R-17

Code: 7G631

II B.Tech. I Semester Supplementary Examinations May 2019
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 qualities of good building stones? Discuss them   7M
   b) Describe the process of blasting?   7M

OR

2. a) Write about dressing of stone.   7M
   b) What are the precautions to be taken while dressing a stone? Explain.   7M

UNIT–II

3. a) Write Methods of manufacture of lime?   7M
   b) List out the constituents of limestone. Explain the importance of each   7M

OR

4. a) What are the different types of tiles?   7M
   b) State the general properties and importance of glass.   7M

UNIT–III

5. a) What is seasoning of timber   4M
   b) Explain the classification of wood used in buildings in detail?   10M

OR

6. a) Explain decay of timber.   4M
   b) Discuss about alternative materials for wood.   10M

UNIT–IV

7. a) Explain the difference between English and Flemish bond?   7M
   b) Explain about Rubble and Ashlar masonry?   7M

OR

8.   List various types of foundations and Explain them?   14M

UNIT–V

9. a) List different types of roofs?   4M
   b) Explain king post truss with a neat sketch   10M

OR

10. a) What is damp proofing? Discuss the materials used.   4M
    b) Explain the following items in case of staircases (i) Balustrade (ii) Handrail
       (iii) soffit (iv) pitch and (v) Rise and Tread   10M

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Hall Ticket Number :

R-17

Code: 7G537

II B.Tech. I Semester Supplementary Examinations May 2019
Electrical & 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) Explain R, L, C parameters in detail.   6M

   b) Three resistance of 4 , 1 , 3 are connected in parallel and the combination
      is connected in series with 8 resistor. If the whole combination is connected
      across 220 V DC supply. Find the current flowing through each resistor.   8M

OR

2. a) Explain the constructional details of a DC generator with neat diagram.   8M

   b) A 4 pole DC motor has lap connected armature winding. The flux per pole is
      30 mWb. The number of armature conductors is 250. When connected to 220
      V DC supply it draws an armature resistance of 40A. Calculate back e.m.f. and
      Speed with which motor is running. Assume R_a=0.6 .   6M

UNIT–II

3. a) Derive e.m.f. equation of a single phase transformer.   8M

   b) A single phase transformer has 300 primary and 1000 secondary turns. The
      primary is connected to 400V, 50Hz, AC supply. If the net cross sectional area
      of core is 50 cm^2. Calculate
      i.   Maximum value of flux density in the core.
      ii. Induced e.m.f. in secondary winding.   6M

OR

4. a) Explain the principle of operation of alternator.   6M

   b) A 3- induction motor is wound for 4 poles and supplied from a 50 Hz supply.
      Determine
      (i)   Synchronous speed.
      (ii) Slip when rotor speed is 900 rpm.
      (iii) Rotor frequency at that slip.   8M

PART-B

UNIT–III

5. a) List the advantages and disadvantages of a gas welding over arc welding process.   7M

    b) Distinguish between welding, brazing and soldering?   7M

OR

6. a) What are the functions of coatings on shielded electrodes?   7M

    b) Describe MIG welding process stating its advantages and limitations.   7M

UNIT–IV

7. a) What are the important basic components of an IC engine? Explain them briefly.   7M

    b) Explain the working principle of a four stroke S.I. engine with the help of a neat sketch?   7M

OR

8. a) What are the characteristics of a good fuel supply system? Explain fuel supply system in petrol engine.   7M

    b) Explain the working principle of a single stage reciprocating air compressor.   7M

UNIT–V

9. a) Discuss the properties of any three refrigerants used in refrigeration system.   7M

    b) Explain the working of vapour compression refrigeration system and state its advantages and disadvantages?   7M

OR

10. a) Define air conditioning. Explain the factors affecting comfort air conditioning.   7M

    b) Discuss the equipment used in air conditioning systems.   7M

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Hall Ticket Number :

Code: 7G632

II B.Tech. I Semester Supplementary Examinations May 2019
Fluid Mechanics
(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) A velocity profile of a flowing fluid over a flat plate is parabolic and given by $u = ay^2 + by + c$ where a, b and c are constants. The velocity of fluid is 1.2 m/s at 20 cm from the plate which the vertex point of the velocity distribution. Find out the velocity gradients and shear stresses at $y = 0, 10$ and 20 cm respectively.

    b) Write short notes on micro manometers.

