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 $n m$ (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 $T_H = T_1 = 327°$ and $T_L = T_2 = 27$ C° , then efficiency will be (A) 50 % (B) 52 % (C) 100 % (D) Zero

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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 ?

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

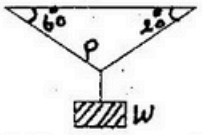
If a wavelength of light 600 nm illuminates two slits 0.5 mm apart. The distance between the slits and screen is 200 cm. Calculate its fringe spacing.
Why centre spot of Newton Rings appear dark?
Hold two fingers close together to form a slit. Look at the light bulb through the slit pattern of light 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