Hall Ticket Number :										

R-14

Code: 4G633

II B.Tech. I Semester Supplementary Examinations Nov/Dec 2017

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) What is Rheology? Explain about Rheological diagram. 6M

   b) A mass of liquid weighs 500N, corresponding to g = 9.81 m/s^2. Find (**i**) its mass and (**ii**) its weight in a planet with the acceleration due to gravity 3.2 m/s^2 and 20 m/s^2. 8M

OR

2. a) State and prove the Pascal's law and give some examples where this principle is applied. 4M

   b) The pressure intensity at a point in a fluid is given as 49 kN/m^2. Find the corresponding height of the fluid when it is (i) water and (ii) an oil of specific gravity 0.8. 10M

UNIT–II

3. a) Define the following and give one particle example for each of the following. (**i**) Laminar flow (**ii**) Turbulent flow (**iii**) Steady flow and (**iv**) Uniform flow. 6M

   b) (i) Laminar flow (represent the two velocity components. of the flow 5 5 The following cases $u = x^2 - xy$; $v = 3xy - 2y + z^3$. Determine the third component of velocity such that they satisfy the continuity equation. 8M

OR

4. a) Explain some practical applications of Bernoulli's theorem. 4M

   b) In a smooth pipe of uniform diameter 25cm, pressure of 50 kPa was observed at section 1, which was at elevation 10.0m. At another section 2 at elevation 12.0 m the pressure was 20 kPa and the velocity was 1.25 m/s. Determine the total head, if the pipe is 7 m above the datum line. 10M

UNIT–III

5. a) Explain about Moody's chart with help of neat sketch. 7M

   b) Draw the Total Energy Line (TEL) and Hydraulic Gradient Line (HGL) between the water surfaces in the two tanks which are connected by a horizontal pipe of diameter 0.35 m and length 450 m. The rate of flow of water through the pipe is 290 lit/sec. Consider all losses and take the value of f = 0.018. 7M

OR

6. a) Sketch a Pitot tube and explain how it is used to measure the velocity of a flowing fluid? 7M

   b) A Venturimeter has its axis vertical, the inlet and throat diameters being 145 mm and 65 mm respectively. The throat is 220 mm above inlet and C_d = 0.97. Petrol of Specific gravity 0.78 flows up through the meter at a rate of 0.029 m^3/s. Find the pressure difference between the inlet and the throat. 7M

UNIT–IV

7. a) Show that the ratio of maximum velocity to average velocity is 2.0 in the case of laminar flow through pipe. 7M

b) Heavy fuel oil flows from *M* to *N* through a 100 m horizontal steel pipe of 150 mm diameter. The pressure at *M* is 1.08 MPa and at *N* is 0.95 MPa. The kinematic viscosity is 412.5 x 10^{-6} m^2/s and relative density of the oil is 0.918. What is the flow rate in m^3/s. 7M

OR

8. a) How would you distinguish between hydro-dynamically smooth and rough boundaries? 4M

b) Show that the discharge per unit width between two parallel plates distance *h* apart, when one plate is moving at velocity *U* while the other one is held stationary, for the condition of zero shear stress at the fixed plate is $q = hU/3$. 10M

UNIT–V

9. a) Define the terms dimensional analysis and model analysis 6M

b) Explain the terms distorted models and undistorted models. What is the use of distorted models? 8M

OR

10. a) What do you understand by the term dimensionally homogeneous equation? 4M

b) The variables controlling the motion of a floating body through water are the drag force *F*, the speed *V*, the length *L*, the density °, dynamic viscosity of water *μ* and acceleration due to gravity *g*. Derive an expression for *F* by Rayleigh's method of dimensional analysis. 10M

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Hall Ticket Number :										

R-14

Code: 4GC31

II B.Tech. I Semester Supplementary Examinations Nov/Dec 2017

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) Find the rank of the matrix by reducing it to the normal form $\begin{bmatrix} 4 & 3 & 2 & 1 \\ 5 & 1 & -1 & 2 \\ 0 & 1 & 2 & 3 \\ 1 & -1 & 3 & -2 \end{bmatrix}$ 7M

b) Find the values of 'a' and 'b' for which the equations

$x+y+z=3;\ x+2y+2z=6;\quad x+ay+3z=b$

have (**i**) No Solution (**ii**) a Unique Solution (**iii**) Infinite number of Solutions. 7M

OR

2\. Find a Matrix P which transforms the matrix $A=\begin{bmatrix} 1 & 0 & -1 \\ 1 & 2 & 1 \\ 2 & 2 & 3 \end{bmatrix}$ to Diagonal form.

