R-17

Code: 7G633

II B.Tech. I Semester Supplementary Examinations November 2020

Strength of Materials

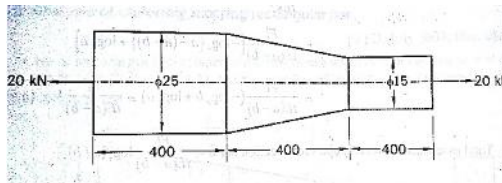(Civil Engineering)

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) Derive the expression for the elongation of taper round bar subjected to axial tensile load.   7M

   b) Find the total elongation in the bar made of steel loaded as shown in the figure. Take modulus of elasticity as 200 GPa.

7M

OR

2. a) Derive the relation between young's modulus and bulk modulus.   7M

    b) Find strain energy stored in a round rod of diameter 50 mm and 4 m long when a load of 50 kN is gradually applied. $E = 2 \times 10^5$ N/mm^2. Also find the stretch in the rod.   7M

UNIT–II
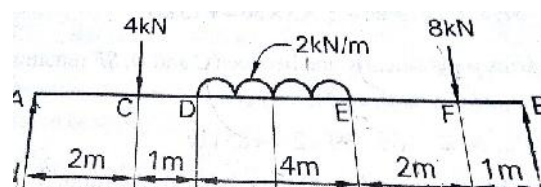
3. a) With neat sketches explain the various loads acting on a beam.   5M

    b) Draw the shear force and bending moment diagrams for a beam loaded as shown in figure.
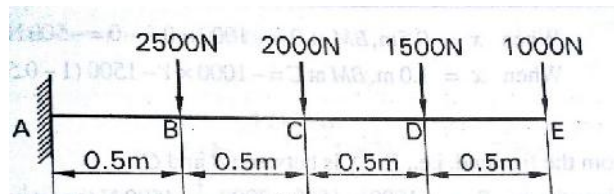
9M

OR

4. a) Explain the relation between shear force and bending moment.   4M

    b) Draw the shear force and bending moment diagrams for a bam loaded as shown in figure.

10M

UNIT–III

5. a) Derive the equation of bending.   8M

    b) A cantilever beam 1 m long having rectangular cross section 90 mm wide and 150 mm deep fails when a concentrated load of 30 kN is applied at its free end. What uniformly distributed load is to be applied over entire span for the same beam to cause failure?   6M

OR

6. a) Derive the equation for the maximum shear stress for a rectangular cross section subjected to a transverse shear load. 7M

    b) A simply supported beam of circular cross section 60 mm diameter and 3 m long, caries a central load of 90 kN. Find the maximum bending stress and maximum shear stress. Sketch the distribution of stresses. 7M

UNIT–IV

7. a) A cantilever beam of length L carries a point load W at its free end. Determine the deflection and slope at the free end. 7M

    b) A simply supported beam of rectangular cross section 60 mm wide and 90 mm deep is 1.2 m long.   It carries a central load of 60 kN. Find the maximum deflection at the middle and slope at the supports. 7M

OR

8. A simply supported beam of length 2 m is supported at its ends and carries concentrated loads of 30 kN and 40 kN at distances 800 mm and 1400 mm from left support. The beam is of rectangular cross section 100 mm wide and 120 mm deep. E = 210 GPa. Find the deflection of the beam at load points. 14M

UNIT–V

9. At a point in a strained material, the stresses on two planes at right angles to each other are 100 MPa tensile and 50 MPa compressive and a complementary shear stresses in these directions of 40MPa. Find the normal and shear stresses on a plane inclined at 30^0 to plane of 100 MPa. Also find the maximum principal stress and maximum shear stress. 14M

OR

10. a) Derive the expression for maximum principal stress theory of failure. 10M

    b) A round rod is subjected to a bending moment of 3 kN-m and a torque of 1.2kN-m. Find the diameter of the rod according to the maximum principal stress theory. The allowable stress may be taken as 90 MPa. 4M

