No. of Printed Pages : **4**

BET-014

00682

Diploma in Civil Engineering / Diploma in Electrical & Mechanical Engineering

DCLEVI/DMEVI/DELVI/DECVI/DCSVI/ ACCLEVI/ACMEVI/ACELVI/ACECVI/ACCSVI

Term-End Examination

December, 2011

BET-014 : APPLIED MECHANICS

Time : 2 hours *Maximum Marks : 70*

Note : *Answer **any five** questions.*
Assume any missing data, if required.

---

1. (a) A force of 120 N is exerted on a hook in the ceiling as shown in figure. 1. Determine the horizontal and vertical components of the force. **7**

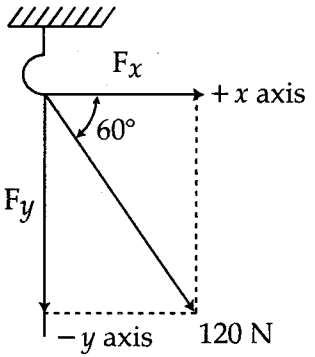

Figure. 1

(b) Four Coplanar Concurrent Forces act at a point and keep it at rest. These are shown in figure.2. Determine the forces P and Q. 7

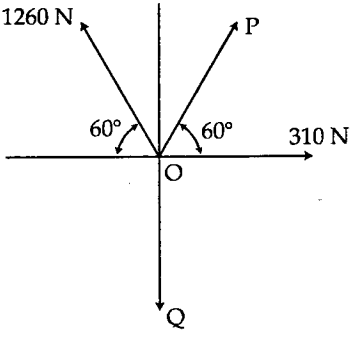

Figure. 2

2. A body, resting on a rough horizontal plane required a pull of 180 N inclined at 30° to the plane just moved the body. Determine the weight of the body and the coefficient of friction. 14

3. Find the moment of inertia of the section shown in Figure. 3 about the centroidal axis XX perpendicular to the web. 14

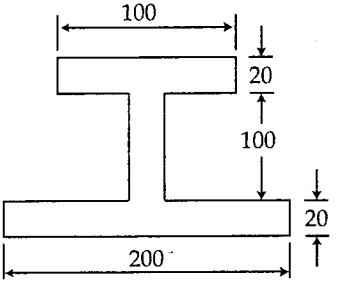

Figure. 3

All dimensions are in mm

4. (a) State and prove the theorem of perpendicular axis, as applied to moment of Inertia. 7

(b) An isosceles triangular section ABC has base width 8 cm and height 6 cm. Determine the moment of inertia of the section about the centre of gravity of the section and the base BC. 7

5. (a) A train which is moving at the rate of 60 km per hour, is brought to rest in 3 minutes with a uniform retardation, find its retardation, and also the distance that the train travels before coming to rest. 7

(b) During the impact test on metal specimen, in the strength of material laboratory, the hammer head weighing 100 N is arranged to swing in a circular path and is released at point 1.6 m higher than the specimen fixture. At impact, after breaking the specimen hammer rises to 0.6 m height above specimen mixture. Calculate the speed of hammer and kinetic energy just before the impact and the energy spent in breaking the specimen, assume $g = 9.81\ m/s^2$. 7

6. Body A is thrown with a velocity of 10 m/s at an angle of 60° to the horizontal. If another body B is thrown at an angle of 45° to the horizontal, find its velocity if it has the same **14**

(a) horizontal range

(b) maximum height

(c) time of flight, as the body A.

7. When a motor cyclist is riding west at 40 km/h, he finds the rain meeting him at angle of 45° with vertical. When he rides at 24 km/h, he finds the rain at an angle of 30° with the vertical. What is the actual velocity (magnitude and direction) of the rain ? **14**