

Roll No.

Total No. of Pages : 02

Total No. of Questions : 18

**B.Tech. (CE) (2012 to 2017) (Sem.-6)**  
**ELEMENTS OF EARTHQUAKE ENGINEERING**  
Subject Code : BTCE-602  
M.Code : 71083

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

**Answer briefly :**

1. Define Magnitude of an earthquake.
2. Give complete name of BIS 13920.
3. Define Seismic gap.
4. Define Green's Function.
5. What is a Response Spectrum?
6. Define Transmissibility Ratio.
7. What is the purpose of a Shear wall?
8. The weight of a building is 200 kN. It is set to vibrate freely by releasing it ( $t = 0$ ) from a displacement of 12 cm. If the maximum displacement of the return swing is 0.8 cm, what would be the spring stiffness?
9. What is the ratio of the energy released by two earthquake having 'M' differing by 2.0?
10. Define 'Critical Damped System'.

### SECTION-B

11. Determine expression for the natural frequency of the weight 'W' for the beam as shown. Assume that Moment of Inertia of beam = I and Modulus of Elasticity = E.

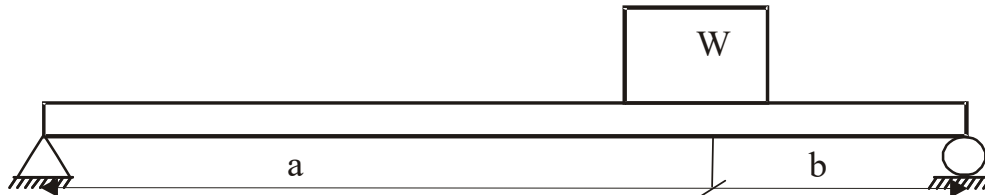


FIG.1

12. a) Discuss in detail 'Elastic Rebound Theory'.  
b) What are different Peak ground parameters?
13. Discuss the importance and behavior of a 'Coupled Shear Wall.'
14. Describe the various earthquake resistant features that can be introduced in a masonry building to make it earthquake resistant.
15. 'Lateral forces determination in an important task.' Enumerate different methods & explain any one with a suitable example.

### SECTION-C

16. A vibrating system consisting of a weight of  $W = 5 \text{ kg}$  and a spring with stiffness  $K = 160 \text{ N/m}$  is viscously damped so that ratio of two consecutive amplitudes is 1.00 to 0.90. Determine (a) Natural frequency of the undamped system (b) the Logarithmic decrement (c) Damped natural frequency.
17. Why and in what circumstances, ductile detailing is required? Give sketches to show ductile detailing for (a) Columns (b) Beams.
18. Write a brief provisions of IS 4326.

**NOTE : Disclosure of identity by writing mobile number or making passing request on any page of Answer sheet will lead to UMC against the Student.**