OR

2. A solid cylinder of diameter 4.0 m has a height of 4.0 m. Find the meta-centric height of the cylinder if the specific gravity of the material of $\text{cylinder} = 0.6$ and it is floating in water with its axis vertical. State whether the equilibrium is stable or unstable.

UNIT–II

3. a) What are the different forms of energy in a flowing fluid? Represent schematically the Bernoulli's equation for flow through a tapering pipe and show the position of total energy line and the datum line.

    b) What is a flow net? Give it uses.

OR

4. The velocity components in a two-dimensional flow are
    $$u = y^3/3 + 2x - x^2y \text{ and } v = xy^2 - 2y - x^3/3.$$
    Show that these components represent a possible case of an irrational flow.

UNIT–III

5. A pumping station supplying water to a town of the one lac population is located at 5 km from the town. The water required is $200 \text{ L/per person/day.}$ Half of the required water is to be supplied within 5 hrs. The loss in friction is limited to 25 m of water. Determine the diameter of the pipe required.

OR

6. What is venturimeter? Also derive the expression to find the rate of flow through a venturimeter.

UNIT–IV

7. When do you call the boundaries as hydro dynamically smooth and rough?

OR

8. A laminar flow is taking place in a pipe of diameter 200 mm. The maximum velocity is 1.5 m/s. Find the mean velocity and the radius at which this occurs. Also calculate the velocity at 4 cm from the wall of the pipe.

UNIT–V

9. a) What are Model laws?

    b) Explain Rayleigh's method.

OR

10. a) State Buckingham's $\pi - \text{theorem}$. What do you mean by repeating variables? How are the repeating variables selected in dimensional analysis?

    b) The discharge through a weir is $1.5 \text{ m}^3/\text{s}$. Find the discharge through the model of the weir if the horizontal dimension of the $\text{model} = \frac{1}{40}$ the horizontal dimension of the prototype and vertical dimension of the $\text{model} = \frac{1}{12}$ the vertical dimension of the prototype.

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II B.Tech. I Semester Supplementary Examinations May 2019
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) Define poisons ratio. Why its value lies between 0 and 1/2 for stable
        materials.   4M

    b) Two layers of carbon fiber are stuck to each other, so that their fibres lie at
        90° to each other, as shown in Figure. If a tensile force of 1 kN were applied
        to this two-layer compound bar, determine the stresses in each. For layer 1,
        E_1 = 300 GPa and A_1 = 10 mm^2 For layer 2, E_2 = 50 GPa and A_2 = $A1$ = 10
        mm^2.

                                                                            10M
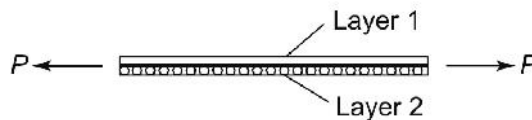
OR

2. a) Define strain energy. Calculate strain energy for a specimen in simple tension
        test.   4M

    b) What change in volume would a 20 cm cube of steel suffer at a depth of 4 km
        in sea water? Take E=200Gpa, and poisons ratio=0.29. Density of sea
        water=1.02g/cc.   10M

UNIT–II

3. a) Draw the shear force and bending moment diagram for the beam shown
        below indicating salient features.

                                                                            10M
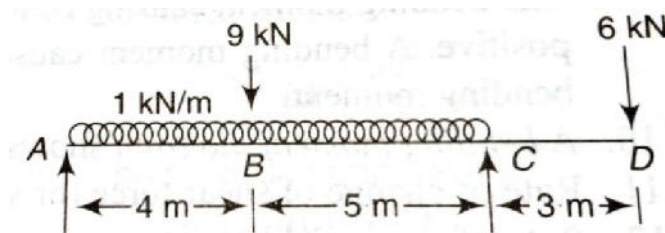
    b) Classify the beams based on support reactions with neat diagram.   4M

OR

4. a) Indicate the shapes of the shear force and bending moment diagrams in case
        of UDL and for triangular loads.   4M

    b) A cantilever beam carries a distributed load the intensity of which varies
        linearly from 10kN/m at the fixed end to 5kN/m at the free end along with
        point load of 2kN at free end. Draw the shear force and bending moment
        diagrams.   10M

5. a) State the assumptions made in the theory of Euler-Bernouli beam. 4M

   b) A cast iron pipe of 200mm internal diameter and 220mm external diameter is supported at two ends 8m apart. Determine the maximum stress in the pipe material when it runs full. The density of the cast iron is 70kN/m³ and of water 9.81kN/m³. 10M

