GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–VII(NEW) EXAMINATION – SUMMER 2019

Subject Code:2170612   **Date:10/05/2019**

Subject Name:Earthquake Engineering

Time:02:30 PM TO 05:00 PM   **Total Marks: 70**

Instructions:
1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks**
4. **Permit use of IS-1893 and IS-13920**

Q.1	**(a)**	Define (i) iso-seismal (ii) Epicenter (iii) Damping	**03**
	(b)	Differentiate between: . (1) Static and Dynamic Analysis,(2) Damped and undamped structures	**04**
	(c)	Explain four virtues of earthquake resistant design.	**07**
Q.2	**(a)**	Explain "elastic rebound theory".	**03**
	(b)	Enumerate various failure mechanism of a masonry building.	**04**
	(c)	Explain and sketch the provisions of ductile detailing of reinforcement at various locations in beams.	**07**
		OR	
	(c)	Write the equation of motion for damped free vibration and derive the expressions for the displacement.	**07**
Q.3	**(a)**	Name the major plates of the earth.	**03**
	(b)	How design eccentricity is calculated as per IS :1893 (1) -2002?	**04**
	(c)	Explain the Short Column Effects in detail.	**07**
		OR	
Q.3	**(a)**	State the soil conditions under which liquefaction can occur	**03**
	(b)	Differentiat between shear wall and flexure wall.	**04**
	(c)	What are the codal provisions for vertical reinforcement in masonry walls?	**07**
Q.4	**(a)**	Explain floating column.	**03**
	(b)	Differentiate :(1)Strength and Stiffness (2)Ductility and Flexibility	**04**
	(c)	A spring mass model consists of 5 kg mass and spring of stiffness 3.5 N/mm was tested for viscous damped vibration. The test recorded two consecutive amplitude is 1.5 cm and 1.2 respectively. Determine (i) natural frequency of undamped system (ii) logarithmic decrement(iii)damping ratio (iv) damping coefficient (v) damped natural frequency of system.	**07**
		OR	
Q.4	**(a)**	Differentiate between active and passive methods of structural control.	**03**
	(b)	Explain : (1) Inertia force (2) Pounding	**04**
	(c)	Explain in brief base isolation technique.	**07**
Q.5	**(a)**	Calculate base shear in for seven storey school RC frame building for hospital ,located in Bhuj ,with following data by seismic coefficient method. (a) No. of bay in x direction = 6 (b) No. of bay in y direction = 4 (c) Storey height = 3.5 m (d) Width of each bay = 4 m (e) Thickness of slab =150mm (f) size of beam= 230mm ×450mm (g) size of column =300mm × 600mm (h)Live load =4kN/m^2.(i) Internal wall thickness=115mm(j) External wall thickness =230mm.Assume suitable data if required. Write all the clauses of IS 1893 (2002). Also draw distribution of shear at each floor level.	**14**

1

OR

Q.5	**(a)**	Explain Mathematical Modeling with appropriate example	**03**
	(b)	What is torsionally coupled and uncoupled system?	**04**
	(c)	Explain Earthquake Resistant Design Philosophy & Differentiate between Earthquake Proof Design and Earthquake Resistant Design	**07**

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