Hall Ticket Number :										

R-11 / R-13

Code: 1G633

II B.Tech. I Semester Supplementary Examinations May 2018

Fluid Mechanics

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

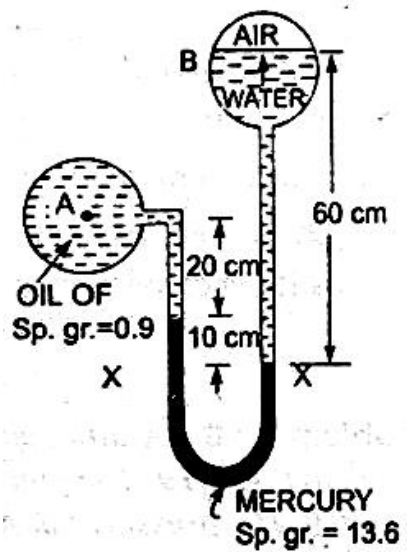
Answer any **five** questions

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

****

1. a) Two coaxial glass tube forming an annulus with small gap are immersed in water in a trough. The inner and outer radii of the annulus are r_i and r_o respectively. What is the capillary rise of water in the aannulus if σ is the surface tension of water in contact with air? 7M

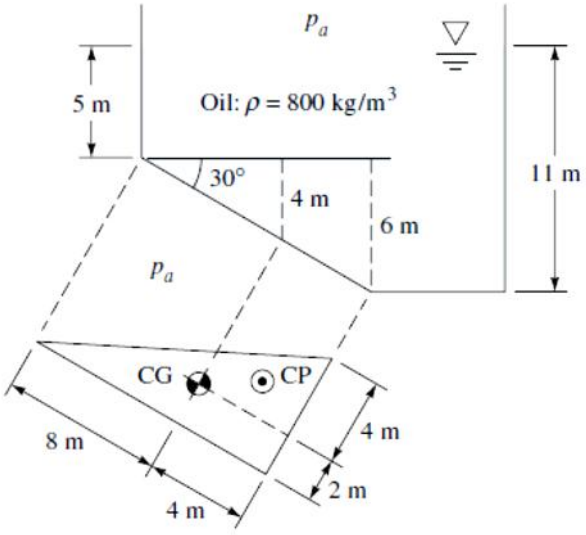
   b) A differential manometer connected at the two points A and B as shown in figure. At B air pressure is 9.81 N/cm^2 (Abs), find the absolute pressure at A.



7M

2. a) How would you determine the horizontal and vertical components of the resultant pressure on submerged curved surface? 7M

   b) A tank of oil has a right-triangular panel near the bottom, as in Fig. Omitting p_a, find the (*a*) hydrostatic force and (*b*) CP on the panel.



7M

3. a) The stream function for a two-dimensional flow is given by $\psi = 3xy$, calculate the velocity at the point P (2, 3). Find the velocity potential function Φ. 7M
   b) The velocity potential function for a flow is given by $\Phi = X^2 - Y^2$ Verify that the flow is incompressible and then determine the stream function for the flow. 7M
4. a) What are the Momentum and kinetic Energy correction factors? 4M
   b) Develop the Euler's equation of motion and then derive Bernoulli's equation. List all some practical applications 10M
5. a) Explain briefly the following:
      i. Hydraulic Gradient Line (HGL)
      ii. Energy Gradient Line (EGL) 4M
   b) Water flows through a pipe line whose diameter various from 25 cm to 15 cm in a length of 10 m. If the Darcy-Weisbach friction factor is assumed constant at 0.02 for the whole pipe, estimate the head loss in friction when the pipe is flowing full with a discharge of $0.06 m^3/sec$. 10M
6. a) How do you measure velocity of flow using pitot tube? 4M
   b) A venturimeter is used for measuring the flow of petrol in a pipe line inclined at 35^0 to horizontal. The specific gravity of the petrol is 0.81 and the area of inlet to throat ratio is 4. If the difference in mercury levels in the gauge is 50 mm, calculate the flow in liters per hour if the pipe diameter is 0.3 m. Take discharge coefficient of discharge of the venturi meter as 0.975. 10M
7. a) Describe characteristics of Laminar and Turbulent flows? 7M
   b) Explain Reynold's experiment with the help of diagram? 7M
8. a) What are the methods of dimensional analysis? Describe the Rayleigh's method for dimensional analysis. 7M
   b) What is meant by geometric, kinematic and dynamic similarities? 7M

***

Hall Ticket Number :										

R-11 / R-13

Code: 1GC31

II B.Tech. I Semester Supplementary Examinations May 2018

Mathematics -II

(Common to CE & ME)

Max. Marks: 70 Time: 3 Hours

Answer any **five** questions

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

****

1. a) Prove that the Eigen values of a triangular matrix are the diagonal elements of the matrix. 4M

   b) Verify Cayley-Hamilton theorem for the matrix

   $$A=\begin{bmatrix} 3 & 4 & 1 \\ 2 & 1 & 6 \\ -1 & 4 & 7 \end{bmatrix} \text{ and hence find } A^{-1}.$$ 10M

