Hall Ticket Number :

Code : 1GC31 **R-11 / R-13**

II B.Tech. I Semester Supplementary Examinations Nov/Dec 2015

Mathematics-II

(Common to CE & ME)

Max. Marks: 70 **Time: 03 Hours**

Answer *any five* questions

All Questions carry equal marks (14 Marks each)

****

1. a) Find the Eigen values and Eigen vectors of the matrix $A=\begin{bmatrix}1 & 1 & 3\\ 1 & 5 & 1\\ 3 & 1 & 1\end{bmatrix}$. 7M

   b) Verify Cayley-Hamilton theorem for the matrix $A=\begin{bmatrix}2 & -1 & 1\\ -1 & 2 & -1\\ 1 & -1 & 2\end{bmatrix}$ and hence find its inverse. 7M

2. a) Find the Fourier series for $f(x)=e^{ax}$ in $(0, 2\pi)$. 7M

   b) Obtain the half range cosine series for $f(x)=x^3 \quad in \quad 0<x<L$. 7M

3. a) Form partial differential equation by eliminating the arbitrary functions from $z=f(x)+e^{y}g(x)$. 5M

   b) Solve the by the method of separation of variables $4u_x+u_y=3u \text{ and } u(0,y)=e^{-5y}$. 9M

4. a) Determine the root of $x^3-4x+1=0$ by method of false position. 7M

   b) Using Lagrange's formula, express the function $\frac{x^2+6x-1}{(x^2-1)(x-4)(x-6)}$ as a sum of partial fractions. 7M

5. a) Obtain Picard's second approximate solution of the initial value problem $\frac{dy}{dx}=\frac{x^2}{y^2+1}$, $y(0)=0$ .Find $y(1)$. 7M

   b) Given that $\frac{dy}{dx}=2+\sqrt{xy}$, $y(1)=1$. Find $y(2)$ in steps of **0.2** using the Euler's method. 7M

6. a) Determine $\frac{dy}{dx}$ at $x = 0$ from the following data

x	0	1	2	3	4	5
y	4	8	15	7	6	2

7M

b) Use Simpson's 1/3rd rule to find $\int_0^{\frac{®}{2}} \sqrt{\sin x}\ dx$ by taking $h = \frac{®}{12}$. 7M

7. a) Show that $f(z) = \begin{cases} \frac{x^2 y^5 (x + i\, y)}{x^4 + y^{10}}, & z \neq \\ 0 & z = \end{cases}$ is not analytic at $z = 0$ although the Cauchy-Riemann equations are satisfied at the origin. 7M

b) Find the analytic function whose real part is $e^{2x}(x\ \cos 2y - y\ \sin 2y)$. 7M

8. a) Use Cauchy's integral formula to evaluate $\int_C \frac{\sin ® z^2 + \cos ® z^2}{(z-1)(z-2)} dz$ where C is the circle $|z| = 3$. 7M

b) Find the Laurent series of $f(z) = \frac{z^2 - 1}{(z + \ )(z + \ )}$, for $|z| > 3$. 7M

***

Hall Ticket Number :

Code : 1G634

R-11 / R-13

II B.Tech. I Semester Supplementary Examinations Nov/Dec 2015

Building Materials and Construction

(Civil Engineering)

Max. Marks: 70 **Time: 03 Hours**

Answer *any five* questions

All Questions carry equal marks (14 Marks each)

****

1.	a)	List the methods of quarrying of stone and explain the method of quarrying of stone by blasting.	7M
	b)	What are the classifications of common bricks? Describe the test for bricks.	7M
2.	a)	How are tiles manufactured?	7M
	b)	Briefly explain different forms of bitumen.	4M
	c)	Enumerate the properties of aluminium.	3M
3.	a)	Briefly explain the constituents of lime stones.	5M
	b)	Explain the chemical composition of ordinary Portland cement.	4M
	c)	Enumerate the various methods of curing of concrete and briefly explain any one method.	5M
4.		Discuss in detail the defects occurring in the timber.	14M
5.	a)	Draw the isometric view of a corner of a one and half brick wall along with its plan for five layers in English bond.	8M
	b)	Explain Random Rubble stone masonry with a neat sketch.	6M
6.	a)	What are the purposes of foundations?	5M
	b)	Explain with the help of sketches, various types of shallow foundations.	9M
7.	a)	What are the functions of arches and lintels?	4M
	b)	State the essential requirements of a good roof. Write short notes on king post truss.	5M
	c)	Mention the types of staircases and illustrate any two with neat sketches.	5M
8.	a)	Explain in detail about white washing and colour washing.	7M
	b)	What are the various factors on which the selection of type of plaster depends on?	3M
	c)	What are the requirements of a good form work?	4M

***

Hall Ticket Number :										

R-11 / R-13

Code : 1G633

II B.Tech. I Semester Supplementary Examinations Nov/Dec 2015

Fluid Mechanics

(Civil Engineering)

Max. Marks: 70 **Time: 03 Hours**

Answer *any five* questions

All Questions carry equal marks (14 Marks each)

****

1. a) Derive expressions for excess programme over the surrounding pressure of a soap bubble in terms of surface tension.

   b) 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.