OR

6. Derive the expression for shear stress distribution in solid circular beam. Obtain the ratio between the maximum and average shear stress. 14M

UNIT–IV

7. a) A beam of length 6m is simply supported at its ends and carries two point loads of 36kN and 40kN at a distance of 1m and 3m respectively from the left support. Find the deflection under each load and maximum deflection using Macaulay's functions. 10M

   b) What are Macaulay's functions? State their significance in deflections of beams. 4M

OR

8. An overhang beam with equal overhangs of 1m is loaded with two point loads of 40kN each at the ends of the beam. Length of the beam is 4m. EI=5100 kN-m². Use moment area method to find the deflection at the midspan C and at the free end D of the overhang beam. 14M

UNIT–V

9. a) Define state of stress at a point. What is the significance of principal stresses? 4M

   b) State of stress at point is given as $\sigma_x = 4MPa, \sigma_y = 2MPa \text{ and } \tau = -7Mpa.$ Draw the Mohr's circle and hence deduce principal stresses and maximum shear stress. Find also the inclinations of principal planes. 10M

OR

10. a) State maximum strain theory of failure and draw the failure envelop with neat diagram indicating salient points. 10M

    b) Maximum principal stress theory is used for designing of brittle materials preferably. Comment. 4M

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Hall Ticket Number :

R-17

Code: 7G634

II B.Tech. I Semester Supplementary Examinations May 2019

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. Explain about classification of surveying   14M

OR

2. a) The following bearings are the bearings observed in traversing, with a compass, an area where local attraction was suspected. Calculate the interior angles of the traverse and correct them?

Line	FB	BB
AB	$150^0 0'$	$330^0 0'$
BC	$230^0 30'$	$48^0 0'$
CD	$306^0 15'$	$127^0 45'$
DE	$298^0 0'$	$120^0 0'$
EA	$49^0 30'$	$229^0 30'$

14M

UNIT–II

3. The following readings were obtained in running a line of fly levels from a B.M of elevation 162.350. From the position of the instrument, 6 pegs at 20 mm intervals are to be set out on a uniform falling gradient of 1 in 50. The first peg is to have a RL of 162.220. Work out the staff readings required for setting the tops of the pegs on the given gradient and enter the result in a level book form.

Back sight	2.850	1.690	2.075	1.720	0.955
Fore sight	2.325	1.575	2.340	1.855	

14M

OR

4. a) The following offsets were taken at 15 m intervals from a survey line to an irregularly boundary line: 3.50, 4.30, 6.75, 5.25, 7.5, 8.80, 7.90, 6.40, 4.40 and 3.25 m. Calculate the area enclosed between the survey line, the irregular boundary line, and the first and last offsets by trapezoidal rule and Simpson's rule.   14M

UNIT–III

5. a) Explain about Gale's traverse table   7M

b) Explain about Temporary and permanent adjustments of vernier transit theodolite   7M

OR

6. a) Write the desired relations between fundamental lines and enumerate the permanent adjustments of vernier transit theodolite. Explain the temporary adjustments   7M

b) A straight tunnel is to be run between two points A and B whose independent coordinates are:

Station	Northing	Easting
A	0	0
B	3014	256
C	1764	1398

It is desired to sink a shaft at D, the mid-point of AB. It is not possible to measure along AB directly. Therefore, D is to be fixed from C, another point whose independent coordinates are known. Calculate the:

(i) Independent coordinates of D

(ii) Length of bearing of CD

(iii) Angles ACD, given the W.C.B of AC is $38^0 35'$. 7M

UNIT–IV

7. a) List out the methods of plane table surveying 7M

b) The bearing of the sides of traverse ABCDE are given below. Compute the interior angles of the traverse.

Line	Fore bearing	Back bearing
AB	$110^0 15'$	$290^0 15'$
BC	$35^0 15'$	$215^0 15'$
CD	$276^0 30'$	$96^0 30'$
DE	$195^0 30'$	$15^0 30'$
EA	$131^0 15'$	$312^0 15'$

7M

OR

8. a) What is the principle of stadia tacheometry? Derive distance equation for staff vertical condition? 7M

b) The following observations are made on a vertical held staff:

Station	R.L. (m)	H.I (m)	Coordinates of station		Staff station	Vertical angle	Bearing	Stadia hair readings
A	1020.60	1.50	1800 N	800 E	P	$+8^0 12'$	$15^0 12'$	1.100, 1.850, 2.600
B	1021.21	1.53	2500 N	950 E	Q	$+2^0 11'$	$340^0 21'$	

