LHR-G1-11-18

Roll No _____ (To be filled in by the candidate) **(Academic Sessions 2015 – 2017 to 2017 – 2019)**

PHYSICS 218-(INTER PART – I) Time Allowed : 20 Minutes

Q.PAPER – I (Objective Type) GROUP – I Maximum Marks : 17

PAPER CODE = 6475

Note : Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink in the answer-book. Cutting or filling two or more circles will result in zero mark in that question.

1-1	The component of the weight which balances the tension in pendulum is : (A) $mg\cos\theta$ (B) $mg\sin\theta$ (C) $mg\tan\theta$ (D) $-mg\sin\theta$
2	Work has the dimensions as that of : (A) Momentum (B) Power (C) Torque (D) Force
3	If red light is used as compared to blue light, then fringe spacing : (A) Increases (B) Decreases (C) Remains same (D) Becomes zero
4	A precise measurement is the one which has : (A) Greater precision (B) Less precision (C) Medium precision (D) More % error
5	The work done in isochoric process is : (A) Constant (B) Variable (C) Zero (D) Depend on condition
6	As we go from pole to equator of earth, the value of 'g' : (A) Increases (B) Decreases (C) Remains constant (D) Zero
7	Maximum number of components of a vector may be : (A) One (B) Two (C) Three (D) Infinite
8	Physical quantity " pressure" in term of base unit is : (A) $Kg^{-1}mS^{-2}$ (B) $Kg^{2}mS^{-3}$ (C) $Kg^{2}m^{-2}Sec$ (D) $Kg\,m^{-1}S^{-2}$
9	When one end of organ pipe is closed, then the frequency of stationary waves of any harmonic in it is given by : (A) $f_n = \frac{nv}{2\ell}$ (B) $f_n = \frac{n\ell}{4v}$ (C) $f_n = \frac{4v}{n\ell}$ (D) $f_n = \frac{nv}{4\ell}$
10	Repeaters are placed in new system at distance of : (A) 30 km (B) 50 km (C) 80 km (D) 100 km
11	The fluid is said to be incompressible, if its density is : (A) Zero (B) Very high (C) Very small (D) Constant
12	The distance covered by a body in time 't' starting from rest is : (A) at^2 (B) $2at^2$ (C) $\frac{1}{2}at^2$ (D) $\frac{1}{2}a^2t$
13	When hot and cold water are mixed, the entropy : (A) Decreases (B) Increases (C) Remains constant (D) Zero
14	The relation between the speed of disc and hoop can be written as : (A) $V_{disc} = \sqrt{\frac{3}{4}}V_{hoop}$ (B) $V_{disc} = \sqrt{\frac{4}{3}}V_{hoop}$ (C) $V_{disc} = V_{hoop}$ (D) $V_{disc} = \frac{1}{2}V_{hoop}$
15	The magnitude of a vector $\vec{r} = 3\hat{i} + 6\hat{j} + 2\hat{k}$ is : (A) – 1 (B) – 7 (C) 7 (D) 8
16	If a stretched string is 4 m and it has 4 loops of stationary waves, then wavelength is : (A) 1 m (B) 2 m (C) 3 m (D) 4 m
17	The blue colour of sky is due to : (A) Diffraction of light (B) Reflection of light (C) Polarization of light (D) Scattering of light

Roll No _____ (To be filled in by the candidate) **(Academic Sessions 2015 – 2017 to 2017 – 2019)**

PHYSICS 218-(INTER PART – I) Time Allowed : 2.40 hours

PAPER – I (Essay Type) GROUP – I Maximum Marks : 68

SECTION – I

LHR-G1-11-18

2. Write short answers to any EIGHT (8) questions : **16**

(i) Define and explain scientific notation,also give example.

(ii) Show that the expression $v_f = v_i + at$ is dimensionally correct.

(iii) Write any two uses of dimensional analysis.

(iv) Name several repetitive phenomenon occurring in nature which could serve as reasonable time standards.

(v) Can the magnitude of a vector have a negative value?

(vi) The vector sum of three vectors gives a zero resultant. What can be the orientation of the vectors?

(vii) Define the terms (i) Null vector (ii) Subtraction of vector

(viii) What happens when a very heavy body collides with lighter stationary body? Explain.

(ix) Can the velocity of an object reverse direction when acceleration is constant? If so, give an example.

(x) Define isolated system with example.

(xi) Two boats moving parallel in the same directon are pulled towards each other. Explain why?

(xii) Explain the difference between laminar flow and turbulent flow.

3. Write short answers to any EIGHT (8) questions : **16**

(i) When a rocket re-enters the atmosphere, its nose cone becomes very hot, where does this heat energy comes from?

(ii) What sort of energy is in compressed spring and water in a high dam?

(iii) Write two merits and demerits of solar cells.

(iv) Explain how many minimum number of geo-stationary satellites are required for global coverage of T.V. transmission.

(v) Show that orbital angular momentum $L_o = mvr$

(vi) Find total kinetic energy of rolling sphere of mass 'm' and radius ' r ' on horizontal smooth surface.

(vii) Prove that $\omega = \sqrt{\frac{k}{m}}$ for mass spring system.

(viii) How displacement and amplitude are related for mass spring system?

(ix) What happens to the period of a simple pendulum if its length is doubled? What happens if the suspended mass is doubled?

(x) Explain the term crest, trough, node and antinode.

(xi) As a result of a distant explosion an observer senses a ground tremor and then hears the explosion. Explain the time difference.

(xii) Why does transverse wave reflecting from a denser medium undergo a phase change of 180^o?

LHR-G1-11-18

12

4. Write short answers to any SIX (6) questions :

(i) Differentiate between polarized and unpolarized light.

(ii) What aspect of nature of light is proved by the phenomena of polarization?

(iii) Explain briefly whether the Young's experiment is an experiment for studying interference or diffraction effects of light.

(iv) Differentiate between linear magnification and angular magnification.

(v) Why would it be advantageous to use blue light with a compound microscope?

(vi) Derive Charles's law from kinetic theory of gases.

(vii) Define internal energy of a substance.

(viii) Give an example of a natural process that involves an increase in entropy.

(ix) Is it possible to construct a heat engine that will not expel heat into the atmosphere?

SECTION – II

Note : Attempt any THREE questions.

5. (a) Define elastic and inelastic collision. Discuss elastic collision in one dimension and show that velocity of approach is equal to the velocity of separation. 5

(b) A load of 10 N is suspended from a clothline. This distorts the line so that it makes an angle of 15° with each end. Find tension in the clothline. 3

6. (a) What is escape velocity? Derive an expression for it and calculate its value on the surface of the earth. 5

(b) A 1000 kg car travelling with a speed of 144 kmh^{-1} round a curve of radius 100 m. Find the necessary centripetal force. 3

7. (a) What is petrol engine? Describe its working by elaborating its four strokes and what is main difference between petrol engines and diesel engines. 5

(b) 336 J of energy is required to melt 1 gm of ice at 0 °C. What is the change in entropy of 30 gm of water at 0 °C as it is changed to ice at 0 °C by a refrigerator? 3

8. (a) What is Doppler Effect? Discus the case when :
(i) observer is moving towards a stationary source,
(ii) observer is moving away from stationary source. 5

(b) A simple pendulum is 50.0 cm long. What will be its frequency of vibration at a place where $g = 9.8ms^{-2}$? 3

9. (a) Explain a simple microscope. Derive formula for its magnification. 5

(b) Sodium light of wavelength $\lambda = 589$ nm, is incident normally on a grating having 3000 lines per centimeter. What is highest order of the spectrum obtained with this grating? 3