

GUJARAT TECHNOLOGICAL UNIVERSITY**B.E. Sem-III Regular / Remedial Examination December 2010****Subject code: 131304****Subject Name: Basics of Structural Engineering****Date: 15 /12 /2010****Time: 10.30 am – 01.00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Draw neat and clean figures wherever required.

- Q.1** (a) Analyze the frame as shown in **fig. 1**, by using moment distribution method and draw bending moment diagram. **10**
- (b) Explain in short 'Moment area theorems'. **04**
- Q.2** (a) A short rod is bent in the form of an arc such that the central deflection is about 15 mm. If the maximum permissible stress is 150 MPa, find the proportionate maximum load it can carry as a compression member compared to the same rod had it been straight. The rod is square in section of side 15 mm. **07**
- (b) Define void ratio, Degree of saturation, air content and percentage air voids. **07**
- OR**
- (b) Enlist the laboratories and field tests to be used for the determination of shear strength. Explain in short any one field test only. **07**
- Q.3** (a) What is bearing capacity of soil? What are the factors affecting it? Explain the criteria for the determination of bearing capacity **07**
- (b) Explain the property 'Soundness of cement'. Explain the Le Chatelier's test. **07**
- OR**
- Q.3** (a) The dry unit weight of a sand sample in the loosest state is 13.34 kN/m^3 and in the densest state, it is 21.19 kN/m^3 . Determine the density index of this sand when it has a porosity of 33%. Assume specific gravity as 2.68 **07**
- (b) Explain the property 'Setting time of cement'. Explain the procedure for the determination for the same. **07**
- Q.4** (a) Define 'shrinkage of concrete'. What are the factors affects the shrinkage? Explain them in detail. **07**
- (b) Write short note on 'Kernel of section'. **07**
- OR**
- Q.4** (a) Write short note on 'Middle third rule'. **07**
- (b) Define 'Creep of Concrete'. What are the factors affects the creep? Explain them in detail. **07**
- Q.5** (a) Determine slope at A and deflection mid span E for simply supported beam by using moment area theorems as shown in **fig. 2**. **08**
- (b) Analyze the beam by moment distribution method and draw bending moment diagram. Use **fig. 3**. **06**
- OR**
- Q.5** (a) Determine the slope and deflection at the end of the beam by using moment area theorems as shown in **fig. 4**. EI is constant throughout. **08**
- (b) What do you understand by 'Curing of concrete'? What are the various methods of curing and under what circumstances are used? **06**

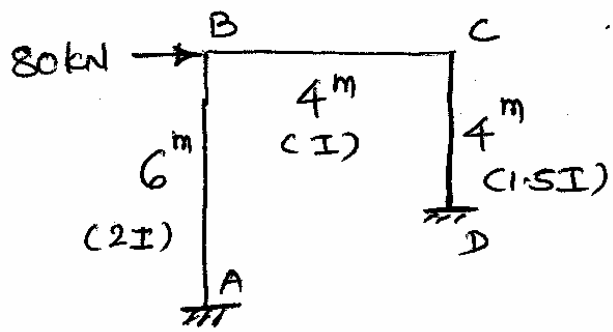
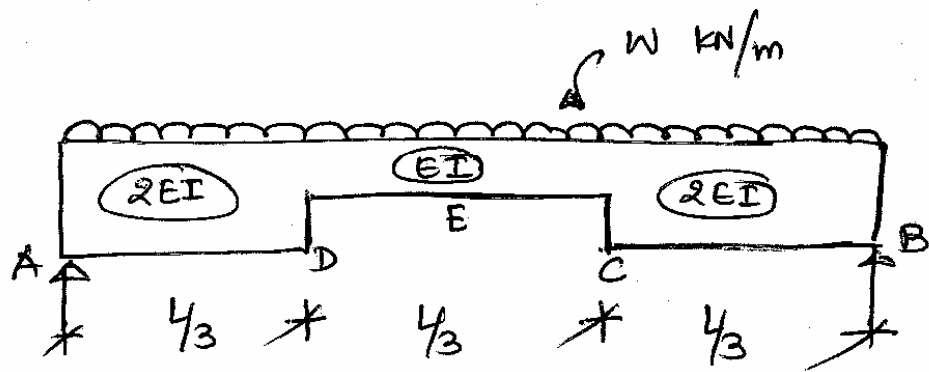
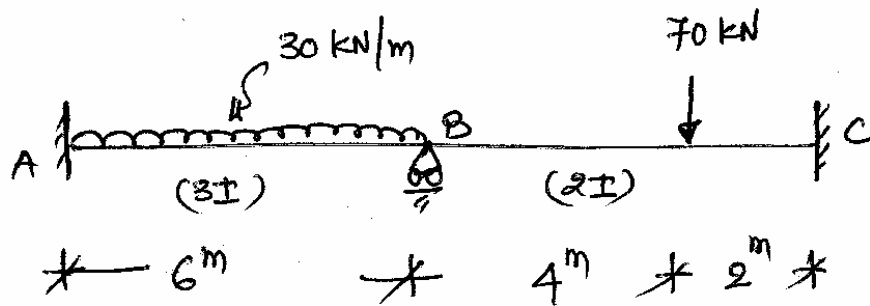


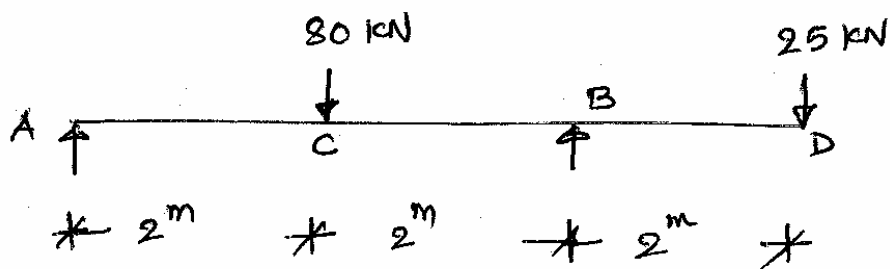
Fig. 1 (Q-1 (a))



(Fig. 2 Q-5 (a))



(Fig. 3 Q-5 (b))



(Fig. 4 OR Q-5 (a))