The instrument is fitted with an anallactic lens and the instrument constant is 100. Compute the gradient from point P to point Q and bearing of PQ 7M

UNIT–V

9. a) What are the elements of a simple circular curve? What are unit chord and sub chord? 7M

b) A circular curve has a 200 m radius and 65^0 deflection angle. Find (i) Degree of the curve (ii) Length of the curve (iii) Tangent length (iv) Length of long chord (v) Apex distance and (vi) Mid-ordinate 7M

OR

10. What are the characteristics and functions of a Total Station? Enumerate the parts of a Total station Instrument with a neat sketch. 14M

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Code: 7GC32

II B.Tech. I Semester Supplementary Examinations May 2019

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 real root of the equation $x^3 - 2x - 5 = 0$ using bisection method correct to three decimal places.   7M

   b) Find the real root of the equation $\sin^2 x + 1 = x^2$ using Newton-Raphson method.   7M

OR

2. a) Employ Euler's method to obtain the approximate value of y at $x = 1.0$ for the differential equation $\frac{dy}{dx} = x - y^2, \ y(0) = 1.$ 7M

   b) Apply Runge-Kutta method of order 4, compute $y(0.2) \ and \ y(0.4)$ from the equation $\frac{dy}{dx} = x + y, \ y(0) = 1.$ 7M

UNIT–II

3. a) The population of a town in the decennial census was given below

Year : x	1891	1901	1911	1921	1931
Population: y (in thousands)	46	66	81	93	101

   Estimate the population for the year 1925.   7M

   b) Use Lagrange's interpolation formula to find the value of y when $x = 3.5$ from the following table

x	0	1	3	4
y	-12	0	12	24

                                                                                                  7M

OR

4. a) Find the first and second derivatives of the function tabulated below at the point $x = 1.5$

x	1.5	2.0	2.5	3.0	4.0
y	3.375	7.0	13.625	38.875	59

                                                                                                  7M

   b) Evaluate $\int_0^1 \frac{dx}{1+x^2}$ by using

   (i)Trapezoidal rule (ii)Simpson's $\frac{1}{3}$ rule and (iii)Simpson's $\frac{3}{8}$ rule with $h = 0.5 \, and \, 0.125$ 7M

5. a) Determine the values of $a \, and \, b$ by the method of least squares such that

$y = ae^{bx}$ fits the following data

x	2	4	6	8	10
y	4.077	11.084	30.128	81.897	222.62

7M

b) Solve $\left(p^2 + q^2 \right) y = qz$ using Charpit's method.

7M

OR

6. a) Fit a second degree polynomial to the following data by the method of least squares

x	10	12	15	23	20
y	14	17	23	25	21

7M

b) Using the method of separation of variables,

solve $\dfrac{\partial u}{\partial x} = 4\dfrac{\partial u}{\partial y}$, $when \; u\left(0, y \right) = 8e^{-3y}$

7M

UNIT–IV

7. Prove that $x^2 = \dfrac{f^2}{3} + 4\sum\limits_{n=1}^{\infty}(-1)^n \dfrac{\cos nx}{n^2}$, $-f < x < f$ by using Fourier series and

hence show that $\sum\limits_{n=1}^{\infty}\dfrac{1}{n^2} = \dfrac{f^2}{6}$

14M

OR

8. Obtain a half range cosine series for $f\left(x \right) = \begin{cases} kx, \, 0 \le x \le l/2 \\ k\left(l - x \right), l/2 \le x \le l \end{cases}$

and deduce the sum of the series is $\dfrac{1}{1^2} + \dfrac{1}{3^2} + \dfrac{1}{5^2} + ... = \dfrac{f^2}{8}$

14M

UNIT–V

9. Find the Fourier sine and cosine transforms of $e^{-ax}\left(a > 0 \right)$. Hence Evaluate the

integrals $\int\limits_{0}^{\infty}\dfrac{x\sin \} x}{x^2 + a^2}dx$ and $\int\limits_{0}^{\infty}\dfrac{\cos \} x}{x^2 + a^2}dx$

14M

OR

10. Obtain the Fourier sine transfromation of

$f\left(x \right) = \begin{cases} 4x, & for \; 0 < x < 1 \\ 4 - x, & for \; 1 < x < 4 \\ 0, & for \; x > 4 \end{cases}$

14M

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