P.V.G.'s

Muktangan English School & Jr. College, Pune - 9

Annual Examination (2024-25)

STD XI

Subject : Physics | Marks - 70
Date : 27.03.2025 | Time : - 8.30 - 11.30 am

General Instructions:

The question paper is divided into Four sections.

1. Section A : Q 1 contains 10 multiple choice questions carrying 1 mark each.
2. Section B : Q 3 to Q 14 contains 12 short answer type questions carrying 2 marks. each. (Attempt any Eight)
3. Section C : Q 15 to Q 26 contains 12 short answer type questions carrying 3 marks. each. (Attempt any Eight)
4. Section D : Q 27 to Q 31 contains 5 long answer type questions carrying 4 marks each. (Attempt any Three)
5. Use of log table is allowed. Use of calculator is not allowed.
6. Figures to the right indicate full marks.
7. For multiple choice type questions, only first attempt will be considered for evalutation.
8. Physical constants :
   i) $g = 9.8\ m/s^2$
   ii) $\pi = 3.142$
   iii) $\frac{1}{4\pi \in_0} = 9 \times 10^9$ SI unit
9. Symbols have usual meaning unless and otherwise stated.

SECTION - A (18)

Q1. Select and write most approprite answer from the given alternatives for each sub-question. (10)

i) _____ is not a unit of energy.

a) Joule b) Calorie
c) megawatt d) Electron Volt

ii) The path followed by projectile is called _____.

a) ellipse b) projection
c) tragectory d) parabola

iii) When a sound wave moves from one medium to another, the quantity that remains unchanged is _____.

a) frequency b) amplitude
c) wavelength d) speed

iv) Light is in the form of radiation which is _____.

a) electromagnetic b) magnetic

c) electrical d) geometric

v) Which of the following is not involved in formation of rainbow?

a) refraction b) angular dispersion

c) angular deviation d) total internal reflection

vi) Like charges _____ each other.

a) added b) repel

c) cancel d) attract

vii) Reciprocal of resistivity is called _____.

a) electricity b) conductance

c) conductivity d) electromotive force

viii) The resultant of two forces 20 N and 25 N acting along +x and -x axes respectively is _____.

a) 45 N along +x axis b) 45 N along -x axis

c) 5 N along +x axis d) 5 N along -x axis

ix) What force will change the velocity of a body of mass 1 kg from 20 m/s to 30 m/s in two seconds?

a) 1 N b) 5 N

c) 10 N d) 25 N

x) If the coefficient of volume expansion of glass is $1.2 \times 10^{-5} / {}^0C$, then the coefficient of linear expansion is _____ $/{}^0C$.

a) 4×10^{-5} b) 3.6×10^{-5}

c) 0.4×10^{-5} d) 1.2×10^{-5}

Q2. Answer the following. **(8)**

i) State Newton's law of gravitation.

ii) What is the value of coefficient of restitution for elastic collision?

iii) Write a formula for relative velocity of object A having velocity $\overline{V}_A$ with respect to object B having velocity $\overline{V}_B$.

iv) What is stress?

v) Name the cell which converts light energy into electric energy.

vi) If an object moves uniformly along a circular path of radius 5 m with anular velocity 10 rad/s. Find its linear speed.

vii) A tuning fork of frequency 170 Hz produces sound waves of wavelength 2m. Calculate speed of sound.

viii) A rubber band originally 40 cm long is stretched to a length of 42 cm by a certain load. What is the strain produced?

SECTION - B (16)

Attempt any Eight.

Q3. Write any two features of P - type semiconductor.

Q4. Define magnetic dipole moment of a bar magnet, write its SI unit.

Q5. State any two properties of magnetic lines of force.

Q6. Wirte the formula for -

a) Electric field of a dipole along its axis.

b) Electric field of a dipole at a point on the equatorial line.

Q7. Write any two characteristics of transverse waves.

Q8. Distinguish between inertial and non-inertial frame of reference. (Any two points).

Q9. Draw a neat labelled diagram showing Earth and atmosphere layers.

Q10. A police car travels towards a stationary observer at a speed of 15 m/s. The siren on the car emits a sound of frequency 250Hz. Calculate the recorded frequency. The speed of sound is 340 m/s.

Q11. Write down the number of significant figures in the following numbers.

i) 4.5678

ii) 3.02

Q12. Estimate the number of images produced if a tiny object is kept in between two plane mirrors inclind at (i) 60^0 (ii) 40^0.

Q13. The speed of light is 3×10^8 m/s. Calculate the frequency of light wavelength 1.5×10^{-7}m.

Q14. Calculate electric field due to charge of 5×10^8 C at the distance of 10 cm.

SECTION - C (24)

Attempt any Eight

Q15. Draw a neat labeled ray diagram of compound microscope.

Q16. Define - 1) Conduction 2) Convection 3) Radiation

Q17. What is a) Eleastic collision

b) Inelastic collision

c) Perfectly inelastic collision

Q18. With the help of neat labelled diagram obtain an expression for parallel combination of two resistors R_1 and R_2.

Q19. Show that square of period of revolution of satellite is directly proportional to the cube of the radius of the orbit.

Q20. For a stretched wire show that

Work done = $\frac{1}{2}$ X load X extension

Q 21. Obtain an expression for horizontal range (R) of the projectile. Draw necessary diagram.

Q22. Determine the vector product of

$\vec{V}_1 = 2\hat{i} + 3\hat{j} - \hat{k} = \vec{V}_2 = \hat{i} + 2\hat{j} - 3\hat{k}$.

Q23. Find the acceleration due to gravity on a planet that is 10 times as massive as the Earth and with radius 20 times of the radius of the Earth. ($g = 9.8\ m/s^2$)

Q24. A car moving along a straight road with a speed of 120 km/hr, is brought to rest by applying brakes. The car covers a distance of 100 m before it stops. Calculate the time taken by the car to come to rest.

Q25. Calculate the electrostatic force between two charges having charge of 1.6×10^{-19} C on each and seperated by distance 10^{-15} m.

(Given $\rightarrow \frac{1}{4\pi \in_0} = 9 \times 10^9$ SI units)

Q26. The temperature difference between two sides of an iron, 2 cm thick is 10^0C. Heat is transmitted through a plate at the rate of 600 kcal per minute per square meter at steady state. Find the thermal conductivity of iron.

SECTION - D (12)

Attempt any three

Q27. State any four properties of scalar product.

Q28. With the help of neat labeled ray diagram, derive the prism formula.

Q29. a) Find the dimention of

i) momentum ii) pressure

b) Write SI unit of -

i) Torque ii) Impulse

Q30. a) State any two used of X- rays.

b) The internal resistance of a cell of emf 2V is 0.1 Ω. It is connected to a resistance of 0.9 Ω. What is the voltage across the cell?

Q31. a) Distinguish between intrinsic and extrinsic semiconductor. (Any two points)

b) A short magnetic dipole has magnetic moment $0.5A\ m^2$. Calculate its magnetic field at a distance of 20 cm from the centre of magnetic dipole on the axis.

❖❖❖