Hence Calculate A^4. Find the Eigen Values and Eigen Vectors of A. 14M

UNIT–II

3\. a) Derive a formula to find the cube root of N using Newton- Raphson Method hence find the cube root of 15. 10M

b) Find the parabola passing through points (0,1) (1,3) Raphson Meth *and* (3,55) using Lagrange's interpolation formula. 4M

OR

4\. Evaluate $\int_0^1 \sqrt{1+x^3}\, dx$ taking h = 0.1 using

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

UNIT–III

5\. Find $y(0.1), y(0.2), z(0.1), z(0.2)$ given that $y' = x+z$, $z' = x-y^2$ and $y(0) = 2, z(0) = 1$ by using Taylor's series method. 14M

OR

6\. Apply the fourth order Runge-Kutta method, to find an approximate values of y when x= 1.2, in steps of 0.1, given that $y' = x^2+y^2$, y(1) = 1.5 14M

UNIT–IV

7. Find the Fourier series to represent the function $f(x) = x \sin x$, $-\text{®} < x < \text{®}$.

Hence deduce that $\dfrac{1}{1.3} - \dfrac{1}{3.5} + \dfrac{1}{5.7} - \dfrac{1}{7.9} + \ldots\ldots = \dfrac{1}{4}(\text{®} - 2)$ 14M

OR

8. a) Form the Partial differential equation by eliminating the arbitrary function from

$$\text{¤}\left[\frac{y}{x},\ x^2 + y^2 + z^2\right] = 0$$

7M

b) Solve by the method of separation of variables $2\,x\,z_x - 3\,y\,z_y = 0.$ 7M

UNIT–V

9. a) If f(z) is a regular function of z, prove that

$$\left[\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2}\right]\left|f(z)\right|^2 = 4\left|f'(z)\right|^2$$

7M

b) Find k such that $f(x, y) = x^3 + 3k\,x\,y^2$ may be harmonic and find its conjugate. 7M

OR

10. Using Cauchy's integral formula, evaluate $\displaystyle\int_C \frac{z^4}{(z+1)(z-i)^2}\,dz$ where C is the ellipse $9x^2 + 4y^2 = 36.$ 14M

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Hall Ticket Number :

R-14

Code: 4G631

II B.Tech. I Semester Supplementary Examinations Nov/Dec 2017

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) Define the following 8M

i. Yield point ii. Proportional limit iii. Elasticity

iv. Plasticity v. Ultimate Strength vi. Strain hardening

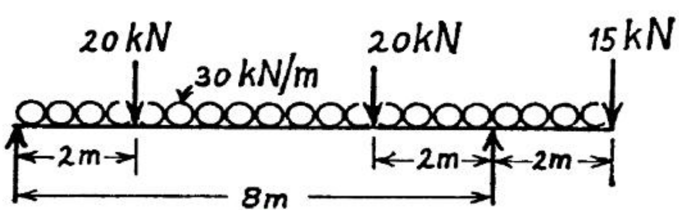
b) A steel cube is subjected to a hydrostatic pressure of 1.5 MPa. Because of this pressure the volume decreases to give a dilatation of -10^{-5}. The Young's modulus of the material is 200 GPa. Determine Poisson's ratio of the material and also the bulk modulus. 6M

OR

2\. A copper rod, 12 mm dia and 400 mm long, fits into an aluminium tube of external diameter 20 mm and thickness 4 mm of equal length. If the assembly is held together by a rigid plate at the end and is stress-free at 20^0C, find the stresses in the two materials when it is heated to 60^0 C. For copper, E = 120 GPa and α= 18x $10^{-6}/^0$C. For aluminium, E = 70 GPa and α= 23x $10^{-6}/^0$C. 14M

UNIT–II

3 Sketch the B.M. and S.F. diagrams for the beam shown and state (a) the position and magnitude of the maximum bending moment, (b) the position of the point of contra-flexure.



