

Total No. of printed pages = 6

Sc-104/AP-I/1st Sem/2016/N

APPLIED PHYSICS – I

Full Marks – 70

Pass Marks – 21

Time – Three hours

The figures in the margin indicate full marks for the questions.

Answer question No.1 and any five from the rest.

1. (A) Fill in the blanks : $1 \times 5 = 5$

(i) The dimensional formula for energy is _____

(ii) The value of acceleration due to gravity at pole is _____.

(iii) On increase of pressure melting point of ice is _____.

(iv) In case of simple pendulum, the sum of the P. E and K. E is _____.

(v) The dot product of two vectors is a _____ quantity.

[Turn over

(B) Choose the correct answer : $1 \times 5 = 5$

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

(a) mass

(b) force

(c) work

(d) time.

(ii) The resultant of two vectors of magnitude 2 and 5 is 1. The angle between them is

(a) 180°

(b) 270°

(c) 120°

(d) 90°

(iii) When a particle is moving with uniform velocity, which of the following quantity changes ?

(a) speed

(b) velocity

(c) position vector

(d) acceleration.

(iv) The value of -40°C in Fahrenheit scale is

- (a) 40°F
- (b) 0°F
- (c) -40°F
- (d) 100°F

(v) The momentum of a body is doubled. Its K.E will

- (a) be doubled
- (b) be halved
- (c) increase four times
- (d) decrease four times.

2. (a) Define unit. Name the basic and supplementary units of S.I. $1+3=4$

(b) Define average velocity and instantaneous velocity. 2

(c) State Newton's 2nd law of motion. Give quantitative definition of force from this law. $1+2=3$

(d) A body starts from rest and has a velocity of 15 m/s in 6 sec . If the acceleration is uniform, how far will it move in next 6 seconds ? 3

3. (a) Define work and power.

Calculate the K. E. of a motor car of mass 6×10^3 kg moving with velocity 48 km/h in a straight line.

2+2=4

- (b) Define centripetal force.

Deduce an expression of angle of banking of a curved track.

1+3=4

- (c) State dot product and cross product of two vectors with examples.

3

State the principle of conservation of linear momentum.

1

4. (a) State and explain Newton's law of gravitation. Write the dimension of universal gravitational constant G.

2+1=3

- (b) State the characteristics of S. H. M.

2

- (c) Define stress, strain and Poisson's ratio.

3

- (d) The diameter of the pump plunger and press plunger of a hydraulic press are 0.02m and 0.12m respectively. It is worked by a hand lever of which the ratio of the arms is 1:8. If force 30 kgf is applied on the handle, what is the force exerted on load ?

4

5. (a) Define calorie, thermal capacity and water equivalent. 3

(b) What do you mean by co-efficient of linear expansion? Establish the relation between α and β . $1+3=4$

(c) When 150 gm of water at 50°C is mixed with 100 gm of water at 20°C in a copper calorimeter, the temperature of the mixture becomes 25°C . Find the water equivalent of calorimeter. 3

(d) Distinguish between evaporation and boiling. 2

6. (a) Define density and specific gravity. 2

(b) What is co-efficient of thermal conductivity? Write its dimension. $2+1=3$

(c) "The dew point at a place on a certain day is 14.5°C ." What do you mean by the statement? 2

(d) State Pascal's law. Hence explain the law of multiplication of force. 4

Define Joule's mechanical equivalent of heat. 1

7. (a) Deduce a relation between wavevelocity, wavelength and frequency of a wave. 2

(b) What is musical sound ? Write the characteristic of musical sound. 1+3=4

(c) Write the difference between : 2+2=4

(i) Echo and reverberation

(ii) Longitudinal and transverse wave.

(d) State the effect of temperature and pressure on velocity of sound in a medium. 2