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ET-105(A)

B.Tech. Civil (Construction Management) / B.Tech. Civil (Water Resources Engineering) / BTCLEVI / BTMEVI / BTELVI / BTECVI / BTCSVI

Term-End Examination

00263

December, 2018

ET-105(A) : PHYSICS

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any **seven** questions. All questions carry equal marks. Use of scientific calculator is permitted.*

1. (a) State the five laws of friction. 5

(b) A bullet of mass 5 gm, moving with a speed of 80 m/s, strikes a wall and undergoes a uniform deceleration. The bullet comes to a stop after travelling a distance of 4 cm. Find the impulse on the wall and average force experienced. 5

2. A 2 kg mass, initially at rest, is acted upon by a force of 10 N at 30° to the horizontal, as shown in Figure 1. The force acts for a period of 2 seconds. The coefficient of kinetic friction with the floor is 0·25. Calculate the work done by various forces on the body. *10*

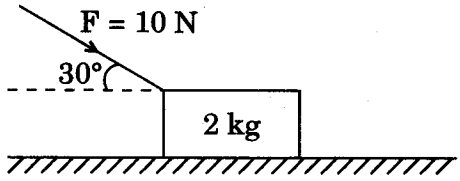

Figure 1

3. (a) Enlist the universal laws of gravitation. Also give reasons as to why two objects (say two books) kept on a table do not move towards each other. *5*

(b) A sphere of radius R and mass m rolls down without slipping on an inclined plane which makes an angle θ to the horizontal. Find the angular acceleration. *5*

4. Describe in detail, Young's double slit experiment. *10*

5. (a) State Gauss' law of electrostatics. A charge q is kept at the centre of a cube of side a. Find the flux though any one of the faces of the cube. *5*

(b) Derive an expression for the capacitance of a cylindrical capacitor. *5*

6. Explain in detail the formation of Newton's rings in an interference experiment, with a neat sketch. *10*

7. Derive an expression for the charge (Q) developed on the plates of a capacitor C connected in an RC circuit. *10*

8. Write short notes on the following : $4 \times 2\frac{1}{2} = 10$

(a) Biot-Savart Law

(b) Interference of Light Waves

(c) Polarization of Light

(d) Elastic and Inelastic Collisions