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DSC01
ALL

Jharkhand University of Technology, Ranchi

Diploma 1st Semester Examination, 2023 (NEP)

Subject : Engineering Physics

Subject Code : DSC01

Time Allowed : 3 Hours

Full Marks : 70

Answer in your own words.

Answer any five questions. Question No. 1 is compulsory.

Marks are given in the right margin.

1. Choose the correct answer in the following:

1×10=10

(i) Which of the following is a vector quantity?

- (a) Energy (b) Impulse
(c) Temperature (d) Density

(ii) In the measured length of 0.05060m, the number of significant figures is

- (a) 5 (b) 4
(c) 2 (d) 3

(iii) A rocket works on the principle of conservation of

- (a) mass (b) energy
(c) linear momentum (d) angular momentum

(iv) Newton's first law of motion gives the concept of

- (a) work (b) power
(c) momentum (d) inertia

(v) The weight of a body at the centre of the earth is

- (a) zero (b) infinite
(c) same as on the surface of earth (d) None of these

(vi) Heat travels through vacuum by

- (a) conduction (b) convection
(c) radiation (d) Both (a) and (b)

(vii) Spring is made of steel instead of copper because

- (a) steel is cheap. (b) steel is in abundance.
(c) steel is more elastic than copper. (d) None of these

Handwritten calculations in the top right corner:

$$\frac{3.71}{3.67} = 1.008$$

$$\frac{3.71}{3.69} = 1.005$$

$$\frac{3.71}{3.68} = 1.008$$

$$\frac{3.71}{3.67} = 1.008$$

(viii) Pressure has the same dimensional formula as that of

- (a) power (b) force
(c) stress (d) strain

(ix) In a stationary wave, the distance between the nearest node and antinode is

- (a) λ (b) $\frac{\lambda}{2}$
(c) $\frac{\lambda}{4}$ (d) 2λ

(x) The ratio of co-efficient of superficial expansion and co-efficient of linear expansion is

- (a) 1 : 1 (b) 2 : 1
(c) 3 : 1 (d) None of these

2. (a) What do you mean by dimensions of a physical quantity? Explain with examples. Also write the dimensional formula of momentum, impulse and universal gravitational constant (G).

(b) Diameter of a pipe was measured by Vernier Callipers. The measurements were 3.71 cm, 3.70 cm, and 3.67 cm. Calculate mean absolute error and percentage error. 10+5

3. (a) State Newton's laws of motion. Also define force, momentum and impulse. Write their units too.

(b) Explain why a passenger sitting on a running bus tends to fall forward, when the bus suddenly stops. 10+5

4. (a) Define the terms — velocity and acceleration. Also derive the following equations for a uniformly accelerated motion.

(i) $v = u + at$

(ii) $s = ut + \frac{1}{2}at^2$

(iii) $v^2 = u^2 + 2as$

where the symbols have their usual meanings.

(b) A car initially at rest starts moving with a constant acceleration of 0.5 ms^{-2} and travels a distance of 25 m. Find :

(i) its final velocity

(ii) the time taken 10+5

5. (a) Define acceleration due to gravity (g) and write its S.I. unit. How is it related to universal gravitational constant (G)? Explain the variation of ' g ' with altitude and depth.

(b) Define — stress, strain and elastic limit. Also write their S.I. units. 10+5

