

Seat No.



Maharashtra Education Society's Jr. Colleges / Higher Secondary Schools

Prelim Examination (2018-19)

Std. - XII Science

Date - 09/01/2019

Marks -70

Subject - PHYSICS

Time -3 Hrs.

Instructions:

- 1) All the questions are compulsory.
- 2) **Section A** contains Q. No. 1 to 4 of multiple Choice type of questions carrying one mark each.
Q. No. 5 to 8 of very short answer type of questions carrying one mark each.
- 3) **Section B** contains Q. No. 9 to 15 short answer (SA1) types of questions carrying twomarks each.
Internal choice is provided to only one question.
- 4) **Section C** contains Q. No. 16 to 26 of short answer (SA2) type of questions carrying 3 marks each.
Internal choice is provided to only one question.
- 5) **Section D** contains Q. No 27 to 29 of long answer (LA) type of questions carrying five marks each.
Internal choice is provided to each question.
- 6) Use Log – Table if necessary. Use of calculator is not allowed.
- 7) Physical Constants: $e = 1.6 \times 10^{-19}$ C, mass of an electron = 9.1×10^{-31} kg,

Section A

Q1. A body is travelling along a circular path with constant speed. It has

- a) constant velocity. b) no acceleration.
c) inward acceleration. d) an outward radial acceleration.

Q2. Gravitational potential energy of a particle with reference to the surface of earth.....

- a) is always zero. b) remains constant.
c) decreases with increase in height. d) increases with increase in height.

Q3. The force experienced by a unit positive charge, when it placed in an electric field is called

- a) electric potential at that point. b) electric potential energy at that point.
c) electric intensity at that point. d) capacity at that point.

- Q4. A $10\ \Omega$ coil is put in the left gap of a Wheat stone's meter bridge. The value of resistance in the other gap, when null point is obtained at 40 cm from left end will be.....
- a) $15\ \Omega$ b) $30\ \Omega$ c) $20\ \Omega$ d) $18\ \Omega$
- Q5. State the principle of parallel axes.
- Q6. Define perfectly black body?
- Q7. What is step up voltage transformer?
- Q8. What is the energy of electron in 4th orbit of hydrogen atom?

Section B

- Q9. State Kepler's law of orbit and law of period.
- Q10. Distinguish between stationary waves and beats.
- Q11. Monochromatic light of wavelength 5000\AA falls on a slit of width a. If the first maximum falls at 30° , what is the value of a?
- Q12. Explain the principle of potentiometer.
- Q13. Write a note on ground wave propagation.

OR

- Q13. Write a note on sky wave propagation.
- Q14. Draw a neat labeled diagram for the angle of contact between mercury and clean glass.
- Q15. A $10\ \mu\text{F}$ capacitor is connected to a 100 V battery. How much electrostatic energy is stored in capacitor?

Section C

- Q16. Define centrifugal force. Give its any four examples.
- Q17. State any three laws of simple pendulum.
- Q18. State any six properties of a diamagnetic substances.
- Q19. Derive an expression for magnetic induction at a point near infinitely long straight conductor carrying an electric current on the basis of Ampere's law.
- Q20. The work function of tungsten is 4.5 eV. Calculate the speed of fastest electron ejected from tungsten surface when light whose photon energy is 5.8 eV shines on the surface.

Q21. State and prove principle of conservation of angular momentum.

Q22. For strained wire, show that strain energy = $\frac{1}{2}$ x load x extension.

Q23. Explain the reflection of transverse wave from a denser medium and a rarer medium.

OR

Q23. Derive an expression for a one dimensional simple harmonic progressive wave travelling in the direction of positive X - axis..

Q24. In a resonance tube experiment, a tuning fork resonates with an air column 10cm long and again resonates when it is 32.2 cm long. Calculate the end correction and the wavelength of the wave.

Q25. What is an oscillator? Draw the block diagram for oscillator.

Q26. If the critical angle of medium is $\sin^{-1} (3/5)$. Find the polarizing angle.

Section D

Q27. State the basic assumptions of kinetic theory of gases.

Explain the effect of presence of impurities on the surface tension of liquid.

OR

Q27. Define athermanous substances and diathermanous substance. Give one example of each.

What is capillarity? Give two examples of capillarity.

Q28. A series LCR circuit has resistance of 300Ω , capacitor of $0.2 \mu\text{F}$ and inductor of 8mH .

Find the impedance at resonance and resonant frequency.

State the condition to get steady interference pattern.

OR

Q28 A coil of resistance 5Ω and self inductance 0.2 H is connected in series with a variable capacitor across 30 volt, 50 Hz supply. At what value of capacitor-resonance will occur? Find the corresponding value of current.

What is meant by limit of resolution and the resolving power of microscope?

Q29. A monochromatic light of wavelength λ is incident on an hydrogen atom that lifts it to third orbit from the ground level. Find the wavelength and frequency of photon.

$(E_3 = -1.51 \text{ eV}, E_1 = -13.6 \text{ eV})$.

Draw neat labeled diagram of variation of kinetic energy and potential energy of a particle in S.H.M.

OR

Q29. Find the shortest wavelength in Paschen series if the longest wavelength in Balmer series is 6563 \AA .

Plot a graph of velocity and acceleration against time for a particle performing S.H.M. when starts from mean position.

