

GUJARAT TECHNOLOGICAL UNIVERSITY**B.E. Sem-III(Environment)Examination December 2009****Subject code:131304****Subject Name:Basics of Structural Engineering****Date: 21 / 12 /2009****Time: 11.00 am – 1.30 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

Q.1 (a) Give the property and use of any four cements:(given below) **07**
air entraining cement, oil-well cement, colored cement ,sulphate
resisting cement, low heat Portland cement, hydrophobic cement.

(b) Discuss the main types of soil found in our country. State their **07**
geotechnical characteristics.

Q.2 (a) Analyse the fixed beam AB of span 6m as shown in **Fig. 1** **07**

(b) Determine the end moments for the beam of **Fig. 2** by moment **07**
distribution method and plot the bending moment diagram. Consider EI
constant.

OR

(b) Beam ABC, 12m long, fixed at A & C and continuous over support B, is **07**
loaded as shown in **Fig. 3**. Calculate the end moments and plot the
bending moment diagram. Consider EI constant.

Q.3 (a) Find θ_B and δ_B for the beam shown in **Fig. 4**. $E = 200\text{GPa}$, $I = 5 \times 10^8$ **07**
 mm^4 .

(b) A masonry pier of 2m x 3m supports a vertical load of 50kN as shown in **07**
Fig. 5. Find the stresses developed at each corner of the pier . Show by
sketch - the location of the load to be placed on the pier, so that there is
no tension any where in the pier section.

OR

Q.3 (a) Find out $\theta_{\max}$ and $\delta_{\max}$ for **Fig.6**. $E = 200\text{GPa}$, $I = 5 \times 10^8 \text{mm}^4$. **07**

(b) A Masonry dam 8m high , 1.5m wide at top and 5m wide at the base **07**
retains water to a depth of 7.5m.If the water face to the dam is vertical
,find the maximum and minimum stress intensities of at the base . Take
the density of water as 9.8 kN/ m^3 and that of concrete as 22 kN/ m^3 .

Q.4 (a) Aggregate has large share as the ingredient of concrete. How does the **07**
size , shape , texture, and strength of aggregate influence the property of
the concrete made from it?

(b) Write a short note on any two: membrane curing of concrete, alkali **07**
aggregate reaction, durability aspects related to cracking.

OR

Q.4 (a) Enlist the physical tests of cement , write the property tested and state **07**
the codes related to them

(b) Give the main types of admixtures and state in brief the advantages of **07**
using these admixtures

- Q.5 (a) Discuss any one: Role of geo-synthetics in geo-techniques or Significance of Bearing capacity of soil. 07
- (b) Explain in brief any two: Consolidation, Stages in subsurface exploration, Shear failure, 07
- OR
- Q.5 (a) Define: Soil engineering, Liquid limit, Darcy's law 07
- (b) Enlist the factors affecting compaction of soil and explain the effect of compaction on the properties of soil. State the four methods used by mechanical compaction equipment to densify soils. 07

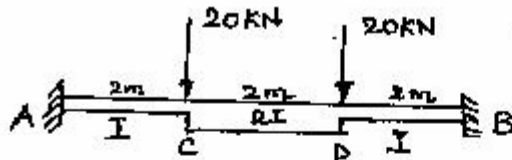


Fig. 1 - Q.2(a)

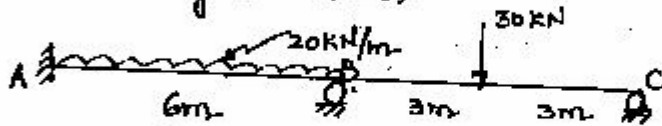


Fig. 2 Q.2(b)

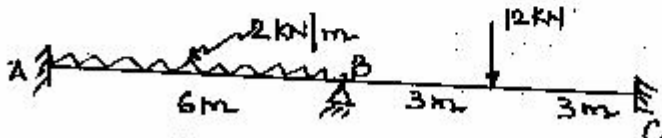


Fig. 3 Q.2(b) OR

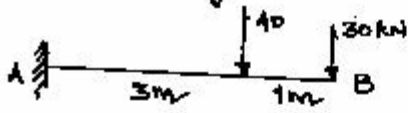


Fig. 4 Q.3(a)

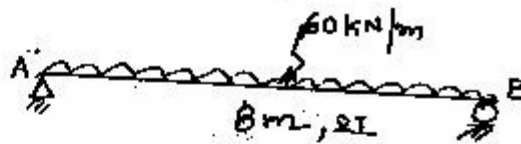


Fig. 6 Q.3(a) OR

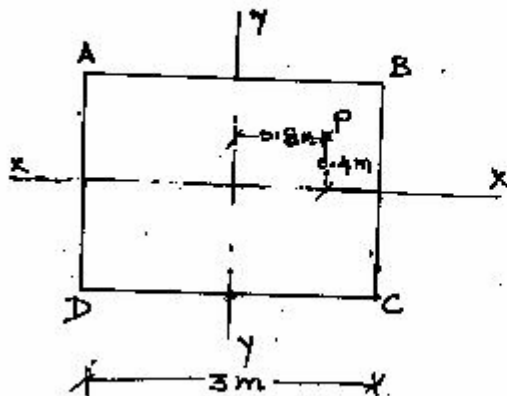


Fig. 5 Q.3(b)