

PHYSICS

GROUP : SECOND *OGR-11-2-23* OBJECTIVE

TIME: 20 MINTUES

MARKS : 17

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 expression for the time period of low flying satellite put into the orbit is
(A) $T = \frac{2\pi R}{g}$ (B) $T = \frac{2\pi R}{g^2}$ (C) $T = \frac{2\pi g}{R}$ (D) $T = \frac{2\pi R}{v}$
- 2 The incompressible and non viscous fluid is called
(A) Viscous fluid (B) Non ideal fluid (C) Real Fluid (D) Ideal fluid
- 3 The product of frequency and time period is equal to
(A) 1 (B) 2 (C) 3 (D) 4
- 4 The portion of a wave below the mean level is called
(A) Crest (B) Trough (C) Node (D) Anti - node
- 5 When an aero plane move towards air port, then its frequency received by radar
(A) Decreases (B) Increases (C) Remain same (D) Become zero
- 6 Which of the following waves cannot be polarized
(A) X - rays (B) radio waves (C) Ultra - violet waves (D) Sound waves
- 7 The magnifying power of a simple microscope is
(A) $M = 1 + \frac{f}{d}$ (B) $M = 1 + \frac{d}{f}$ (C) $M = 1 + \frac{1}{f}$ (D) $M = 1 + df$
- 8 Charle's law can be written as mathematically
(A) $V \propto T$ (B) $V \propto \frac{1}{T}$ (C) $P \propto T$ (D) $P \propto \frac{1}{T}$
- 9 The carnot cycle can be shown by
(A) V – T graph (B) P – V graph (C) P – T graph (D) P – V – T graph
- 10 The unit of power in terms of base unit is
(A) $Kg ms^{-2}$ (B) $Kg m^{-1}s^{-1}$ (C) $Kg m^{-2}s^{-2}$ (D) $Kg m^2s^{-3}$
- 11 Time taken by light to reach from sun to earth is
(A) 1 min, 20 sec (B) 4 min, 20 sec (C) 8 min, 20 sec (D) 10 min, 20 sec
- 12 $\vec{r} = a\hat{i} + b\hat{j} + c\hat{k}$
(A) Equal vector (B) Position vector (C) Unit vector (D) Negative vector
- 13 Torque has maximum value if angle between \vec{r} and \vec{F} is
(A) 30° (B) 90° (C) 45° (D) 60°
- 14 The time rate of change of displacement is called
(A) Acceleration (B) Velocity (C) Speed (D) Average force
- 15 The relation $I = \vec{F} \times \Delta t$ shows
(A) Momentum (B) Power (C) Impulse (D) Work
- 16 The original source of energy of tides is
(A) Earth (B) Sun (C) Moon (D) Star
- 17 Angular momentum of a body under a centripetal force is
(A) Zero (B) Maximum (C) Minimum (D) Constant

PHYSICS

GROUP : SECOND

SUBJECTIVE

SECTION - I

TIME: 2.40 HOURS

MARKS : 68

QUESTION NO. 2 Write short answers of any Eight (8) parts of the following

16

- Add the given masses, in kg up to appropriate precision 2.189, 0.089, 11.8 and 5.32
- How many nano-seconds in one year ?
- Why do we find it useful to have two units for the amount of substance, the Kilogram and the mole ?
- Write the dimensions of (i) Pressure (ii) Density
- Can the magnitude of a vector have a negative value ?
- Is it possible to add $2\vec{A}$ into \vec{B} ? Explain
- Name the three conditions that could make $A_1 \times A_2 = 0$
- At the highest point in the path of a projectile its speed is minimum, why? Explain it.
- Derive the relation for the height of a projectile.
- Motion with constant velocity is a special case of motion with constant acceleration. Is this statement true? Discuss.
- Explain the circumstances in which the velocity ' \vec{v} ' and acceleration ' \vec{a} ' of a car are
 - Parallel
 - Perpendicular to one another
- Two row boats moving parallel in the same direction are pulled towards each other. Explain.

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

16

- A person holds a bag of groceries while standing still, talking to a friend. A car is still while its engine is running. From the stand point of work, How are these two situations similar ?
- Calculate the work done in Kilojoules in lifting a mass of 10 kg (at a steady velocity) through a vertical height of 10 m.
- Define escape velocity. Does the escape velocity of a body depend upon its mass ?
- Calculate the rotational K.E of a disc and a hoop
- Differentiate between tangential and angular velocity. If one of these is given for a wheel of known radius, how will you find the other ?
- What is meant by moment of inertia ? Explain its significance.
- Name the two characteristics of simple harmonic motion.
- Does frequency depend on amplitude for harmonic oscillators ? Explain.
- Explain briefly the example of an electrical resonance.
- Find the temperature at which the velocity of sound in air is two times its velocity at 10°C
- What features do longitudinal waves have in common with transverse waves ?
- 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 of any Six (6) parts of the following

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- Draw the experimental arrangement for observing Newton's ring.
- How would you manage to get more orders of spectra using a diffraction grating ?
- Why the Polaroid sunglasses are better than ordinary sunglasses ?
- Define near point and resolving power.
- Why would it be advantageous to use blue light with a compound microscope ?
- What is heat engine ? Define efficiency.
- Explain bicycle pump as an example of 1st law of thermodynamics.
- Is it possible to convert internal energy into mechanical energy ? Explain with examples.
- A thermos flask containing milk as a system is shaken rapidly. Does the temperature of milk rise ?

SECTION - II

NOTE : Attempt any three questions from this part (8 x 3 = 24) (Part A = 5 marks and Part B = 3 marks)

Q. No.5 (A)	Define absolute potential energy. Derive relation for absolute potential energy of body of mass 'm' at distance 'r' from the centre of earth.
(B)	Find the angle between the two Vectors $\vec{A} = 5\hat{i} + \hat{j}$ and $\vec{B} = 2\hat{i} + 4\hat{j}$
Q. No.6 (A)	What is projectile motion? Work out expressions for (i) Height (ii) Time of light
(B)	A gramophone record turntable accelerates from rest to an angular velocity of $45.0 \text{ rev min}^{-1}$ in 1.60 s. What is its average angular acceleration ?
Q. No.7 (A)	Derive a relation which shows that flow rate is a constant quantity in an ideal fluid.
(B)	A thermodynamic system undergoes a process in which its internal energy decreases by 300 J. If at the same time 120 J of work is done on the system, find the heat lost by the system.
Q. No.8 (A)	Define and explain the phenomenon of beats. How beats are graphically represented. Also mention the uses of beats.
(B)	A simple pendulum is 50.0 cm long. What will be its frequency of vibration at a place where $g = 9.8 \text{ ms}^{-2}$
Q. No.9 (A)	What is compound microscope ? Explain its working and derive the formula for its angular magnification
(B)	In a double slit experiment the second order maximum occurs at $\theta = 0.25^\circ$. The wavelength is 650 nm. Determine the slit separation.