2. a) Write the Fourier representation of the periodic function $f(x)=x$ in $(-\pi\ \pi)$. 7M

   b) Find the half range cosine series for the function $f(x)=(x-1)^2$ in the interval (0 1) and hence show that $\frac{1}{1^2}+\frac{1}{2^2}+\frac{1}{3^2}+------=\frac{\pi^2}{6}$. 7M

3. a) Form a partial differential equation by eliminating the arbitrary constants a, b, c from the equation $\frac{x^2}{a^2}+\frac{y^2}{b^2}+\frac{z^2}{c^2}=1$. 7M

   b) A tightly stretched string with fixed end points $x=0$ and $x=l$ is initially in a position given by $y(x,0)=y_0\sin^3(\frac{\pi x}{l})$. If it is released from rest from this position. Find the displacement 'y' at any time 't' and at a distance 'x' from one end. 7M

4. a) Find the roots of the equation $x^3-x-4=0$ using *False position method* 7M

   b) Using Newton-Raphson method, find a positive root of the equation $x^4-x-9=0$ and correct to three decimal points. 7M

5. a) Find the value of y at x=0.1 by Picard's method, given that $\frac{dy}{dx}=\frac{y-x}{y+x},\ y(0)=1$ 7M

   b) Use Milne's Predictor corrector method to find y(0.3) from $y'=x^2+y^2,\ y(0)=1.$ 7M

6. a) *Evaluate* $\int_0^{\pi} t \sin t \, dt$ using *the Trapezoidal rule.* 4M

   b) *Evaluate* $\int_0^6 \frac{1}{1+x} \, dx$ using *Simpson's* $1/3$ *rule and Simpson's* $3/8$ *rule.* 10M

7. a) *Prove that* $\left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2}\right) |\text{Re}\, al \; f(z)|^2 = 2|f'(z)|^2$, *where* $w = f(z)$ *is analytic.* 7M

   b) Show that for $f(z) = \frac{2xy(x+iy)}{x^2+y^2}$, *if* $z \neq 0$

   $= 0$, *if* $z = 0$,

   The C-R equations are satisfied at the origin but the derivative of $f(z)$ at origin does not exists. 7M

8. a) *Evaluate* $\int_c \frac{z^2 - z - 1}{z(z-i)} \, dz$, *where* $c : \left|z - \frac{1}{2}\right| = 1$, using *Cauchy's* integral *formula*. 4M

   b) *Find the Taylor's series* expansion *of* $f(z) = \frac{2z^3+1}{z^2+1}$ *about the* point

   i) $z = i$ *ii)* $z = 1$ 10M

****

Hall Ticket Number :										

R-11 / R-13

Code: 1G631

II B.Tech. I Semester Supplementary Examinations May 2018

Strength of Materials-I

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

Answer any **five** questions

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

****

1. a) A hollow cast iron cylinder 4m long, 300mm outer diameter and thickness of 50mm is subjected to a central load on the top when standing straight. The stress produced is 75000 kN/m^2. Assume Young's Modulus as 1.5 x 10^8 kN/m^2 and find i) Magnitude of the load ii) Longitudinal strain produced and iii) Total decrease in length. 7M

   b) A steel wire 2m long and 3mm in diameter is extended by 0.75mm when a weight W is suspended from the wire. If the same weight is suspended from a brass wire, 2.5m long and 2mm in diameter, it is elongated by 4.64mm. Determine the modulus of elasticity of brass if that of steel be 2 x 10^5 N/mm^2. 7M

2. A simply supported beam of span 16m carries concentrated loads of 4kN, 5kN, 6kN at distances 3, 7 and 11 m respectively from the left support. Calculate maximum shear force and bending moment. Draw shear force and bending moment diagrams. 14M

3. a) What are the Assumptions in Theory of Simple bending? 4M

   b) A 150mm wide and 250mm deep rectangular beam is subjected to a maximum bending moment of 750kNm. Determine
      i. The maximum stress in the beam
      ii. Find out the radius of curvature for that portion of the beam where the bending is maximum, take E as 2 x 10^5 N/mm^2
      iii. The value of the longitudinal stress at a distance of 65mm from top surface of the beam. 10M

4. a) A beam of triangular section having base width 200mm and height 300mm is subjected to a shear force of 3kN. Find the value of maximum shear stress, and sketch the shear stress distribution along the depth of the beam. 7M

   b) A circular beam 150mm diameter is subjected to a shear force of 7kN. Calculate the maximum shear stress, and sketch the shear stress distribution along the depth of the beam. 7M