14M

OR

4 a) Establish a relation between intensity of loading, **w** shear force **F** and bending moment **M** at section in a beam. 8M

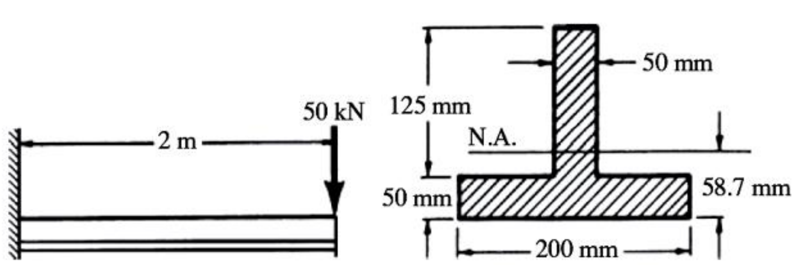
b) Define point of contra-flexure with a diagram and state its significance in beams. 6M

UNIT–III

5\. State the assumptions made in the theory of simple bending and derive the equation $M/I = \sigma/y = E/R$ stating the significance of each term clearly. 14M

OR

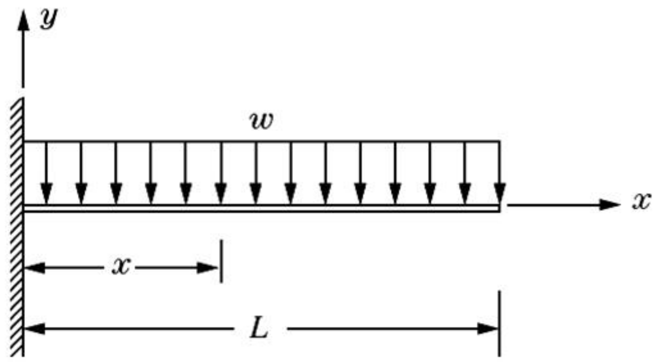
6\. Consider the cantilever beam subject to the concentrated load shown in Fig. Determine the maximum shearing stress due to ***F*** in the beam and also determine the shearing stress 25 mm from the top surface of the beam at a section adjacent to the supporting wall.



14M

UNIT–IV

7. Determine the deflection curve of a cantilever beam subject to the uniformly Distributed load ***w***, shown in Fig.



14M

OR

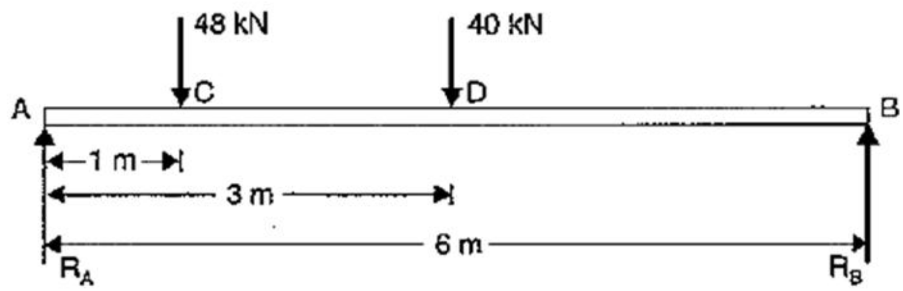
8 A beam of length 6 m is simply supported at its ends and carries two point loads of 48 kN and 40 kN at a distance of 1 m and 3 m respectively from the left support. Find:

(i) deflection under each load,

(ii) maximum deflection, and

(iii) the point at which maximum deflection occurs.

Given E = 2 X 10^4 N/mm^2 and I = 85 X 10^6 mm^4.



