II SEMESTER EXAMINATION, 2022 – 23
First Year, B.Tech – Civil Engineering
BASIC CIVIL ENGINEERING AND MECHANICS

Duration: 3:00 hrs   **Max Marks: 100**

Note: - Attempt all questions. All Questions carry equal marks. In case of any ambiguity or missing data, the same may be assumed and state the assumption made in the answer.

Q 1.	Answer any four parts of the following.	5x4=20
	a) What are the properties of good building stones and bricks?	
	b) Explain the different tests of cement.	
	c) What are the different types of limes that are used as building material?	
	d) What is the seasoning of timber? How timber is used as a building material?	
	e) What is workability? How is it tested?	
	f) Write the properties of concrete that make it a good building material.	
Q 2.	Answer any four parts of the following.	5x4=20
	a) What is surveying? Why is it done? What are the different instruments and methods involved?	
	b) What is the difference between conventional methods and EDM's for distance measurement?	
	c) Explain reciprocal levelling with suitable example.	
	d) How are directions and elevations measured in surveying?	
	e) What are contours? Enlist their characteristics.	
	f) Explain profile leveling and cross sectioning with appropriate examples.	
Q 3.	Answer any two parts of the following.	10x2= 20
	a) Explain the laboratory tests of concrete and mortar.	
	b) Explain the various components of a building.	
	c) What is remote sensing? Explain different processes involved in it? What are its applications?	
Q 4.	Answer any two parts of the following.	10x2= 20
	a) The following readings were taken sequence during leveling work: 1.605, 2.150, 1.385, 1.895, 1.365, 2.105, 1.950, 0.985, 1.305, 1.185and 1.145. The first reading was to a BM of 100m elevation. Find the RL's of the remaining stations if the instrument was shifted after 3rd reading.	
	b) (i) Area A has the following properties. $I_x = 6.4 \times 10^6$ mm4, $I_y = 16 \times 10^6$ mm4 and $I_{xy} = 6.4 \times 10^6$ mm4. Calculate maximum and minimum principal moment of inertia.	
	(ii) A simply supported beam of span 5m is loaded with a concentrated load of 4kN at 1m from right end. The beam is also loaded with a uniformly distributed load of 2kN/m length over 2m from the left end of the beam. Find the reactions at the supports of the beam using principle of virtual work.	
	c) Distinguish Free vibration and Forced vibration. Explain instantaneous center of rotation.	
Q 5.	Answer any two parts of the following.	10x2= 20
	a) ABCD is a rectangle where AB = 40mm and BC = 30mm. E is the middle point	

of AB. Forces of magnitude 18, 20, 14, 16, 10 and 8N act along AB, CB, CD, EC, DE and AD respectively. Find the magnitude, direction and position of the equilibrant. B is to the right of A and taken in the anticlockwise direction.

b) Explain laws of friction. Explain free body diagram with the example of a ladder resting against a smooth wall and a rough floor.

c) A simply supported beam AB of span 4m is carrying point loads 5kN, 2kN and 3kN at 1m, 2m and 3m respectively from the support A. It also carries a uniformly distributed load of 2kN/m over the entire span of the beam. Find the support reactions.

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