

VII SEMESTER B.TECH (CIVIL ENGINEERING)

END SEMESTER EXAMINATIONS, NOV/DEC 2015

SUBJECT: ELEMENTS OF EARTHQUAKE RESISTANT DESIGN OF

STRUCTURES [CIE 405]

REVISED CREDIT SYSTEM

Time: 3 Hours

MAX. MARKS: 50

Instructions to Candidates:

- ✤ Answer ANY FIVE FULL the questions.
- ✤ Missing data may be suitable assumed.
- ✤ Use of IS 1893 2002 is permitted

1A.	(i). Write a note on tectonic sub-regions in India(ii).Define liquefaction as per IS 1893: 2002. Describe in brief the phenomenon in which static equilibrium is lost under static or dynamic loads.	5
1B.	(i). Explain microzonation levels with scale and what are the uses of microzonation maps are.(ii). How do you locate the epicenter of an earthquake.	5
2A.	What are the codal provisions for size and details of band as per IS 13828(1993). Explain rigid diaphragm action with a neat sketch	5
2B.	(i). Explain concrete frame with URM infill(ii).What are the main concerns with joints and how pull-push forces on joints cause problem.	5
3A.	Write short notes on: (a) Collar prestressing (b) Low cast base isolation	4
3B.	Explain with neat sketches the design philosophy for Earthquake resistant columns	5
4A.	An under damped SDOF system is subjected to an external harmonic force of $P_0 \sin \omega t$. Derive expression of response for initial condition at t =0, V=V ₀ and $V = V_0$	5
4B.	Determine the natural frequency for the system shown in Fig. Q4B. Also determine the displacement and velocity after 2.5 sec, if Vo = 25 mm, V o = 60 mm/sec and ζ =10%.	5
5A.	An electric motor weighing 1260 N is attached to a floor beam that deflects 0.85 mm under the weight. The armature of the motor weighs 390 N. As the motor is run up gradually to operating speed of 1800 rpm, it is observed that the maximum amplitude is 3.5 mm and decreases to 1.5 mm at the operating speed. Calculate the damping coefficient and eccentricity of the armature from its axis of rotation.	5
5B.	Formulate the equation of motion from the basics for the structure shown in Fig. Q5B.	5
6.	A seven storied R.C.C framed building with live load of 5 on floors is to be constructed in Chandigarh on soft soil. Work out seismic forces on the structure. All beams and columns may be assumed to be 450 mm x 600 mm and 600mm x 650 mm respectively. The roof and floor slabs may be assumed as 125 mm and 150 mm thick respectively. The walls are present on all the beams except the roof and the thickness of the wall is 180 mm. Refer Fig. Q6	10



