

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI (OLD) EXAMINATION – WINTER 2018****Subject Code:160605****Date: 20/11/2018****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. Use of IS 1893 and IS 13920 is permitted.

- Q.1 (a)** Define following **07**
(1) Magnitude of Earthquake (2) Damping (3) Ductility (4) Faults
(5) Seismograph (6) Epicenter (7) Resonance
- (b)** Derive an equation of Equivalent Spring Constant for a system in which **07**
(1) Springs are in Parallel and (2) Springs are in Series
- Q.2 (a)** Derive the expression for the response of Single Degree Free Damped Structural **07**
System.
- (b)** A spring mass model consists of 15 kg mass and spring of stiffness 25 N/mm was **07**
tested for viscous damped vibration. The test recorded two consecutive amplitude is
2.0 cm and 1.5 cm respectively. Determine (i) Natural frequency of un-damped
system (ii) Logarithmic decrement (iii) Damping ratio (iv) Damping coefficient (v)
Damped natural period.
- OR**
- (b)** An empty elevated water tank is pulled by a steel cable by applying a 50 kN force **07**
horizontally and displaced by 6 cm. The cable is suddenly cut and the resulting
free vibration is recorded. At the end of the six complete cycles, the time is 3
seconds and the amplitude is 2.5 cm. Determine the damping ratio, natural period
of undamped vibration, effective stiffness, effective weight and damping
coefficient.
- Q.3 (a)** Write short note on Seismic Waves. **07**
- (b)** Explain the failure mechanism of Masonry Buildings due to action of **07**
Earthquake.
- OR**
- Q.3 (a)** Explain the term Degree of Freedom in detail. **07**
- (b)** Explain the earthquake resistant features of Masonry Buildings as per I.S. Code. **07**
- Q.4 (a)** Explain the philosophy of Earthquake Resistant Design. **07**
- (b)** Write short note on Short Column Effect. **07**
- OR**
- Q.4 (a)** Explain soft storey and storey drift in details. **07**
- (b)** Write short note on Rigid Diaphragm Effect. **07**
- Q.5 (a)** Explain in detail the Portal Method of analysis of frames. **07**
- (b)** Describe the Jacketing technique for RCC columns and beams through illustrative **07**
sketches.
- OR**
- Q.5 (a)** Write short note on Liquefaction and remedial measures. **07**
- (b)** Explain the criteria for ductile detailing of column as per IS: 13920. **07**
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