Hall Ticket Number :										

R-11/R-13

Code : 1GC31

II B.Tech. I Semester Supplementary Examinations May/June 2016

Mathematics-II

(Common to CE & ME)

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

Answer *any five* questions

All Questions carry equal marks (14 Marks each)

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1. a) Find the Eigen values and Eigen vectors of the matrix $A=\begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$. 7M

   b) Verify Cayley-Hamilton theorem for the matrix $A=\begin{bmatrix} 7 & 2 & -2 \\ -6 & -1 & 2 \\ 6 & 2 & -1 \end{bmatrix}$ and hence find its inverse. 7M

2. a) Given that $f(x) = \begin{cases} -® \ , & -® < x < 0 \\ x \ , & 0 < x < ® \end{cases}$. Find the Fourier series for $f(x)$. Also deduce that $\frac{1}{1^2}+\frac{1}{3^2}+\frac{1}{5^2}+\frac{1}{7^2}+ \cdots\cdots = \frac{®^2}{8}$. 9M

   b) Obtain the half range sine series for $f(x)=e^x \ in \ 0 < x < 1$. 5M

3. a) Derive the partial differential equation by eliminating the constants from the equation $2z=\frac{x^2}{a^2}+\frac{y^2}{b^2}$. 4M

   b) A tightly stretched string with fixed end points $x=0$ and $x=L$ is initially in a position given by $y=y_0\sin^3\left(\frac{®x}{L}\right)$ if it is released from rest from this position, find the displacement $y(x,t)$. 10M

4. a) Determine the root of $x\,e^x - 2 = 0$ by method of false position. 7M

   b) Using Lagrange's formula, express the function $\frac{x^2+x-3}{x^3-2x^2-x+2}$ as a sum of partial fractions. 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) Apply Runge-Kutta method of 4th order, to find an approximate value of y when $x=0.2$ given that $\frac{dy}{dx}=x+y, \ y(0)=1$. 7M

6. a) Determine $\frac{dy}{dx}$ $at \ \ x = 2$ from the data below:

x:	0	1	2	3	4	5
y:	0	1	8	27	64	125

7M

b) Use Simpson's 1/3rd rule to find $\int_0^{0.6} e^{-x^2}\, dx$ by taking seven coordinates. 7M

7. a) Show that for $f(z) = \begin{cases} \dfrac{xy^2(x + i\,y)}{x^2 + y^4}, & z \neq (\\ 0 & z = \end{cases}$ the Cauchy-Riemann equations are satisfied at the origin but the derivative of $f(z)$ at origin does not exist. 7M

b) Find the analytic function $f(z) = u + i\,v$ where $u = \dfrac{\sin 2x}{(\cosh 2y - \cos 2x)}$. 7M

8. a) Use Cauchy's integral formula to evaluate $\int_C \dfrac{e^{2z}}{(z+1)^4}\, dz$ where C is the circle $|z| = 2.$ 7M

b) Find the Laurent series of $f(z) = \dfrac{(z-2)(z+2)}{(z+1)(z+4)}$, for **(i)** $1 < |z| < 4$ **(ii)** $|z| > 4$. 7M

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Hall Ticket Number :										

R-11/R-13

Code : 1G538

II B.Tech. I Semester Supplementary Examinations May/June 2016

Electrical & Mechanical Technology

(Civil Engineering)

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

Answer *any five* questions

(Minimum of two questions from each Part should be chosen for answering five questions)

Use Separate Booklets for Part-A and Part-B

All Questions carry equal marks (14 Marks each)

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PART-A

1. a) Discuss about various types of D.C generators.

   b) A 4-pole wave connected DC generator having 60 slots on its armature with 6 conductors per slot, run at 750 rpm and generate an open circuit voltage of 230V. Find the useful flux per pole.

2. a) Derive the condition for maximum efficiency of a transformer.

   b) Explain the procedure to conduct the following tests on a single phase transformer.
   i) Open circuit test and ii) Short circuit test

3. a) What is an alternator? What is its operating principle?

   b) Derive the expression for Torque of a 3- ø Induction motor.

4. With a neat diagram, explain the construction and working principle of permanent magnet moving coil instruments.

PART-B

5. a) What are the essential characteristics of a flux?

   b) Explain submerged arc welding with a neat diagram

6. a) Write a brief note on pressure lubrication system.

   b) Explain principle of 4-stroke diesel engine with neat diagram.

7. Draw a line diagram of an air-conditioning system used for hot and humid weather conditions and explain the purpose of each component.

8. a) List the important equipment and machinery used in earth moving.

   b) Explain the factors which are taken into consideration in the selection of earth moving machinery.

