DGK-G1-11-19

11th CLASS – 12019

PHYSICS (NEW COURSE)
GROUP FIRST
ACADEMIC SESSION : 2015 – 2017 TO 2018 - 2020

TIME: 20 MINUTES
MARKS: 17

OBJECTIVE

NOTE: You have four choices for each objective type question as A , B , C and D . The choice which you think is correct , fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

QUESTION NO. 1

1	The prefix femto is equal to (A) 10^{-9} (B) 10^{-12} (C) 10^{-14} (D) 10^{-15}
2	The time taken by light from moon to earth is (A) 1 min 10 sec. (B) 1 min 20 sec. (C) 1 min 30 sec. (D) 1 min 40 sec.
3	If the magnitudes of scalar and vector product of two vectors are $2\sqrt{3}$ and 2 respectively. The angle between vectors is (A) 30° (B) 60° (C) 120° (D) 180°
4	The resultant of two perpendicular vectors each of magnitude A is (A) A (B) 2A (C) $\sqrt{2}$ A (D) A^2
5	Ballistic missiles are used for (A) short ranges (B) long ranges (C) very long ranges (D) any range
6	Power of an electric heater is (approximate power) (A) 1 KW (B) 2 KW (C) 3 KW (D) 4 KW
7	A man in a lift moving upward with constant velocity will conclude that his weight has (A) Increased (B) Decreased (C) Reduced to zero (D) Not changed
8	The number of satellites in global positioning system is (A) 3 (B) 12 (C) 24 (D) 36
9	If the radius of droplet becomes half, then terminal velocity will become (A) Half (B) Four times (C) One third (D) One fourth
10	The systolic pressure for a normal healthy person is (A) 75 – 80 torr (B) 100 torr (C) 120 torr (D) 140 torr
11	If the length of simple pendulum is doubled then its time period becomes (A) Half (B) 2 times (C) $\sqrt{2}$ times (D) 4 times
12	The speed of sound in vacuum is (A) 330 ms^{-1} (B) 332 ms^{-1} (C) 3×10^8 ms^{-1} (D) Zero
13	It becomes difficult to recognize the beats when the difference between the frequencies of two sounds is more than (A) 10 Hz (B) 20 Hz (C) 30 Hz (D) 40 Hz
14	Bending of light around the edges of an obstacle is called (A) Refraction (B) Interference (C) Polarization (D) Diffraction
15	In multimode step index fiber, the value of refractive index of core is (A) 1.33 (B) 1.52 (C) 1.67 (D) 1.48
16	The approximate efficiency of dry cell battery is (A) 70 % (B) 80 % (C) 90% (D) 93 %
17	For an ideal gas, the P.E. associated with its molecules is equal to (A) $\frac{1}{2}$ KX (B) $\frac{1}{2}$ KX_0^2 (C) 2 KX_0 (D) Zero

SECTION-I

ESTION NO. 2 Write short answers any Eight (8) questions of the following 16

(1) Give the drawbacks to use the period of pendulum as a time standard.
(2) Is zero significant or not ? Explain?
(3) Define the null vector and give two examples
(4) Is it possible to add a vector quantity to scalar quantity ? Explain
(5) Can a body rotate about its centre of gravity under the action of its weight ? Explain briefly.
(6) A girl drops a cup from a certain height, which breaks into pieces. What energy changes are involved?
(7) Define kilowatt hours and show that 1 KWh = 3.6 MJ.
(8) Why fog droplets appear to be suspended in air? Explain briefly.
(9) Write the three characteristics of an ideal fluid.
(10) Name two characteristics of simple harmonic motion.
(11) State Hook's law. Give SI unit of spring constant.
(12) What is driven harmonic oscillator ? Give example.

QUESTION NO. 3 Write short answers any Eight (8) questions of the following 16

(1) At what point or points in its path does a projectile have its minimum speed, its maximum speed.
(2) Explain the difference between (i) Elastic collision and (ii) In-elastic collision.
(3) State and derive second law of motion in terms of momentum.
(4) What is (i) Ballistic missile (ii) Ballistic Trajectory.
(5) Define angular velocity and give its formula.
(6) Prove that $a = r \propto$
(7) State the direction of the following vectors in simple situation
(i) Angular momentum (ii) Angular velocity.
(8) What is meant by moment of inertia? Explain its significance.
(9) Explain the effect of variation of density on the speed of sound in gas.
(10) Give the rules for the reflection of waves from the boundary of a (i) denser medium (ii) rarer medium
(11) Explain why sound travels faster in warm air than in cold air?
(12) Is it possible for two identical waves travelling in the same direction along a string to give rise to a stationary wave ? Explain

QUESTION NO. 4 Write short answers any Six (6) questions of the following 12

(1) Can visible light produce the interference fringes ? Explain
(2) An oil film spreading over wet foot path show colours. Explain
(3) What are Newton's rings ? Explain briefly.
(4) Define resolving power and the magnification.
(5) If a person was looking through telescope at the full moon, how would the appearance of moon be changed by covering half of the objective lens?
(6) Internal energy is a state function. Explain
(7) Give two examples of the adiabatic process.
(8) Is it possible to construct a heat engine without sink ? Explain.
(9) Does entropy of a system increase or decrease due to friction ? Explain.