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Code: 7G634

II B.Tech. I Semester Supplementary Examinations November 2020
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) What are the steps of chain surveying in the field?   5M

   b) A 30-m chain was tested before starting the day's work and found to be 20 cm short. After measuring a length of 1200 m, the chain was tested again and was found to be 10 cm too long. At the end of the day's work the chain was tested again and was found to be 30 cm too long. Find the true length of the line if the total length measured was 2648 m.   4M

   c) Describe about the errors in chaining.   5M

OR

2. a) The following bearings were observed in running a closed traverse:

Line	F.B.	B.B.
AB	75º5	254º20
BC	115º20	296º35
CD	165º35	345º35
DE	224º50	44º5
EA	304º50	125º5

   7M

   At what stations do you suspect the local attraction? Determine the correct magnetic bearings. If declination was 5°10 E, what are the true bearings?

   b) What are the errors in compass surveying?   5M

   c) Define angle of dip or dip of the needle.   2M

UNIT–II

3. a) State and derive the Simpson's one-third rule.   4M

   b) The following table gives the corrected latitudes and departures (in meters) of the sides of a closed traverse ABCD:

Side	Latitude N	Latitude S	Departure E	Departure W
AB	108		4	
BC	15		249	
CD		123	4	
DA	0			257

   Compute its area by D.M.D. method.   3M

   c) A two-level section is shown in Figure. Find the area of the section.
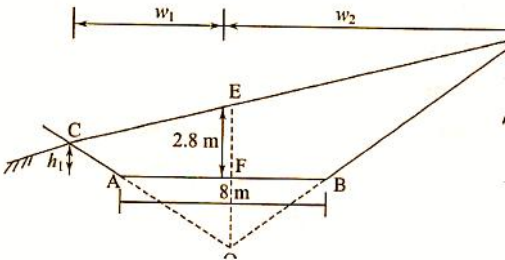
   7M

OR

4. a) The following consecutive readings were taken with a level and a 4 m staff on a continuously sloping ground at a common interval of 30 m: 0.780, 1.535, 1.955, 2.430, 2.985, 3.480, 1.155, 1.960, 2.365, 3.640, 0.935, 1.045, 1.630 and 2.545. The reduced level of the first point A was 180.750 m. Rule out a page of a level field book and enter the above readings. Calculate the reduce levels of the points by the collimation system. Also calculate the gradient of the line joining the first and last points.   7M

   b) Explain the characteristics of contours with neat sketches.   7M

UNIT–III

5. a) Explain the procedure to measure a horizontal angle by direction method or reiteration method.   7M

   b) Describe the temporary adjustments of theodolite in the field.   7M

OR

6. a) Describe the procedure to measure vertical angle with appropriate diagram.   7M

   b) The whole circle bearings of the lines of a closed traverse are given below. Find the included angles of the traverse.

Line	AB	BC	CD	DA
Bearing	78º40 20	152º31 40	251º18 40	3º44 15

    7M

UNIT–IV

7. a) Explain the methods of plane table surveying with neat sketches.   7M

   b) Describe the two point and three point problem.   7M

OR

8. a) Define anallactic lens and its function.   2M

   b) Determine the gradient from a point A to point B from the following observations made with a tacheometer fitted with an anallactic lens. The constant of the instrument was 100 and staff was held vertically.

Inst. station	Staff point	Bearing	Vertical angle	Staff readings
P	A	134º	+10º32	1.360, 1.915, 2.470
	B	224º	+5º6	1.065, 1.885, 2.705

    7M

   c) What are the tacheometric methods? Explain them briefly.   5M

UNIT–V

9. a) Write the requirements of transition curve.   4M

   b) A circular curve has a 200 m radius and 65° deflection angle. What is its degree (i) by arc definition (ii) by chord definition. Also calculate: (i) length of curve (ii) tangent length (iii) length of long chord (iv) apex distance and (v) mid-ordinate.   5M

   c) Write the methods for calculating the length of transition curves.   5M

OR

10. a) A curve of radius 400 m and deflection angle 30° is to be set using a tacheometer. If the tacheometer constants are 100 and 0, list the staff intercepts to locate points on the curve at 20 m intervals. The chainage of tangent point T_1 is 1326.78 m.   7M

   b) Describe about the obstacles in laying out simple curve with diagram.   7M

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II B.Tech. I Semester Supplementary Examinations November 2020
Building Materials and Construction
(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 are the geological physical, and chemical classification of rock?

   b) Briefly explain the laboratory tests that are usually carried out to determine the quality of stones.

