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R-11 / R-13

Code: 1G634

II B.Tech. I Semester Supplementary Examinations Nov/Dec 2017

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) What are the tests to which a stone should be subjected before it is selected for building purposes? 7M
 b) When is it required to quarry stones by blasting? How do you quantify the requirement of explosives in blasting rocks? 7M

2. a) What are the characteristics of good tiles? Write type of tiles. 7M
 b) Write different uses of aluminium, glass and bituminous materials in building. 7M

3. a) What is cement? Write different types of cement and methods of manufacturing of cement. 7M
 b) Explain the classification of limes. Compare fat lime and hydraulic lime. 7M

4. a) What is timber and it's seasoning? Explain different methods of seasoning with advantages and disadvantages. 7M
 b) Classify tree and write advantages of wood. Describe various parts of exogenous tree at any cross-section. 7M

5. a) Explain types of masonry. Describe classification of rubble masonry in details. 7M
 a) Differentiate between English bond and Flemish bond. 7M

6. a) What are the purposes of foundations? 6M
 b) Explain with the help of sketches, various types of shallow foundations. 8M

7. a) Explain different types of Lintels, Arches and Stair cases and their purposes. 7M
 b) Discus different types of floors and roofs with uses. 7M

8. a) Write the objectives of plastering and pointing. Explain different types of pointing. 7M
 b) Describe centering, shuttering and scaffolding. 7M

Code: 1G538

II B.Tech. I Semester Supplementary Examinations Nov/Dec 2017

Electrical & Mechanical Technology

(Civil Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five questions by choosing at least 2 questions from each part

Use separate booklets for Part-A & Part-B

PART-A

1. a) i. State ohm's law. What are the limitations of ohm's law?
ii. Explain inductance parameter in detail. 6M
- b) i. State KVL & KCL.
ii. A 10 Ω resistor is connected across 50V battery.
Calculate:
(A) Current through resistor.
(B) Power consumed by resistor.
(C) Energy with time 10 seconds. 8M
2. a) Explain the types of DC generators with neat diagrams. 8M
b) Explain the principle of operation of DC generator. 6M
3. a) Explain the principle of operation of single phase transformer. 7M
b) A 4 kVA, 200/400 V, 50 Hz, 1- ϕ transformer has equivalent resistance referred to primary as 0.15 Ω . Calculate
i. Total copper loss on full load.
ii. Efficiency while supplying full load at 0.9 p.f lagging.
iii. Efficiency while supplying half load at 0.8 p.f lagging.
Assume iron losses equal to 60W. 7M
4. a) Explain the torque-slip characteristics of three phase induction motor. 7M
b) Derive the expression for e.m.f. of 3- ϕ alternator. 7M

PART-B

5. a) What is welding? Classify the welding processes? 7M
b) Exemplify the formation of various types of flames in oxy acetylene welding process with neat sketches. 7M
6. a) Describe the working principle of arc welding and explain the importance of polarity in arc welding. 7M
b) Describe the working of TIG with its specific applications. 7M
7. a) Compare four stroke and two stroke cycle engines. Bring out clearly their relative merits and demerits. 7M
b) Explain the working of a two stroke petrol engine with neat sketch. 7M
8. a) Define air-conditioning. Explain room air-conditioning system with a neat sketch. 7M
b) Explain the following terms briefly :
i. Refrigerating effect
ii. Wet bulb temperature
iii. Dew point temperature
iv. Psychrometry
v. Comfort Air conditioning
vi. Relative humidity
vii. coefficient of performance 7M

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II B.Tech. I Semester Supplementary Examinations Nov/Dec 2017

Fluid Mechanics

(Civil Engineering)

