

Code: 1GC31

II B.Tech. I Semester Supplementary Examinations November 2016

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)

1. a) Verify Cayley-Hamilton theorem for the matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 5 \\ 3 & 5 & 6 \end{bmatrix}$ and hence find the inverse of A 8M

b) Diagonalize the matrix $A = \begin{bmatrix} 4 & 1 \\ 2 & 3 \end{bmatrix}$ 6M

2. a) Obtain the Fourier series of $f(x) = \frac{(f-x)}{2}$ in the interval $(0, 2f)$.
 Deduce $\frac{f}{4} = 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \dots$ 7M

b) Find Fourier series of $f(x) = x^3$ in the interval $(-f, f)$ 7M

3. a) Form the partial differential equation by eliminating the arbitrary function $xyz = f(x + y + z)$ 7M

b) Use the separation of variables technique to solve $3\frac{\partial u}{\partial x} + 2\frac{\partial u}{\partial y} = 0$ with $u(x, 0) = 4e^{-x}$ 7M

4. a) Apply Newton-Raphson method to evaluate approximately $\sqrt{12}$ 7M

b) Using Newton's forward formula compute the pressure of the steam at temperature 142° from the following steam table

Temperature	140	150	160	170	180
Pressure	3.685	4.854	6.302	8.076	10.225

7M

5. Using Runge-Kutta fourth order method find the solution of $\frac{dy}{dx} = x + y$ with initial condition $y(0) = 0, h = 0.25$ on the interval $[0, 1]$. 14M

6. a) Find the first two derivatives at $x = 16$ from the following table:

x	15	17	19	21	23	25
y	3.873	4.123	4.359	4.583	4.796	5.8

7M

b) Given that $y = \log x$, and

x	4.0	4.2	4.4	4.6	4.8	5.0	5.2
y	1.3863	1.4351	1.4816	1.5261	1.5686	1.6094	1.6487

Evaluate $I = \int_4^{5.2} \log x \, dx$ by i) Trapezoidal rule and ii) Simpson's rule 7M

7. a) Show that the function $u(x, y) = e^x \cos y$ is harmonic. Determine its harmonic conjugate $v(x, y)$ and the analytic function. 7M

b) Show that the function $f(z) = \sqrt{|xy|}$ is not analytic at the origin, although the Cauchy-Riemann equations are satisfied at that point. 7M

8. a) Evaluate $\int_C \frac{e^z dz}{z(z-1)^3}$ where $C : |z| = 2$ using Cauchy's integral formula 7M

b) Obtain the Laurent's series expansion of the function $f(z) = \frac{z^2 - 1}{(z+3)(z+2)}$ in the region $2 < |z| < 3$. 7M

Hall Ticket Number :

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R-11 / R13

Code: 1G538

II B.Tech. I Semester Supplementary Examinations November 2016

Electrical & Mechanical Technology

(Civil Engineering)

Max. Marks: 70

Time: 3 Hours

Answer **five** questions by choosing **two** questions from **each Part**

All questions carry equal marks (14 Marks each)

Use separate booklets for Part-A & Part-B

PART-A

1. a) Explain the action of commutator in DC generators.
b) Explain the constructional features of a dc machine in detail.
2. a) Explain the losses that occur in transformers.
b) A 30 KVA single phase transformer has an iron loss of 457 watts and copper loss of 125 watts when delivering half the full load. At what percentage of full load will the transformer have maximum efficiency?
3. a) Explain with the help of diagram how a rotating magnetic field is produced in a 3-phase Induction Motor.
b) Explain about Torque- slips Characteristics of 3- phase Induction motor.
4. a) Explain different torques required for the operation of an instrument.
b) Explain the operation of permanent magnet moving coil ammeter with neat diagram.

PART-B

5. a) List the advantages and disadvantages of a gas welding over arc welding process.
b) Illustrate the formation of neutral, oxidizing and reducing flames in a welding torch of a gas welding.
6. Explain the working of a two stroke petrol engine with neat sketches. In what context it differs from a two stroke diesel engine?
7. a) Compare vapour compression refrigeration system with a vapour absorption refrigeration system.
b) Explain different properties of a refrigerant.
8. a) What are the advantages of a multi-stage compression over single stage? List the applications of a compressed air.
b) Classify various material handling systems with examples.