2. Obtain an expression for the total pressure acting on plane surface immersed in a fluid at any angle. Also find the corresponding depth of centre of pressure.

3. a) Define path line, streak line and stream line.

   b) Obtain the general three-dimensional continuity equation in differential form. Simplify the equation for a steady incompressible flow.

4. a) State the Bernoulli's theorem write its assumptions.

   b) A 200mm diameter to 150mm diameter reducing bend having included angle of 120^o is connected to a horizontal pipe carrying $0.3m^3$/sec of water. The pressure of the inlet to the bend is 300KPa. Determine the magnitude and direction of the force exerted by the bend. If 10% of the exit kinetic energy lost in the bend.

5. a) What are major and minor losses?

   b) Derive an expression for loss of head due to sudden enlargement of the pipe.

6. a) Define orifice & mouthpiece explain the classification with neat sketches.

   b) Derive an expression of discharge through a V-notch.

7. Derive Hagen–Poiseuille equation and state the assumptions made in the derivation.

8. a) What are the different methods of dimensional analysis?

   b) What is meant by scale effect? Why does it occur? Explain a method for quantifying the scale effect.

***

Hall Ticket Number :										

Code : 1G631 **R-11 / R-13**

II B.Tech. I Semester Supplementary Examinations Nov/Dec 2015

Strength of Materials-I

(Civil Engineering)

Max. Marks: 70 **Time: 03 Hours**

Answer *any five* questions

All Questions carry equal marks (14 Marks each)

****

1. a) 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. 6M

   b) Mild steel rod of 25 mm diameter and 300 mm long is enclosed centrally inside a hollow copper tube of external diameter 30 mm and internal diameter 25 mm. The composite bar is subjected to an axial pull of 50 kN. If E for steel and copper is 200 GPa and 100 GPa respectively, find the stresses developed in the rod and the tube. Also find the extension of the rod. 8M

2. a) A Cantilever 2 m long carries a varying load of zero at its free end to maximum of 20kN/m at fixed end. Draw shear force and bending moment diagrams for the cantilever. 6M

   b) A Simply supported beam 6 metre span carries udl of 10 KN/m for left half of span and two point loads of 25 kN end 50 kN at 4 m and 5 m from left support. Find maximum SF and BM and their location drawing SF and BM diagrams. 8M

3. a) Write the assumption in the theory of simple bending? 4M

   b) A beam simply supported at ends and having cross-section as shown in figure is loaded with a U.D.L., over whole of its span. If the beam is 8m long, find the U.D,L, if maximum permissible bending stress in tension is limited to 30N/m and in compression to 45MN/m^2. What are the actual maximum bending stresses set up in the section.

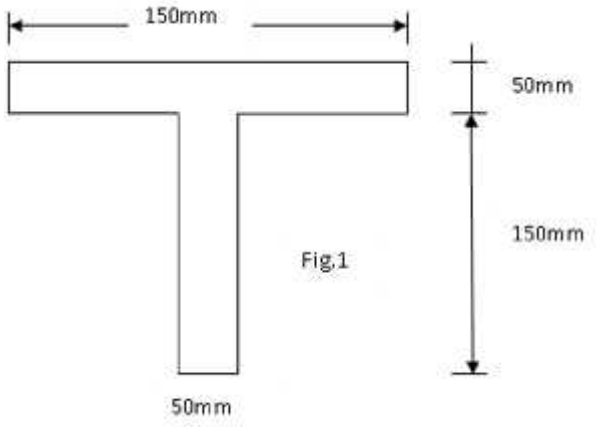

Fig.1

10M

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

   b) A beam of triangular cross section having base width of 100 mm and height of 150 mm is subjected to a shear force of 15 kN. Find the value of maximum shear stress, and sketch the shear stress distribution along the depth of beam. 8M