SECTION-II

Note: Attempt any Three questions from this section **8 x 3 = 24**

5 (a) Define Molar specific heat at constant pressure and at constant volume and also derive relation between them. 5
(b) Calculate, how many seconds are there in one year and many years in one second? 3

6 (a) What is scalar product of two vectors ? Discuss its four characteristics. 5
(b) A truck weighing 2500 kg and moving with a velocity of 21 ms^{-1} collides with a stationary car weighing 1000 kg.The truck and the car move together after the impact. Calculate their common velocity? 3

7 (a) Show that frequencies of stationary waves in a stretched string are quantized. 5
(b) A car of mass 800 kg travelling at 54 km/h is brought to rest in 60 meters. Find the average retarding force on the car. What has happened to original kinetic energy? 3

8 (a) Define centripetal force and derive its relation. 5
(b) A block of mass 4.0 kg is dropped from a height of 0.80 m on to a spring of spring constant K =1960 Nm^{-1}. Find the maximum distance through which the spring will be compressed 3

9 (a) Describe the construction of a simple microscope and derive an expression for its magnifying power. 5
(b) In a double slit experiment the second order maximum occurs at $\theta = 0.25°$. The wavelength is 650 nm. Determine the slit separation. 3

DGK-Gr2-11-19

PHYSICS (NEW COURSE) **TIME: 20 MINUTES**

GROUP SECOND **MARKS: 17**

ACADEMIC SESSION : 2015 – 2017 TO 2018 - 2020

OBJECTIVE

NOTE: You have four choices for each objective type question as A , B , C and D . The choice which you think is correct , fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

QUESTION NO. 1

1	Dimension of coefficient of viscosity " η " is (A) $[ML^2T^{-1}]$ (B) $[ML^{-1}T^{-2}]$ (C) $[ML^{-1}T^{-1}]$ (D) $[ML^{-2}T^{-2}]$
2	One year has seconds (A) 3.1536×10^7 (B) 3.1536×10^6 (C) 3.1536×10^8 (D) 3.1536×10^9
3	Self dot product of a vector $\vec{A}$ is (A) A (B) A^2 (C) Zero (D) 1
4	If Rx is negative and Ry is positive the resultant lies in quadrant (A) 1st (B) 2nd (C) 3rd (D) 4th
5	A typical rocket consumes fuel at a rate of (ejecting gas at speed of 4000 m s^{-1}) (A) 10000 Kg /s (B) 1000 Kg /s (C) 100 Kg /s (D) 100000 Kg /s
6	Power is the dot product of force and (A) Acceleration (B) Mass (C) Velocity (D) Displacement
7	In rotational motion analogous of force is (A) Torque (B) Rotational inertia (C) Mass (D) Momentum
8	If orbital velocity of a satellite is 7.9 Km /s and ' R ' is the radius of Earth , time required to complete one rotation will be (A) 84 min (B) 84 sec (C) 6050 sec (D) 24 hours
9	Drag force is given by (A) Stoke's law (B) Bernoulli's equation (C) Continuity equation (D) Newton's law
10	If $V_1 = 0.20$ m/s and $V_2 = 2$ m/s and density $S = 1000$ Kg /m^3 , then $P_1 - P_2$ will be (A) 1980 N / m^2 (B) 1970 N / m^2 (C) 1960 N / m^2 (D) 1990 N / m^2
11	Potential energy of oscillating mass spring system at any instant is (A) mgh (B) KX^2 (C) $\frac{1}{2}K X_0^2$ (D) $\frac{1}{2}KX^2$
12	If organ pipe is open at both ends, frequency of fundamental harmonic is given by (A) $V / 2\ell$ (B) $V / 4\ell$ (C) $4\ell / V$ (D) $2\ell / V$
13	Increase in velocity of sound in air per degree Celsius is (A) 0.61 m/s (B) 0.61 cm/s (C) 0.61 dm/s (D) 0.61 km/s
14	Phase difference of 180 ° between two waves is equal to a path difference of (A) λ (B) $\lambda/2$ (C) $\lambda/4$ (D) $3\lambda/4$
15	In single mode step index fiber core diameter is (A) 5 μm (B) 5 nm (C) 5 pm (D) 5 cm
16	If internal energy decreases by 300 J and 120 J of work is done on the system then heat will be (A) 420 J (B) 320 J (C) 400 J (D) 300 J
17	If $T_H = T_1 = 327^\circ$ and $T_L = T_2 = 27\ C^\circ$, then efficiency will be (A) 50 % (B) 52 % (C) 100 % (D) Zero