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Hall Ticket Number :										

Code : 1G631

R-11/R-13

II B.Tech. I Semester Supplementary Examinations May/June 2016

Strength of Materials-I

(Civil Engineering)

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

Answer *any five* questions

All Questions carry equal marks (14 Marks each)

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1. a) Derive the expression for extension of a bar of uniform cross section 'd' due to self-weight having length 'l' which is hanging vertically down. 6M

   b) A bar of magnesium alloy 30 mm in diameter was tested on a gauge length of 250 mm in tension and in torsion. A tensile load of 50kN produced an extension of 0.4 mm and a torque of 125000 N-mm produced a twist of 1.51 degrees. Determine the (**i**) Young's modulus (**ii**) Modulus of rigidity (**iii**) Bulk modulus (**iv**) Poisson's ratio for the material under test. 8M

2. a) Derive the relationship between load, shear force and bending moment in beams. 6M

   b) Draw the shear force and bending moment diagram for a simply supported beam of length 'L' subjected to couple at midspan. 8M

3. a) Derive the relation between the intensity of load and shear force, in bending theory. 4M

   b) A beam of size 150 mm wide, 250 mm deep carries a uniformly distributed load of w kN/m over entire span of 4 m. A concentrated load 1 kN is acting at a distance of 1.2 m from the left support. If the bending stress at a section 1.8 m from the left support is not to exceed 3.25 N/mm^2 find the load w. 10M

4. a) Sketch the shear stress distribution across the circular section of dimension 100mm. 6M

   b) A beam of rectangular cross section having width of 100 mm and height of 200 mm is subjected to a shear force of 25 KN. Find the value of maximum shear stress, and sketch the shear stress distribution along the depth of beam. 8M

5. a) Derive the deflection equation for the beam in the standard form $EI\frac{dy^2}{dx^2} = M$ 6M

   b) A simply supported beam of 6m span is subjected to a concentrated load of 10kN at 4m from left support. Calculate the position and value of maximum deflection using Mecaulay's method. Take E = 200 GPa and I = 15 x 10^6 mm^4, 8M

6. a) Derive the expression for maximum deflection of a simply Supported beam loaded with a central point load using Mohr's theorem. 6M

   b) Draw the shear force and bending moment diagram for a propped cantilever beam of span 'L', when it is subjected to udl over the entire length. 8M

7. a) Obtain an expression for normal and tangential stresses on an inclined plane when an element subjected to bi-axial direct stresses. Also obtain the expressions for resultant stress and their direction. 6M

   b) At a point in a strained material the principal stresses are 100 N/mm^2 (tensile) and 60 N/mm^2 (compressive). Determine normal stress, shear stress, resultant stress on a plane inclined at 30 degrees to the axis of the major principal stress. Also determine the maximum shear stress at the point. 8M

8. a) Write the significance of theories of failure in structures. 4M

   b) A cylindrical shaft of diameter made of steel of yield strength 250MPa is subjected to static load consiting of bending moment of 10kN.m and a torsional moment of 25kN.m. Determine the diameter of the shaft using (**i**) maximum principal stress theory, (**ii**) maximum shear stress theory and (**iii**) maximum distorsion energy theory. Take E=200GPa. Poisson;s ratio =0.25 and factor of safety =2. 10M

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Hall Ticket Number :										

R-11/R-13

Code : 1G632

II B.Tech. I Semester Supplementary Examinations May/June 2016

Surveying

(Civil Engineering)

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

Answer *any five* questions

All Questions carry equal marks (14 Marks each)

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1. a) Define Hypotenusal allowance and what is its significance in surveying

   b) A Chain line ABC crosses a river, B and C being on the near and distant banks respectively. The respective bearings of C and A taken at D, a point 60 met measured at right angles to AB from B are 280° and 190°, AB being 32 met. Find the width of the river.

2. a) List out the advantages and disadvantages of Plane Table surveying.

   b) The Following bearings were taken in running a compass traverse

Line	Fore Bearing	Back Bearing	Line	Fore Bearing	Back Bearing
AB	124°30’	304°30’	CD	310°30’	135°15’
BC	68°15’	246°0’	DA	200°15’	17°45’

   At what stations do you suspect local attraction? Find the corrected bearings of the lines.