14M

UNIT–V

9. a) Draw the stress element for a Uni-axial tension test and find out the following from Mohr's circle.

   i. Principal stresses
   ii. Max shear stress
   iii. Principal planes
   iv. Max.shear stress plane. 10M

b) Define shear strain energy theory of failure. For which materials it is preferred. 4M

OR

10. Define maximum shear stress theory of failure. Also draw the envelope of this theory of failure in 2D. 14M

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Hall Ticket Number :										

Code: 4G632

R-14

II B.Tech. I Semester Supplementary Examinations Nov/Dec 2017

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) Briefly explain the plane surveying and geodetic surveying 7M

b) Define true bearing and magnetic bearing. What are the various types of bearing systems? 7M

OR

2. a) What are the various corrections which are applied on the chain? What is the need of applying these corrections? 7M

b) Define local attraction and how we detect it? Convert the following WCB in QB.
(i) $53^0 55'$ (ii) $270^0 45'$ (iii) $175^0 34'$ (iv) $221^0 23'$ 7M

UNIT–II

3. a) What do you understand by contour lines? What are the characteristics of contour lines? 7M

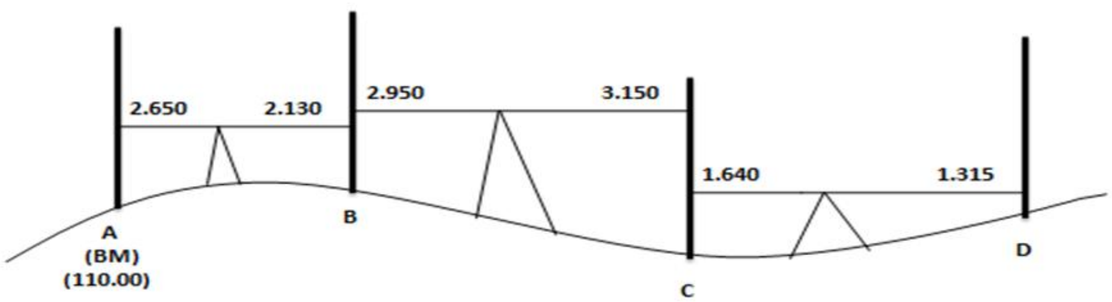
b) The perpendicular offsets that were taken from a chain at a interval of 30 m.

Chainage(m)	0	30	60	90	120	150	180	210
Offset (m)	0	8.76	7.89	9.43	8.44	7.54	7.35	8.75

Compute the area between the chain line and irregular boundary by, Trapezoidal rule. 7M

OR

4. a) The figure given below shows various observations made on station A, B,C and D. Enter the values in the level book and determine the RLs of different points by both the methods.



(All dimensions are in meter) 14M

UNIT–III

5. a) The following bearings were observed for an open traverse.

Line	FB	BB
AB	45^0 45'	226^0 10'
BC	96^0 55'	277^0 5'
CD	29^0 45'	209^0 10'
DE	324^0 48'	144^0 48'

Which stations are affected by local attraction? Find out the corrected bearing of all lines. 7M

b) Discuss briefly, how we calculate the horizontal and vertical angles by a theodolite? 7M

OR

6. The following bearings were observed for a closed traverse ABCDA using a prismatic compass.

Line	FB	BB
AB	75^0 30'	260^0 00'
BC	191^0 45'	11^0 45'
CD	289^0 30'	109^0 45'
DA	358^0 00'	177^0 00'

Find out the corrected bearing of all lines. 14M

UNIT–IV

7. a) What is plane table? What are the various types of plane table? 7M

b) The stadia readings with sight horizontal taken on a vertical staff 60 m away from the tacheometer were 1.280m and 1.785 m. The focal length of the object lens was 30 cm and distance between object lens and vertical axis of tacheometer was 20 cm. find the stadia interval. 7M

OR

8. a) What are the various instruments used in plane table surveying, describe briefly. 7M

b) In an ordinary stadia telescope, the focal length is 20 cm. the tacheometric constants are K=100 and c=0. An error of 0.0035 cm exists in stadia interval. What will be the numerical error in computed horizontal distance if 'S' is the staff intercept. 7M

UNIT–V

9. a) What is the need of providing circular curves to the road? What are the various horizontal curves? 7M

b) What are the various elements of a simple circular curve? Describe briefly. 7M

OR

10. a) How you will set out the horizontal circular curve by perpendicular offset method from the tangent? 7M

b) What is a total station? What are the various functions of a total station? 7M

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