OR

2. a) What are light-weight bricks? Where are they commonly used?

   b) Write a short notes on moulding of bricks, modular bricks.

UNIT–II

3. What is meant by the term tile? What are the characteristics of good floor tiles, wall tiles and roof tiles

OR

4. Explain the mechanics of the setting and cementing action of lime, Compare if with that of Portland cement.

UNIT–III

5. a) Sketch the diagram of a growing free showing its different parts.

   b) Give a brief account of the defects that you look for in timber.

OR

6. a) How is teak graded compared to other types of wood?

   b) Write a short note on ASCU treatment.

UNIT–IV

7. a) What are the different types of brick masonry?

   b) What are the features of an English bond?

OR

8. a) Define foundations and mention their objectives?

   b) How will you design the width and depth of shallow foundations?

UNIT–V

9. a) What are the basic functional requirements of a building?

   b) Discuss three main parts of a building

OR

10. a) Explain clearly the meaning of the term damp proofing.

    b) What is pointing? How is it carried out? What are its different types?

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Code: 7GC32

II B.Tech. I Semester Supplementary Examinations November 2020
Engineering Mathematics – III
(Common to All Branches)

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 a root of the equation $x^3 - x - 11 = 0$ by using Bisection method.

   b) Find a root of the equation $3x = \cos x + 1$ by Newton-Raphson method, correct to three decimal places.

OR

2. a) Apply Euler's method to solve for y when $x = 0.6$ given that $y' = 1 - 2xy$, $y(0) = 0$.

   b) Using Runge-Kutta method of order 4, compute $y(0.2)$ from

   $$10\frac{dy}{dx} = x^2 + y^2, \ y(0) = 1, \ h = 0.1.$$

UNIT–II

3. a) Find the missing term in the following table using Lagrange's interpolation

x	1	2	4	5	6
y	14	15	5	-	9

   b) From the following table, estimate the number of students who obtained marks between 40 and 45.

Marks	30-40	40-50	50-60	60-70	70-80
Number of Students	31	42	51	35	31

OR

4. a) Evaluate $\int_0^1 \frac{1}{1+x^2} dx$, by using Trapezoidal rule with $h = 0.2$. Hence determine the value of f.

   b) Compute the value of $\int_{0.2}^{1.4} (\sin x - \log x + e^x) dx$ using Simpson's $\frac{3}{8}$th rule.

UNIT–III

5. a) Find the least squares fit of the form $y = a_0 + a_1 x^2$ to the following data

x	-1	0	1	2
y	2	5	3	0

   b) Solve : $xp - yq = y^2 - x^2$.

OR

6. a) Fit a curve of the form $y = ae^{bx}$ to the following data.

x	0	1	2	3
y	1.05	2.10	3.85	8.30

   b) Using method of separation of variables, Solve $\frac{\partial u}{\partial x} = 4\frac{\partial u}{\partial y}$, given that $u(0, y) = 8e^{-3y}$.

7. a) If $f(x) = \begin{cases} -x, & -f < x < 0 \\ x, & 0 < x < f. \end{cases}$

   then show that $f(x) = \dfrac{f}{2} - \dfrac{4}{f} \left[\dfrac{1}{1^2} \cos x + \dfrac{1}{3^2} \cos 3x + \dfrac{1}{5^2} \cos 5x + \cdots \right].$

   b) Find a Fourier series to represent $f(x) = |\sin x|$ in the interval $-f < x < f$.

OR

8. a) Obtain the half range sine series for e^x in $0 < x < 1$.

   b) Find the Half range cosine series for the function $f(x) = (x-1)^2$ in the interval $0 < x < 1$.

