

Total No. of Questions-30

Roll No. : \_\_\_\_\_

Total No. of Pages-4

# Half Yearly Examination 2019-20

Class : 12

BSE-857

Subject : Physics

Time : 3.15 Hours

M.M. : 40

*Note: (i) Candidate/Student write their Roll Number on the Question Paper Compulsory.*

*(ii) All Questions are Compulsory.*

*(iii) Marks of all questions are mentioned in front of the question.*

*(iv) Write all the Answer in the given Answer booklet at one place.*

1. What is the ratio of different orbitals radius of hydrogen atom? 1/2
2. Draw the curve for change in magnetic field with distance at the axis of current carrying coil. 1/2
3. Define the diffraction of light. 1/2
4. Write the Einstein's photoelectric equation. 1/2
5. The force between two point charges is F in vaccum. If a bras plate inserted between these charges, than what will be the value of new force? 1
6. Write the Gaus's Law in magnetism. 1
7. Write the name of two materials whose resistivity increase with temperature. 1
8. What will be the angle of dip at that place where the vertical and horizontal component of Earth's magnetic field is same? 1
9. State the Fleming's right hand rule to find the direction of induced current. 1

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10. "The Pole segments of permanent magnets used in galvanometer are concave shaped." Why? 1
11. The magnetic susceptibility of a substance is 0.60 at the temperature 120K. Calculate the magnetic susceptibility for this substance at the temperature 27°C. 1
12. Write the aim of Davison & Germer experiment. 1
13. A proton enters in the magnetic field 0.2T perpendicular with the speed  $6 \times 10^5$  m/sec. Calculate the radius of the path of proton. 1
14. Define the following : 1
  - (i) Work function
  - (ii) Stopping Potential
15. Two coils have mutual inductance of 0.5H. If the current in primary coil is raised to a value of 2A to 3A in  $10^{-2}$  seconds. What is the induced emf in secondary coil? Calculate. 1
16. Find the de-Broglie wave length related to an electron accelerated by 100 volt. 1
17. The magnetic flux  $\phi = 10t^2 + 5t + 1$  passes at the perpendicular of the coil, changes with respect to time. Here  $t$  is in sec and  $\phi$  is in Wb. Then at  $t = 5$  sec. Find the value of induced emf in the coil. 1
18. Write the causes of rainbow formation. 1
19. Write three postulates of the Bohr's atomic model. 1½
20. In an experiments of potentiometer two cell of emf  $E_1$  &  $E_2$  ( $E_1 > E_2$ ) are in series. The balanced position is obtained at 60 cm length of wire. If terminal of cell of lower emf are reversed then the balanced position is obtained at 20 cm length of wire. Determine ratio of emf of two cells? 1½
21. Establish the relation between drift velocity and electric field. 1½

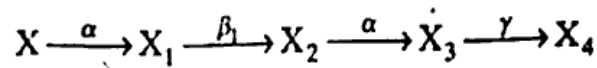
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22. The axis of a polariser and an analyser are parallel to each other then the emitted intensity  $I_0$  is obtained. If the analyser is rotated by  $45^\circ$  then find the value of the emitted intensity.  $1\frac{1}{2}$
23. Two lenses of power 5D and  $-7D$  are in contact with each other forming a combination of lens. Calculate the power of the combination. Will the lens be converging or diverging?  $1\frac{1}{2}$
24. A radioactive nucleus decay in the following way :



If the value of mass number & atomic number of X are 180 and 72 respectively then find the mass number and atomic number of  $X_4$ .  $1\frac{1}{2}$

25. Derive the expression for capacitance of spherical capacitor. Draw necessary diagram. <http://www.rbseonline.com> 2
26. (i) Write the names of two moderators used in nuclear reactors.
- (ii) Write the function of control rods and coolant in the nuclear reactor.  $1 + 1 = 2$
27. Derive an expression for magnetic field at the axis in the toroid. Draw necessary diagram. 2

OR

With the help of Bio-Sawart's Law. Derive the expression for magnetic field at the centre of a current carrying circular coil. Draw necessary diagram.

28. Draw the impedance diagram of LCR series circuit and find the expression for impedance and phase difference. 3
29. With the help of analytical treatment of interference, derive the condition to obtain constructive and destructive interference. 3

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OR

Draw a ray diagram for refraction at a spherical surface separating two mediums.

For refraction at a spherical surface derive the relation

$$\frac{n_2}{v} - \frac{n_1}{u} = \frac{n_2 - n_1}{R}$$

in object distance ( $u$ ), image distance ( $v$ ), refractive index of medium ( $n_1$  and  $n_2$ ) and radius of curvature ( $R$ ). <http://www.rbseonline.com>

30. Obtain formula for electric field intensity due to an uniformly charged spherical shell by the help of Gauss law, when

(a) Point of observation is situated outside the spherical shell.

(b) Point of observation is situated inside the spherical shell.

Draw the curve for change in electric field intensity with distance for charged spherical shell. 3

OR

Derive an expression for electric potential due to electric dipole at any point ( $r, \theta$ ). Prove that the electric potential at point on axial line is maximum and at equatorial is zero.



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