Hall Ticket Number :

R-11 / R-13

Code: 1G631

II B.Tech. I Semester Supplementary Examinations November 2016

Strength of Materials-I

(Civil Engineering)

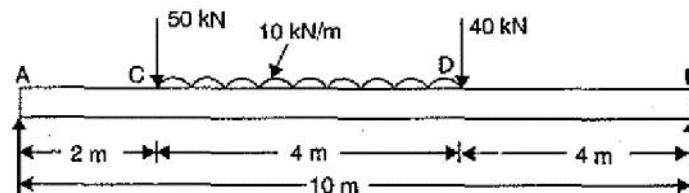
Max. Marks: 70

Time: 3 Hours

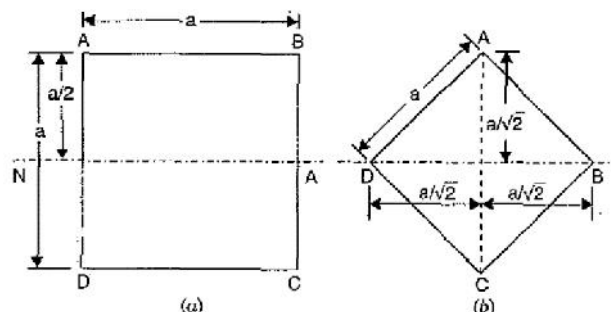
Answer any **five** questions

All Questions carry equal marks (14 Marks each)

1. a) What is the difference between the engineering and true stress strains? Derive the relationship between them. 6M
- b) Determine the final volumes of a square bar under uni-axial strain of 0.01 if the initial un-loaded cross sectional area and length of the bar are 2500 mm^2 and 250 mm respectively. take poisons ratio = 0.3. 8M
2. a) What do you mean by shear force and bending moment at a section of a beam? Derive the relation between them. 6M
- b) A simply supported beam of length 10 m carries the uniformly distributed load and two point loads as shown in Fig. Draw the S.F. and B.M. diagram for the beam. Also calculate the maximum bending moment. 8M



3. a) What is the difference between uniform bending and non-uniform bending? State the assumptions made in the theory of simple bending. 6M
- b) A beam is of square section of the side 'a'. If the permissible bending stress is ' σ ', find the moment of resistance when the beam section is placed such that (a) two sides are horizontal, (b) one diagonal is vertical. Find also the ratio of the moments of the resistance of the section in the two positions. 8M

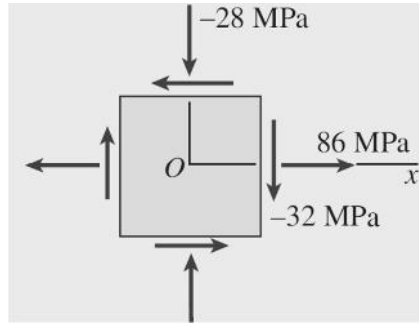


4. Derive an equation for distribution of transverse shear stresses in a beam. State the assumptions made. 14M
5. A cantilever beam of length 3 m carries two point loads of 2 kN and 4 kN at a distance of 1 m and 2 m from the free end. Find the shear stress and deflection at the free end. 14M

Take $E = 2 \times 10^5 \text{ Mpa}$, and $I = 10^8 \text{ mm}^4$.

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6. Define and discuss Mohr's first moment-area theorem and second theorem. 14M
7. What is the significance of principal stresses in design? The state of stress at a point is as shown below. Find the principal normal and principal shear stresses. Show the planes on which they act.



14M

8. State the significance and application of theories of failure. Derive an expression for distortion energy theory of failure.