9. a) Find the Fourier transform of $f(x) = \begin{cases} 1 & \text{for } |x| < 1 \\ 0 & \text{for } |x| > 1. \end{cases}$ Hence evaluate $\displaystyle\int_0^\infty \dfrac{\sin x}{x} dx.$

   b) Find the Fourier Cosine transform of $f(x) = \begin{cases} x, & 0 < x < 1 \\ 2-x, & 1 < x < 2 \\ 0, & x > 2 \end{cases}.$

OR

10. a) Find the Fourier sine transform of $\dfrac{e^{-ax}}{x}$.

   b) Show that the inverse finite Fourier sine transform of $F_s(n) = \dfrac{1}{f} \left\{ 1 + \cos nf - 2 \cos \dfrac{nf}{2} \right\}$ is

   $f(x) = \begin{cases} 1, & 0 < x < f/2 \\ -1, & f/2 < x < f \end{cases}.$

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Code: **7G537**

II B.Tech. I Semester Supplementary Examinations November 2020

Electrical Technology & Mechanical Technology

(Civil Engineering)

Max. Marks: 70   Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

*Use separate booklets for **Part-A & Part-B***

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PART-A

UNIT–I

1. a) What are different elements in electrical circuits define each element; write properties, importance with symbols?   7M

    b) Calculate the following parameters?

    i.   Equibvalent resistance across the voltage source?

    ii. Caluclate the current in 10 ohms resistance when source voltage is 20V?
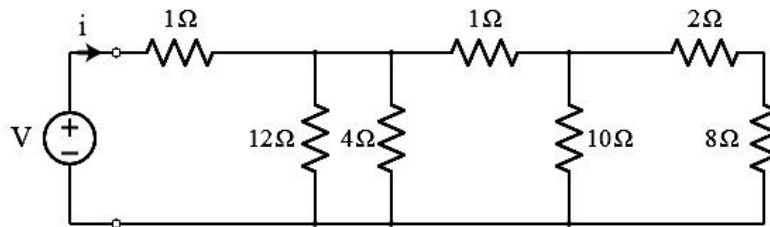
7M

OR

2. a) Explain the principle of operation of DC motor with constructional futures?   7M

    b) Find the value of current flowing through 20   resistor by using KVL & KCL?
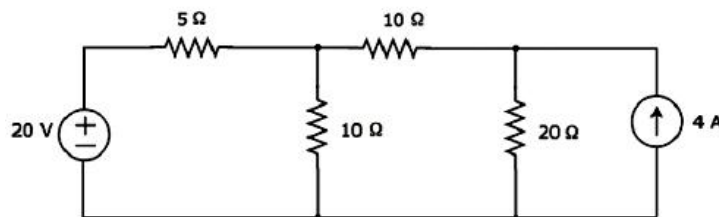
7M

UNIT–II

3. a) Explain the principle of operation of three phase induction motor; with neat diagram explain the torque-slip characteristics?   10M

    b) Explain what is alternator, write the applications of alternator?   4M

OR

4. a) What are the different types losses present in a transformer and explain them in brief?   7M

    b) Define the terms transformer, Induction motor, alternator mention the operational procedure and write their importance?   7M

PART-B

UNIT–III

5. a) What is welding? Classify the welding processes?   7M

    b) List out various advantages and disadvantages of gas welding over arc welding?   7M

OR

6. a) Explain why do we require coatings on shielded electrodes?   7M

    b) Describe the working principle of TIG welding? List few applications of it.   7M

UNIT–IV

7. a) What are the major components of an IC Engine? Explain their functions in brief?   7M

    b) Distinguish between SI and CI engines?   7M

OR

8. a) Explain the significance of fuel injection system in a CI engine and discus about basic components of it?   8M

    b) Discus how could we minimize work spent on multi stage compression instead of a single stage compression for the same pressure ratio?   6M

UNIT–V

9. a) Explain the working of a vapour compression refrigeration system with the required line diagram?   8M

    b) List the desirable properties of a good refrigerant?   6M

OR

10. a) Define what is air conditioning?   4M

    b) Explain about the working of a year round air conditioning system with neat sketch?   10M

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