Max. Marks: 70

Time: 3 Hours

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

1. a) List all fluid properties and derive Newton's law of viscosity. 6M
 b) A U-tube differential manometer connects two pressure pipes A and B. Pipe A contains carbon tetrachloride having a specific gravity 1.594 under a pressure of 11.772 N/cm^2 and pipe B contains oil of specific gravity 0.8 under a pressure of 11.772 N/cm^2 . The pipe A lies 2.5m above pipe B. Find the difference of pressure measured by mercury as fluid filling U-tube. 8M
2. a) Prove that the centre of pressure of a completely sub-merged plane surface is always below the centre of gravity of the sub-merged surface. 8M
 b) A rectangular plane surface is 2m wide and 3m deep. It lies in vertical plane in water. Determine the total pressure and position of centre of pressure on the plane surface when its upper edge is horizontal and coincides with water surface. 6M
3. a) What is flow net? Explain 6M
 b) Define stream function and velocity potential. What are their uses 8M
4. a) What are the surface and body forces? State the Bernoulli's equation and discuss the significance of different terms. 6M
 b) A pipe of 300mm diameter conveying $0.30 \text{ m}^3/\text{sec}$ of water has a right angled bend in a horizontal plane. Find the resultant force exerted on the bend if the pressure at inlet and outlet of the bend are 24.525 N/cm^2 and 23.544 N/cm^2 . 8M
5. a) Derive the Darcy - Weisbach equation for friction head loss in a pipe. 6M
 b) What are hydraulic gradient line and total energy line? How do you draw the same? 8M
6. a) Explain the working of orifice meter with neat sketch. 6M
 b) A horizontal venturimeter with inlet diameter 20cm and throat diameter 10cm is used to measure the flow of oil of specific gravity 0.8. The discharge of oil through venture meter is 60litres/s. Find the reading of the oil-mercury differential manometer. Take $C_d=0.98$. 8M
7. a) A laminar flow is taking place in a pipe of diameter of 200mm. The maximum velocity is 1.5m/s. Find the mean velocity and the radius at which this occurs. Also find the velocity at 4cm from the wall of the pipe 10M
 b) Describe Reynolds experiment to demonstrate two types of flow. 4M
8. a) The efficiency of a fan depends on density, dynamic viscosity μ of the fluid, angular velocity, diameter D of the rotor and the discharge Q. Express in terms of dimensionless parameters. Use Buckingham's π -Theorem. 10M
 b) What do you mean by dimensionless numbers? Name any four dimensionless numbers. 4M

Code: 1GC31

II B.Tech. I Semester Supplementary Examinations Nov/Dec 2017

Mathematics -II

(Common to CE & ME)

Max. Marks: 70

Time: 3 Hours

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

1. a) Prove that a square matrix A and its transpose A^T have the same Eigen values 4M

- b) Diagonalize the matrix $A = \begin{bmatrix} 8 & -8 & -2 \\ 4 & -3 & -2 \\ 3 & -4 & 1 \end{bmatrix}$ and hence calculate A^4 . 10M

2. a) Expand the function $f(x) = x - x^2$ as a Fourier series in $[-\pi, \pi]$. 7M

- b) Find the half-range Fourier sine series for $f(x) = ax + b$ in $0 < x < \pi$ 7M

3. a) Form the PDE by eliminating the arbitrary function $z = f(x^2 + y^2 + z^2)$ 7M

- b) Solve by Method of separation of variables $y^3 \frac{\partial z}{\partial x} + x^2 \frac{\partial z}{\partial y} = 0$ 7M

4. a) Find a root of the equation $x^3 - 4x - 9 = 0$ using False position method 7M

- b) Use Lagrange's interpolation formula to find the value of y when $x=10$, if the following values of x and y are given

x:	5	6	9	11
y:	12	13	14	16

7M

5. a) Find the first and second derivatives of f(x) of x=0 if

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

7M

- b) Evaluate $\int_0^2 e^{x^2} dx$ using Simpson's rule taking $h=0.25$ 7M

6. Find $y(0.1)$, $y(0.2)$, $y(0.3)$ using Taylor's series method given that

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

14M

7. a) Show that the function $f(z) = \sqrt{|x|y|}$ is not analytic at the origin even though C-R equation are satisfied thereof. 7M