5. a) What are the advantages of Macaulay method over the double integration method, for finding the slope and deflections of beams? 4M

   b) A beam AB as of span 8m is simply supported at the ends A and B and is loaded as shown in figure. If E=200x106 kN/m^2 and I=20x10-6m^4. Determine
      i) deflection at the mid-span
      ii) maximum deflection
      iii) slope at the end A 10M

6. a) State Mohr's theorems I and II with suitable sketches. 6M

   b) A beam of length 6 m is simply supported at the ends and carries two point loads of 100 kN and 50 kN at a distance of 1 m and 3 m respectively from the left support. Compute the slope and deflection under each load. Assume EI = 17000 kN–m^2. 8M

7 a) Write the significance of Mohr's circle of stress. 6M

   b) The normal stress in two mutually perpendicular directions is 500N/mm^2 perpendicular directions is 500 N/mm^2 and 100 N/mm^2 both are tensile the complimentary shear stresses in these directions are the intensity 400 N/mm^2. Find the normal and tangential stresses in the two planes which are equally inclined to the planes carrying tthe normal stresses mentioned above. 8M

8 a) Explain the various theories of failure with suitable examples. 4M

   b) A cylindrical shaft 100mm diameter made of steel of yield strength 350MPa is subjected to static load of 100kN and bending moment of 10kN.m and a torsional moment of 30 kN.m. Determine the factor of the shaft using (**i**) Maximum principal stress theory, (**ii**) Maximum shear stress theory (**iii**) Maximum strain energy theory and (**iv**) maximum distortion energy theory. Take E = 200GPa, Poisson's ratio – 0.25. 10M

***

Hall Ticket Number :										

Code : 1G632 **R-11 / R-13**

II B.Tech. I Semester Supplementary Examinations Nov/Dec 2015

Surveying

(Civil Engineering)

Max. Marks: 70 **Time: 03 Hours**

Answer *any five* questions

All Questions carry equal marks (14 Marks each)

****

1. a) List out the instruments used in surveying and explain the principles of surveying.
   b) Explain the significant variation between Systematic Errors and Accidental Errors
2. a) Explain the following terms and its effect on surveying
      i) Magnetic Declination
      ii) Local Attraction
   b) Explain Bessal's Graphical method with neat sketch
3. a) The following staff readings were observed successively with dumpy level, the instrument has been shifted after second, fourth, and eighth readings:
      0.875, 1.235, 2.310, 1.385, 2.930, 3.125, 4.125, 0.120, 1.875, 2.030 and 3.765
      The First reading was taken with the staff held on Benchmark with elevation of 132.135. Enter the readings into the levelling book format and calculate reduced levels. Apply usual checkups and find the difference between first and last points
   b) Explain the characteristics of the contours
4. a) Derive the expression for Simpson's one third rule
   b) The area within the contour line at the site of reservoir and the face of the proposed dam is as follows

Contour	Area(m^2)	Contour	Area(m^2)
101	1000	106	1350000
102	12800	107	1985000
103	95200	108	2286000
104	147600	109	2512000
105	872500		

Taking 101 as the bottom level of the reservoir and 109 as the top level. Calculate the capacity of reservoir.

5 a) List out the significance of fundamental lines and how these are helpful in surveying
   b) The following lengths and bearings were recorded in running a theodolite traverse in the counter clockwise direction, the length of CD and bearings of have been omitted

Line	Length in met	Reduced Bearing
AB	281.4	S 69° 11' E
BC	129.4	N 21°49' E
CD	**	N 19° 34' W
DE	144.5	**
EA	168.7	S 74° 24' W

Determine the length of CD and bearing of DE.

6. a) Derive the expression for distance and elevation, when the staff held vertically

   b) The elevation of a point P is to be determined by observations from two adjacent stations of a tachometric survey. The staff was held vertically upon the point and the instrument was fitted with a analectic lens, the constant instrument being 100. Compute the elevation of the point P from the following data, taking both the observations as equally trustworthy

Inst. Station	Ht of Axis	Staff point	Vertical angle	Staff Readings	Elevation
A	1.42	P	+2°24’	1.23,2.055,2.88	77.5
B	1.40	P	- 3°36’	0.785,1.800,2.815	97.8

   Also calculate the distance of A and B from P.

7. a) Explain the procedure of Rankin’s deflection angle method

   b) A circular curve is tangential to the lines AI and BI intersecting at I with an angle 110°. Find the radius of the curve tangential to the lines passing through a point P and this point is located at angle of 26° from the line IA. The distance of P from I along this direction is 120 met.

8. a) What is the basic principle of electronic distance measurement

   b) What are the various components involved in Total station and explain their application.

***