



USN

First/Second Semester B.E. Degree Examination, June/July 2019 Elements of Civil Engineering and Mechanics

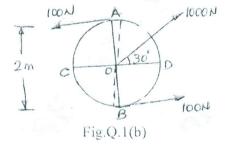
Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- a. Briefly explain the scope of any four fields of civil engineering.
 - Replace the force couple system by a single force with respect to AB and CD shown in Fig.Q.1(b).



OR

2 a. Draw typical cross section of road and explain its components.

(08 Marks)

- b. Briefly explain:
 - i) Rigid body
 - ii) Principle of transmissibility of force
 - iii) Force and its characteristics
 - iv) Couple and its characteristics.

(08 Marks)

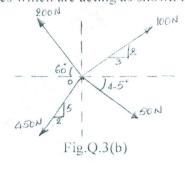
Module-2

3 a. State and prove Lamis theorem.

(08 Marks)

b. Determine the resultant of forces which are acting as shown in Fig.Q.3(b).

(08 Marks)



OR

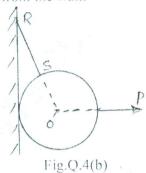
- 4 a. Define:
 - i) Coefficient of friction
 - ii) Angle of friction
 - iii) Angle of repose
 - iv) Limiting friction.

(08 Marks)

Lof3



b. A sphere of weight 100N rests against a vertical wall as shown in Fig.Q.4(b). If the sphere is 100mm radius and the rope RS is 400mm length, find the minimum horizontal force 'P' necessary to move the sphere free from the wall. (04 Marks)



c. Determine the value of W₁ and W₂ shown in Fig.Q.5(e) to keep BC horizontal. (04 Marks)

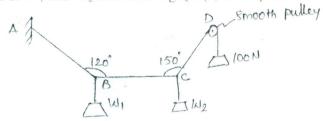


Fig.Q.5(c)

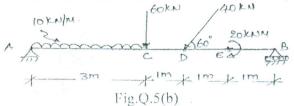
Module-3

5 a. State and prove Varignon's theorem.

(08 Marks)

b. Determine the support reactions at A and B for the beam shown in Fig.Q.5(b)

(08 Marks)



OR

6 a. Explain the different types of supports for beams.

(08 Marks)

b. Find the resultant of the system of coplanar forces acting on a lamina as shown in Fig.Q.6(b). Each square has a side of 10mm. (08 Marks)

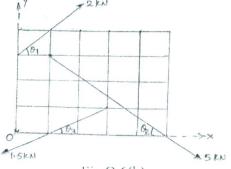


Fig.Q.6(b)