- b) If 'u' is a harmonic function, show that $w=z^2$ is not a harmonic function unless 'u' is a constant. 7M

8. a) Evaluate $\int_C \frac{z^3 - \sin 3z}{\left(z - \frac{f}{2}\right)^3} dz$ with $C: |z| = 2$ using Cauchy's integral formula. 7M

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

Code: 1G631

II B.Tech. I Semester Supplementary Examinations Nov/Dec 2017

Strength of Materials-I

(Civil Engineering)

Max. Marks: 70

Time: 3 Hours

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

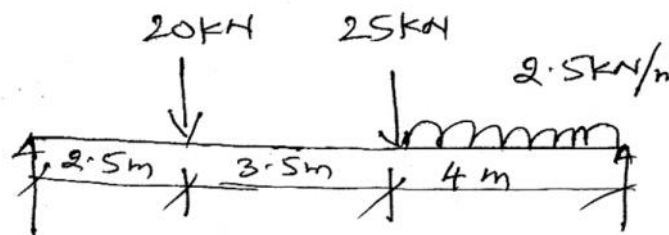
1. a) Explain Hook's Law 4M

- b) A gun metal rod screwed at the end passes through a steel tube. The tube has 25 mm external diameter 20 mm internal diameter. The diameter of the rod is 16 mm. The assembly is heated to 400 K and the nuts on the rod are then tightly screwed home on the ends of the tube. Find the intensity of stress in the rod and in the tube, when the common temperature falls to 100 K.

Coefficient of thermal expansion of steel = 12×10^{-6} per KCoefficient of thermal expansion of gunmetal = 20×10^{-6} per K $E_s = 0.91 \times 10^5 \text{ N/mm}^2$ $E_g = 2 \times 10^5 \text{ N/mm}^2$ 10M

2. a) Derive the relationship between shear force and bending moment 4M

- b) Draw SFD and BMD of the following beam shown in figure



10M

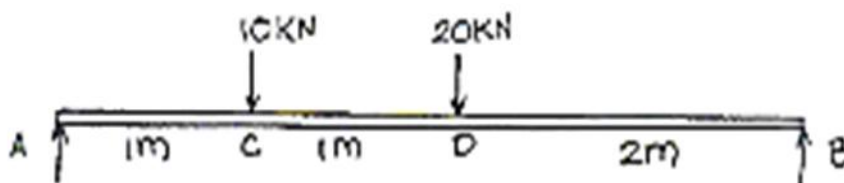
3. a) Derive theory of simple bending equation from the basic assumptions 4M

- b) A 30 cm x 16 cm rolled steel joist of I-section with 30 cm horizontal has flanges 11 mm thick and web 8mm thick. Find the safe uniformly distributed load that this section will carry over a span of 6 m , if the permissible skin stress is limited to 110 N/mm^2 10M

4. a) Derive shear stress equation for beams 5M

- b) A beam of triangular cross section with base 'b' and height 'h' , is used with the base horizontal. Calculate the intensity of maximum shear stress and plot the variation of shear stress intensity along the section 9M

5. Determine the maximum deflection of the following beam using macauly's method Take $I = 8000 \text{ cm}^2$ and $E = 2.1 \times 10^5 \text{ N/mm}^2$



14M

6. a) Determine deflection of simply supported beam subjected to UDL load using Mohr's theorem 7M
- b) Determine deflection and slope at free end of cantilever beam subjected to UDL load using Mohr's theorem 7M
7. A propeller shaft of 200mm external diameter and 100 mm internal diameter has to transmit 1360 kW power at 80 rpm. In addition, it is subjected to a BM of 10 KN-m and an end thrust of 100 KN. Find
- i) The principal stresses and their planes
- ii) The maximum shear stress and its plane 14M
8. a) Explain various theories of failure 6M
- b) The load on a bolt consists of an axial pull of 10 kN together with a transverse shear force of 5 kN. Find the diameter of bolt required according to
- i. Maximum principal stress theory;
- ii. Maximum shear stress theory ;
- iii. Maximum principal strain theory;
- iv. Maximum strain energy theory ; and
- v. Maximum distortion energy theory.
- Permissible tensile stress at elastic limit 200Mpa & $\mu = 0.3$ 8M

