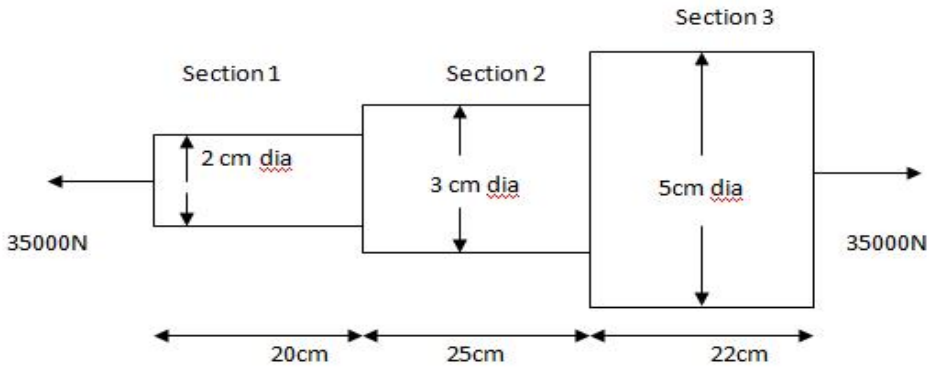
1. An axial pull of 35000N is acting on a bar consisting of three lengths as shown in figure. If the Young's modulus is $2x10^5$ N/mm^2 , Determine

   (i) Stresses in each section and (ii) Total extension of bar.



14M

2. A Simply supported beam of length 8m, carries a point load of 3KN and 6KN at a distance of 2m and 6m from the left end. Draw the Shear Force and Bending Moment Diagrams. 14M

3. Determine the maximum stress induced in a cast iron pipe of external diameter 50mm, internal diameter 30mm and of length 5m, when the pipe is supported at its ends and carries a point load of 8KN. 14M

4. A rectangular beam of 150mm wide and 300mm deep is subjected to a maximum shear force of 60KN. Determine (i) Average shear stress, (ii) Maximum shear stress and (iii) Shear stress at a distance of 25mm above neutral axis. 14M

5. A beam of length 5m and of uniform rectangular section is supported at its ends and carries uniformly distributed load over the entire length. Calculate the depth of the section if the maximum permissible bending stress is 8 N/mm^2 and central deflection is not to exceed 10mm. Take E=$1.2x10^4$ N/mm^2. 14M

6. A Cantilever beam of length 3m carries a uniformly distributed load over the entire length. If the deflection at the free end is 40mm, find the load W and slope at the free end. 14M

7. Determine the resultant stress in magnitude and direction on a plane inclined at 60^o to the axis of the major principal stress and maximum intensity of shear stress in the material at the point in a strained material at one point, the principal stresses are 100N/mm^2 tensile and 60 N/mm^2 compressive.. 14M

8. Explain briefly about Maximum strain energy theory of failure. 14M

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