OGK-GZ-11-19

ESTION NO. 2 Write short answers any Eight (8) questions of the following 16

What is the cause of systematic error? How can it be reduced?
How can the total uncertainty be found in the final results for multiplication and division?
What is the orientation of three vectors to get their vector sum equal to zero magnitude?
For what orientation of a vector its components have opposite signs , if vector lies in xy plane ?
Is it possible to add $2\vec{A}$ into 6 ? Explain
Name the four non conservative forces.
How can air pollution be reduced?
State Stok's law and what are the limitation of this law?
A person standing near a fast moving train , Is there any danger that he will fall towards train?
) Why the amplitude of the lead ball is greater than of pith ball of same size and length? Explain.
) Explain restoring force and what is its direction?
) If mass of a spring-mass vibrating system is increased by four times. What is the effect on its frequency?

ESTION NO. 3 Write short answers any Eight (8) questions of the following 16

What is instantaneous velocity ? Explain. ?
What is difference between open and closed system?
What is trajectory ? Explain briefly.
Show that : Range of projectile is maximum when thrown at an angle of 45° with horizontal.
What are two differences between mechanical and electro-magnetic waves ?
On what factors does the speed of sound in medium depends ?
What features do the longitudinal waves have in common with transverse waves ?
How should a sound source move with respect to an observer so that frequency of sound does not change ?
As a result of distant explosion, an observer senses a ground tremor than hear the explosion. Explain the time difference?
) On what factors does the fundamental frequency in a stretched string depends ?
) Write down two differences between constructive and destructive interferences ?
) What is the principle of superposition of waves ?

JESTION NO. 4 Write short answers any Six (6) questions of the following 12

If a wavelength of light 600 nm illuminates two slits 0.5 mm apart. The distance between the slits and screen is 200 cm. Calculate its fringe spacing.
Why centre spot of Newton Rings appear dark?
Hold two fingers close together to form a slit. Look at the light bulb through the slit pattern of light being seen. What phenomenon is used in this case? Define this phenomenon.
Why would it be advantageous of use of blue light with a compound microscope?
What is the use of light emitting diode and Microphone in signal transmission in optical fiber.
A system absorbs 200 Joule heat at an absolute temperature 200 K. Calculate the change in Entropy.
Why is the average velocity of the molecules in a gas is zero but the average of the square of velocities is not zero
A thermos flask containing milk as a system is shaken rapidly , does the temperature of milk rise ? Explain
Is it possible to construct a heat engine that will not expel heat into atmosphere? Explain it.

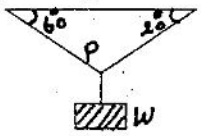
SECTION-II

te: Attempt any Three questions from this section **8 x 3 = 24**

5.(a) Derive the relation for Efficiency of Carnot Engine by explaining its working . 5
(b) Show that expression $V_f = V_i + at$ is dimensionally correct, where V_i is the velocity at t = o , 'a' is acceleration and V_f is the velocity at time t. 3

6.(a) What is difference between elastic and inelastic collision and discuss elastic collision in one dimension to prove that magnitude of relative velocity of approach is equal to the magnitude of the relative velocity of separation. 5

(b) A load is suspended by two cords as shown in figure
Determine the maximum load that can be suspended at ' P ' , if maximum breaking stress of the cord used is 50 N 3



7. (a) Describe Newton's formula for the speed of sound in air and explain how it was corrected by Laplace? 5
(b) Ten bricks each 6cm thick and mass 1.5 Kg lie flat on a table. How much work is required to stack them one on the top of another ? 3

8. (a) What is simple pendulum? Show that its motion is SHM. Derive expression for its time period. 5
(b) A body of moment of inertia I = 0.80 Kg m^2 about a fixed axis, rotates with a constant angular Velocity of 100 rad s^{-1} . Calculate its angular momentum L and the torque to sustain this motion. 3

9. (a) What is compound microscope? Explain its working and derive formula for its magnifying power. 5
(b) The distance between the slits in young's double slit experiment is 0.25 cm .Interference fringes are formed on a screen placed at a distance of 100 cm from the slits .The distance of third dark fringe from the central bright fringe is 0.059 cm. Find the wavelength of the incident light. 3