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II B.Tech. I Semester Supplementary Examinations Nov/Dec 2017

Surveying

(Civil Engineering)

Max. Marks: 70

Time: 3 Hours

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

1. a) Explain the following terms:

(i) Accuracy (ii) Precision (iii) Discrepancy (iv) True Error

4M

b) Explain the direct method of ranging by the use of time ranger with a neat sketch

4M

c) The distance between the points measured along a slope is 800m. Find the distance between the points, if:

(i) The angle of the slope between the points is 10° .

(ii) The difference in level between the points is 60m.

6M

2. a) What is meant by orientation in plane table surveying? List the different methods.

4M

b) Distinguish between

(i) Magnetic Bearing and True Bearing;

(ii) Whole circle bearing and reduced bearing

4M

c) The following bearings are observed with a compass. Calculate the interior angles.

Line	AB	BC	CD	DE	EA
Fore Bearing in degrees	$60^\circ 30'$	$122^\circ 00'$	$46^\circ 0'$	$205^\circ 30'$	$300^\circ 0'$

6M

3. a) Define Contour. List the uses of contour maps

4M

b) Explain the temporary adjustments of dumpy level

4M

c) The following points were observed successively with a leveling instrument. The instrument was shifted after 5th and 11th readings. Draw a level page book and determine RL's of various points by H.I method if the RL of 1st point is 264.350 m.**Readings are:**

0.485, 1.020, 1.787, 3.395, 3.875, 0.360, 1.305, 1.785, 2.675, 3.385, 3.885, 1.835, 0.435 and 1.705

6M

4. a) List the various methods of measurements of area by offsets from baseline. State their relative merits and demerits

4M

b) Describe the principle of Planimeter in measuring area of irregular figure

4M

c) The following table gives the corrected latitudes and departures in metres of the sides of a closed traverse

Side	Latitude		Departure	
	N	S	E	W
PQ	128		9	
QR	15		258	
RS		143	9	
SP	0			276

6M

5. a) Differentiate between:
- (i) Transiting and swinging the telescope;
 - (ii) The upper plate and the lower plate of a theodolite 4M
- b) List the operations that can be performed with a transit theodolite and explain the method of measuring the magnetic bearing of a line. 4M
- c) Explain the procedure for measuring horizontal angles by the method of reiteration 6M
6. a) Derive the standard Tacheometric expression for the horizontal distance with usual notations 4M
- b) Write explanatory notes on: Anallactic lens (ii) Beaman's stadia arc 4M
- c) A tacheometer fitted with anallactic lens was set up at station D with the following observations with $K=100$. Calculate the RL of A and B and also gradient from A to B. RL of instrument axis = 150m
- | Station Sighted | Bearing | Staff Reading | Vertical Angle |
|-----------------|------------------|---------------------|------------------|
| A | $330^{\circ}20'$ | 1.255, 1.860, 2.465 | $+12^{\circ}12'$ |
| B | $20^{\circ}36'$ | 1.30, 1.885, 2.47 | $+10^{\circ}36'$ |
- 6M
7. a) What are the different methods of setting out a simple curve? Explain the procedure for setting a simple curve by offsets from long chords produced. 7M
- b) Two straight lines having total deflection angle of 76° are to be connected by a compound curve. The radius of first arc is 500m and that of the second arc is 800m. If the chainage of point of intersection is 7540m, find the chainage of tangent points and point of compound curvature. Deflection angle for the first arc is 35° 7M
8. a) Explain the basic properties of electromagnetic waves 4M
- b) Explain the basic principle of EDM devices 4M
- c) What is meant by GIS? Explain the concept of GPS as applied to GIS 6M