5. Determine the relation between Slope, deflection and radius of curvature of a beam. 14M

6. A beam 3 m long, simply supported at its ends, is carrying a point load of 30kN at the midspan. The moment of inertia of the beam (i.e. I) is 16 x10^6 mm^4 .If E for the material of the beam =2.1x10^5 N/mm^2 , calculate:
   i. deflection at the centre of the beam and
   ii. slope at the supports 14M

7. An element in a stressed material has tensile stresses of 500 N/mm^2 (tensile) and 350 N/mm^2 (compressive) acting on two mutually perpendicular planes and equal shear stresses of 100N/mm^2 on these planes. Find Principal stresses and position of the Principal planes. Find also maximum shear stress. 14M

8. Explain the following theories of Failure:
   i. Maximum Principal stress theory
   ii. Maximum Principal strain theory
   iii. Maximum shear strain energy theory 14M

***

Hall Ticket Number :										

R-11 / R-13

Code: 1G632

II B.Tech. I Semester Supplementary Examinations May 2018

Surveying

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

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

****

1. a) With the help of a neat sketch explain Main Station, Tie Station, Main Survey line, Subsidiary line, Base line, Check line. 8M

   b) A survey line is obstructed by a high building. To prolong the line beyond the building, a 150m long perpendicular BC is set out at B. From C, two lines CD and CE are set out at angles of 30^0 and 40^0 with CB respectively. Determine the lengths CD and CE so that D and E may be on the prolongation of AB. If the chainage of B is 100m, find the chainage of D. A, B are one side of the building and D, E are on the opposite side. Draw a sketch. 6M

2. a) Define the following terms.
   i. Meridian
   ii. Azimuth of a line
   iii. Back bearing
   iv. Isoclinic lines 4M

   b) Explain with neat sketch Resection method of plotting of plane table survey 4M

   c) A traverse ABCD was run and due to obstruction, length and bearing of DA was omitted. Only the following readings were taken. Determine the length and bearing of line DA.

Line	Length (m)	Reduced Bearing
AB	44.5	N $50^0$20'E
BC	67.0	S 69^0 45'E
CD	61.3	S 30^0 10' E
DA	**?**	**?**

6M

3. a) With the help of neat sketch, explain the characteristics of contour lines 7M

   b) Following is a page of level book. Fill in the missing readings and calculate the reduced level of all points. Apply necessary checks.

Station	BS	IS	FS	Rise	Fall	RL	Remarks
1	3.250					**?**	BM
2	1.755		**?**		0.750	**?**	CP
3		1.950				**?**	
4	**?**		1.920			**?**	
5		2.340		1.500		**?**	
6		**?**		1.000		**?**	
7	1.850		2.185			250.00	CP
8		1.575				**?**	
9		**?**				**?**	
10	**?**		1.895		1.650	**?**	CP
11			1.350	0.750		**?**	Last Point

7M

4. a) Enumerate any four methods of determination of volume of earthwork. Describe their merits & demerits. 8M

   b) The following perpendicular offsets in meter are measured from a straight line to an irregular boundary at regular intervals of 10m.
   h1= 8.25, h2= 13.85, h3= 12.25, h4= 10.85, h5= 12.25, h6=13.6, h7=15.25, h8=16.85, h9= 14.95, h10=17.35, h11=20.05, h12=15.9, h13=12.25, h14=12.00.
   Compute the area lying between the straight line and the irregular boundary by
   i. Trapezoidal rule
   ii. Simpson's one third rule using (A) h1 as the first offset and (B) h14 as the first offset and h2 as last offset. 6M

5. a) List and explain temporary adjustments of a theodolite. 6M

   b) Following observations were made on a hill top to ascertain its elevation. The height of the target P was 5m, which was held on the hill top. Instrument stations were 100m apart and were in line with P. find the R. L. of the top of hill.

Instrument Station	Staff readings on Bench Mark (m)	Vertical angle on target P at hill top	R L of Bench Mark (m)
0_2	2.550	$18^0 6'$	345.580
0_1	1.670	$28^0 42'$	345.580

   8M

6. a) The stadia readings with horizontal sight on a vertical staff held 40m away from a tacheometer were 1.354 & 1.880. The focal length of the object glass was 25cm. the distance between the object glass and trunnion axis of the tacheometer was 15cm. calculate the stadia interval? 7M

   b) Illustrate step by step procedure to determine constants K and C of a tacheometer 7M

7. a) Two straights AI and BI meet at a chainage of 3450m. A right handed simple circular curve of 250m radius joins them. The deflection angle between two straights is 50^0. Tabulate the necessary data to layout a curve by Rankine's method of deflection angles. Take the chord interval as 20 m. 7M

   b) With the help of neat sketch explain procedure to set out a simple circular curve by offsets from chard produced method. 7M

8. a) Differentiate conventional survey instruments from Electronic distance measurement. 6M

   b) Enumerate the instrumental errors in Electronic Distance measurement. 4M

   c) Discuss the applications of Geographic Information System in Surveying. 4M

***