Pune Vidyarthi Griha's

# Muktangan English School & Jr. College, Pune - 9

## Terminal Examination (2024-25)

## Standard - XI

**Subject - PHYSICS** | **Marks - 50**

**Date - 17-10-2024** | **Time - 9.00 a.m. to 11.30 a.m.**

***Note :***

1) *All sections are compulsory.*
2) *All symbols have their usual meaning unless and otherwise stated.*
3) *Figures to the right indicate full marks.*
4) *Draw the diagrams wherever necessary.*
5) *Use of log table is allowed. Calculator is not allowed.*
6) *For each MCQ, correct answer must be written along with its alphabet only the first attempt will be considered for evaluation.*

## SECTION - A [14]

**Q.1 Select and write the most appropriate answer from the given alternatives for each subquestion.** (7)

(1) One giga Hertz (1GHz) = ..... Hz.

(a) $10^{-9}$ (b) $10^{9}$ (c) $10^{-8}$ (d) $10^{8}$

(2) Dimensions of potential energy are the same as that of .....

(a) force (b) acceleration
(c) work (d) pressure

(3) Which of the following is not a scalar quantity ?

(a) Force (b) Temperature
(c) Work (d) Density

(4) Period of revolution of polar satellite is ..... .

(a) 24 hour (b) 58 minutes
(c) 1 year (d) 85 minutes

(5) The process in which temperature remains constant is called .....

(a) adiabatic (b) isothermal
(c) isochoric (d) isobaric

(6) The speed of sound in air is 2 times its speed at N.T.P., then the temperature of the air is .....

(a) 1092 K (b) $1092^{o}C$ (c) 273 K (d) 719K

(7) The magnitude of vector product of two unit vectors making an angle of 30 with each other is .....

(a) 1 (b) 2 (c) 3/2 (d) 1/2

**Q.2 Answer the following.** (7)

(I) What is unit of solid angle ?

(ii) What is the value of acceleration due to gravity at the centre of the Earth ?

(iii) Define time period of the satellite.

(iv) What is doppler effect ?

(v) Write Newton's formula for speed of sound in air modified by Laplace.

(vi) Find the derivaties of the $x^5$.

(vii) A man shouts loudly close to a high wall. He hears an echo. If the man is at 40m from the wall, how long after the shout will the echo be heard ? (speed of the sound in air = 330 m/s)

## SECTION - B

**Attempt any eight.** [16]

Q. 3 Define i) Modulation ii) Transmitter

Q.4 State any two characteristics of transverse waves.

Q.5 Define zero vector. Give one example of it.

Q.6 Explain the effect of pressure on velocity of sound.

Q.7 Write a short note on communication satellites.

Q.8 State any two characteristics of EM waves.

Q.9 Define a) Amplitude b) Wavelength of a wave

Q.10 A radar is located on the top of hill of height 500m. Calculate the maximum distance upto which it can detect object locate on the surface of the Earth. (Radius of Earth = $64 \times 10^5$ m.)

Q.11 Write down the number of significant figures in the following.
a) 256.09 b) 0.00410

Q.12 Show that vectors $\vec{a} = 2\hat{i} + 3\hat{j} + 6\hat{k}$ and $\vec{b} = 3\hat{i} - 6\hat{j} + 2\hat{k}$ are mutually perpendicular.

Q.13 The gravitational force between two bodies is 1N. If distance between them is doubled, what will be the gravitational force between them ?

## SECTION - C

**Attempt any four.** [12]

Q. 14 Draw block diagram of the basic elements of a communication system.

Q. 15 Find the dimensions of a) Work b) Pressure c) Charge

Q. 16 Obtain an expression for critical speed of the satellite.

Q.17 Using dimensional analysis check the correctness of equation $v = u + at$.

Q. 18 For $\vec{V}_1 = 2\hat{i} - 3\hat{j}$ and $\vec{V}_2 = -6\hat{i} + 5\hat{j}$, determine the magnitude and direction of $\vec{V}_1 + \vec{V}_2$.

Q. 19 A rocket is moving at a speed of 220 m/s towards a stationary target. It emits a wave of frequency 1200 Hz. Calculate the frequency of sound detected by the target.

## SECTION - D

**Attempt any two.** **[8]**

Q. 20 Obtain an expression for binding energy of an orbiting satellite.

Q.21 Write any four characteristics of vector product.

Q.22 (a) Write any two properties of Microwaves.

(b) In an EM wave the electric field oscillates sinusoidally at a frequency of $2 \times 10^{10}$ Hz. What is the wavelength of the wave ?
[Speed of the EM wave = $3 \times 10^8$ m/s]

Q.23 (a) Find the order of magnitude of following
i) Radius of the Earth = $6400 \times 10^3$ m
ii) Charge on electron = $1.6 \times 10^{-19}$ C

(b) What are Derived physical quantities ? Give any two examples of the same.

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