3. a) Explain the effect of curvature and refraction on surveying

   b) Distinguish between the following
      i) Horizontal plane and level surface
      ii) Line of collimation and line of sight
      iii) Longitudinal section and cross section

4 a) A series of offsets were taken from a chain line to a curved boundary line at intervals of 15 met in the following order. 0, 2.65, 3.80, 3.75, 4.65, 3.60, 4.95, 5.85 met

   Compute the area between the chain line and curved boundary by
      i) Average ordinate method
      ii) Trapezoidal rule
      iii) Simpson’s rule.

   b) A railway embankment 400 met long and is 12 met wide at the formation level. It has side slope of 2:1. The ground levels at 100 met interval along the centre line as follows

Distance	0	100	200	300	400
R.L	204.8	206.2	207.5	207.2	208.3

   The formation level at zero chainage is 207.00 and the embankment has a rising gradient of 1 in 100. The ground is level across the centre line. Calculate the volume of earth work.

5. a) Explain the instrumental errors of theodolite work

   b) Explain various methods of theodolite traversing

6. a) What are the different methods employed in tachometric survey and describe the most commonly used.

   b) Explain the different methods for determining of tachometric constants and the significant effect of anallatic lens usage in tachometric survey.

7. a) List out the linear methods for setting out curve and explain off sets from long chord method

   b) A curve of radius 800 m has a deflection angle of 40° between the tangents. Calculate the radial and perpendicular offsets at 20 m intervals up to 100m.

8. a) What are the instrumental errors in electronic distance measurement?

   b) What are the basic concepts of triangulation and how the efficiency of work achieved through triangulation

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Hall Ticket Number :										

R-11 / R-13

Code: 1G633

II B. Tech. I-Semester Supplementary Examinations May/June 2016

Fluid Mechanics

(Civil Engineering)

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

Answer *any five* questions

All Questions carry equal marks (14 Marks each)

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1. a) Explain all properties of fluids.
   b) What is meant by Cavitation? What are the effects?

2. An annular plane having internal and external diameters of 0.75M and 1M respectively is kept immersed in an oil tank in such a way that it's greatest and least depths below the oil surface are 0.8M and 0.4M respectively. Determine the magnitude, direction and location of the force acting one side of the plate due to pressure. The specific gravity of oil is 0.92.

3. a) Define stream function and velocity potential function.
   b) The velocity components in a two-dimensional flow field for an incompressible fluid are expressed by $u = x - 4y$ and $v = -4x - y$ obtain expressions for stream function and velocity potential.

4. a) What are the different forces that are accounted for in the Euler's equation, Navier, Reynolds equations?
   b) Derive Euler's equation of motion along a stream line and hence derive Bernoulli's equation.

5. a) Differentiate pipes are parallel and series.
   b) Derive Darcy-Weisbaeh equation for turbulent flows.

6. a) Explain practical applications of Bernoulli's equation.
   b) Derive an expression for coefficient of discharge by using venture meter.

7. a) What is Reynolds number explain Engineering & Significance.
   b) In a laminar flow show that the average velocity of flow is half of the maximum velocity at any section.

8. a) What is meant by dimensionally homogeneous equation?
   b) Explain the Rayleigh method of dimensional analysis with an example.

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Hall Ticket Number :										

Code : 1G634

R-11/R-13

II B.Tech. I Semester Supplementary Examinations May/June 2016

Building Materials and Construction

(Civil Engineering)

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

Answer *any five* questions

All Questions carry equal marks (14 Marks each)

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1. a) Enumerate and briefly explain the characteristics to be considered for selection of stones for various civil engineering works. 7M

   b) With the help of a neat sketch, explain the working of Hoffman's Kiln for the burning of bricks. 7M

2. a) Describe various types of tiles. 7M

   b) Mention the properties and uses of various types of glass. 7M

3. a) Briefly explain the classification of limes. 5M

   b) Describe the field tests for cement. 5M

   c) Define and explain workability of concrete. 4M

4. a) What is meant by seasoning of timber? Explain the process of natural seasoning with its advantages and disadvantages. 7M

   b) Explain the factors which affect the physical properties of steel. 4M

   c) What are the properties of fibre reinforced plastics? 3M

5. a) Classify various types of stone masonry. Draw typical sketches to illustrate the same. 7M

   b) What are the requirements of a good partition wall? 4M

   c) Briefly explain Flemish bond in brick work. 3M

6. a) What are the causes of failure of foundations? What measures are to be taken to prevent such failures? 9M

   b) Explain raft foundation with a sketch. 5M

7. a) Distinguish clearly between a lintel and an arch. 3M

   b) State briefly the requirements of a good staircase. 3M

   c) Compare merits and demerits of flat and pitched roofs. 4M

   d) Briefly explain terrazo flooring. 4M

8. a) Briefly explain the various defects in painting. 3M

   b) Explain the causes of dampness in buildings and what are ill effects of dampness in buildings? 7M

   c) Describe the constituents of a varnish. 4M

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