14M

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R-11 / R-13

Code: 1G632

II B.Tech. I Semester Supplementary Examinations November 2016

Surveying
(Civil Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any **five** questions

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

1. a) What are the different sources of errors in chain surveying? Explain briefly. 6M
b) Explain clearly the various tape corrections. 8M
2. a) Define the terms local attraction, dip and magnetic declination. 6M
b) Write a note on the accessories used in the plane table surveying. Explain the term orientation. 8M
3. a) What is reciprocal leveling? Under which circumstances it is adopted? 7M
b) Describe the various methods of contouring. Discuss the merits and demerits of each. 7M
4. a) State and explain Simpson's one third rule to find areas. 7M
b) Enumerate the methods of determining the volume of earth work along with their merits and demerits 7M
5. a) List out the fundamental lines of a transit. Clearly mention the desirable conditions to obtain the perfect readings. 8M
b) What is meant by balancing a traverse? Explain with illustrations. 6M
6. a) List out the methods adopted in Tacheometric surveying. Explain any one of them. 7M
b) What is a subtense bar? Give a note of the procedure to determine the horizontal distance between two points using subtense bar. 7M
7. a) Clearly explain the different methods of setting out the simple curves. 7M
b) Write a note on two- theodolite method. 7M
8. a) What is the basic principle on which EDM depends? 5M
b) How are the EDM instruments classified? Briefly explain their working. 9M

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II B.Tech. I Semester Supplementary Examinations November 2016

Fluid Mechanics

(Civil Engineering)

Max. Marks: 70

Time: 3 Hours

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

1. a) The dynamic viscosity of oil, used for lubrication between a shaft and sleeve is 6 poise. The shaft is of diameter 0.4m and rotates at 190 r.p.m. Calculate the power lost in the bearing for a sleeve length of 90 mm. The thickness of oil film is 1.5 mm. 8M
b) State and prove Pascal's law. 6M
2. a) What do you understand by 'Total Pressure' and 'Centre of Pressure'? 4M
b) A circular plate 3.0 m diameter is immersed in water in such a way that its greatest and least depths below the free surface are 4 m and 1.5 m respectively. Determine the total pressure on one face of the plate and position of the centre of pressure. 10M
3. a) Explain the classification of fluid flows. 10M
b) Define the terms
(i) velocity potential function and
(ii) stream function. 4M
4. a) Derive the Bernoulli's energy equation for flow along a streamline. State the assumptions involved. 10M
b) Water is flowing through a pipe having diameter 300 mm and 200 mm at the bottom and upper end respectively. The intensity of pressure at the bottom end is 24.525 N/cm² and the pressure at the upper end is 9.81 N/cm². Determine the difference in datum head if the rate of flow through pipe is 40 lit/s. 4M
5. a) Derive the Darcy-Weisbach equation for the loss of head due to friction in pipes. 8M
b) Explain the terms 'Total Energy line' and 'Hydraulic gradient line'. 6M
6. a) Derive an expression for the discharge through an orifice meter. 8M
b) A rectangular channel 2.0 m wide has a discharge of 250 liters per second, which is measured by a right-angled V-notch weir. Find the position of the apex of the notch from the bed of the channel if maximum depth of water is not to exceed 1.3 m. Take $C_d = 0.62$. 6M
7. a) Explain the different stages of filament in the Reynolds experiment with neat sketches. 10M
b) Distinguish between hydrodynamically smooth and rough boundaries. 4M
8. a) What are the methods of dimensional analysis? Describe the Rayleigh's method for dimensional analysis. 5M
b) Explain the geometric, kinematic and dynamic similarities. 9M

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R-11/R-13

Code: 1G634

II B.Tech. I Semester Supplementary Examinations November 2016

Building materials and Construction

(Civil Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any **five** questions

All Questions carry equal marks (14 Marks each)

1. a) Classify stones and give a note on dressing and quarrying of stones. 9M
b) Compare and contrast clamp burning and kiln burning. 5M
2. a) Write about characteristics of good tile. 6M
b) Discuss about atleast three materials for roofing purpose other than traditional tiles. 8M
3. a) Which one do you prefer for construction – lime or cement? Discuss and justify in terms of their properties and drawbacks. 7M
b) Explain laboratory test on cement. 7M
4. a) Give a brief note on seasoning and defects in timber. 7M
b) Write about uses of fiber reinforced plastics and aluminum with respect to construction. 7M
5. a) Give a detailed note on English and Flemish bonds with neat sketches. 7M
b) What are cavity walls and when do you use them. 7M
6. a) Classify types of footings and explain any two. 8M
b) List construction situations and choice of corresponding footings. 6M
7. a) Differentiate King and Queen post trusses. 7M
b) With the help of a neat diagram explain the components of stair case. 7M
8. a) What is the purpose of form work and scaffolding? 5M
b) Write about plastering, pointing, and painting. 9M
