OMR Answer Sheet No.

Question Booklet Number

8119

M.Sc. (Sem.-VIII) Examination, 2022-23

Booklet Series
A

PHYSICS

Plasma Physics

| Time : 1 : 30 Hours
| समय : 1 : 30 घण्टे
| Maximum Marks : 75
| अधिकतम अंक : 75

(To be filled in by the Candidate / निम्न पूर्तियाँ परीक्षार्थी स्वयं भरें)

Roll No. (in figures) _____
अनुक्रमांक (अंकों में)

Roll No. (in words) _____
अनुक्रमांक (शब्दों में)

Enrolment No. (in figures) _____

Name of College _____
कॉलेज का नाम

Signature of Invigilator
कक्ष निरीक्षक के हस्ताक्षर

Instructions to the Examinee :

1. Do not open the booklet unless you are asked to do so.
2. The booklet contains 75 questions. Examinee is required to answer any 50 questions in the OMR Answer-Sheet provided and not in the question booklet. In case Examinee attempts more than 50 Questions, ***first*** 50 attempted questions will be evaluated. All Questions carry equal marks.
3. Examine the Booklet and the OMR Answer-Sheet very carefully before you proceed. Faulty question booklet due to missing or duplicate pages/questions or having any other discrepancy should be immediately replaced.

(Remaining Instructions on last page)

परीक्षार्थियों के लिए निर्देश :

1. प्रश्न-पुस्तिका को तब तक न खोलें जब तक आपसे कहा न जाए।
2. प्रश्न-पुस्तिका में 75 प्रश्न हैं। परीक्षार्थी को किन्हीं 50 प्रश्नों को दी गई OMR उत्तर-पत्रक पर ही हल करना है। परीक्षार्थी द्वारा 50 से अधिक प्रश्नों को हल करने की स्थिति में, ***प्रथम*** 50 उत्तरों को ही मूल्यांकित किया जाएगा। सभी प्रश्नों के अंक समान हैं।
3. प्रश्नों के उत्तर अंकित करने से पूर्व प्रश्न-पुस्तिका तथा OMR उत्तर-पत्रक को सावधानीपूर्वक देख लें। दोषपूर्ण प्रश्न-पुस्तिका, जिसमें कुछ भाग छपने से छूट गये हों या प्रश्न एक से अधिक बार छप गये हों या किसी भी प्रकार की कमी हो, उसे तुरन्त बदल लें।

(शेष निर्देश अन्तिम पृष्ठ पर)

1. When the charged particle enters the homogeneous magnetic field at any angle θ such that $\theta \neq 0^0$ or $\frac{\pi}{2}$; the resulting path is :

(A) Straight line

(B) Circle

(C) Helix or Spiral

(D) None of the above

2. If a charged particle of charge q enters simultaneous electric and magnetic field $\vec{E}$ and $\vec{B}$ respectively, then the total force on the particle is :

(A) $\vec{F} = q\vec{E}$

(B) $\vec{F} = q(\vec{v} \times \vec{B})$

(C) $\vec{F} = q[\vec{E} + \vec{v} \times \vec{B}]$

(D) None of the above

3. Plasma is a mixture of :

(A) Free electrons, positive ions and neutral particles with a high density.

(B) Electrons, Protons and Neutrons

(C) Photons, Neutrons and X-rays

(D) None of the above

4. The path traversed by a charged particle moving with a finite initial velocity and subjected to a constant transverse electric field is:

(A) Circle

(B) Straight Circle

(C) Parabola

(D) None of the above

5. What is a Plasma cut off frequency-

(A) The frequency at which plasma becomes transparent to electro-magnetic waves.

(B) The frequency at which Plasma absorbs all electromagnetic waves.

(C) The frequency at which Plasma emits all electromagnetic waves.

(D) The frequency at which a Plasma stops conducting electricity.

6. What is Plasma instabilities :

(A) Phenomenon that increase the temperature of the Plasma

(B) Phenomenon that do not affect the behaviour of the Plasma

(C) Phenomenon that stabilize the Plasma and prevent it from changing its behaviour

(D) Phenomena that cause the Plasma to loose its stability and to change its behaviour.

7. What is a Plasma discharge

(A) A process in which a Plasma is produced by ionizing a gas.

(B) A process in which Plasma is heated up.

(C) A process in which a Plasma is cooled down.

(D) A process in which a Plasma is confined for a sufficient time to allow nuclear fusion to occur.

8. The magnetic flux through a Larmor orbit is constant if.

(A) $\vec{\mu}$ is constant

(B) $\vec{\mu}$ is variable

(C) Not dependent on $\vec{\mu}$

(D) None of these

Where $\vec{\mu}$ is magnetic moment.

9. What is Plasma Parameter

(A) A dimensionless quantity that characterizes the properties of a Plasma.

(B) A Physical quantity that characterizes the properties of Plasma.

(C) A mathematical quantity that characterizes the properties of Plasma.

(D) A Chemical quantity characterizes the properties of Plasma.

10. What is Plasma Frequency-

(A) The Frequency at which a Plasma emits radiations

(B) The Frequency at which Plasma oscillates.

(C) The Frequency at which Plasma absorbs radiations

(D) The Frequency at which Plasma conducts electricity.

11. The magnetic moment of the gyrating particle is given by :

(A) $\vec{\mu} = \frac{\frac{1}{2} mV_{\perp}^2}{\vec{B}}$

(B) $\vec{\mu} = \vec{B} . \frac{1}{2} mV_{\perp}^2$

(C) $\vec{\mu} = \vec{E} . \frac{1}{2} mV_{\perp}^2$

(D) $\vec{\mu} = \frac{\frac{1}{2} mV_{\perp}^2}{\vec{E}}$

12. The polarization drift is :

(A) $\vec{v}_p = \pm \frac{1}{\omega_c \vec{B}} \frac{d\vec{E}}{dt}$

(B) $\vec{v}_p = \pm \frac{1}{\omega_c \vec{E}} \frac{d\vec{E}}{dt}$

(C) $\vec{v}_p = \pm \frac{1}{\omega_c} \frac{d\vec{E}}{dt}$

(D) None of these

13. The invariance of $\vec{\mu}$ is the basis for one of the primary schemes for .....

(A) Plasma confinement

(B) Plasma pumping

(C) Magnetic skin effect

(D) None of these

14. When the charged particle enters perpendicular to the homogeneous magnetic field, the Larmor radius of the orbit is given by:

(A) $r = \frac{mv}{qB}$

(B) $r = \frac{mB}{qv}$

(C) $r = \frac{mq}{vB}$

(D) None of the above

15. The distance in which the effect of introduced charge is screened out in Plasma is called :

(A) Debye screening distance

(B) Kelving shielding

(C) Curie screening distance

(D) None of the above

16. The conditions a plasma system must satisfy are-

(A) $\lambda_D << L$

(B) $N_D >>> 1$

(C) $\omega_p > 1$

(D) All are correct.

17. The correct dispersion relation for Alfven waves in plasma is-

(A) $\omega^2 = k^2 v_A^2$

(B) $\omega = k^2 v_A^2$

(C) $\omega^2 = k v_A$

(D) $\omega = (k v_A)^{1/2}$

Where v_A is velocity of Alfven waves.

18. The correct expression for Plasma frequency is-

(A) $\omega_p = \left(\frac{n_0 e^2}{\epsilon_0 m}\right)^{1/2}$

(B) $\omega_p = \left(\frac{n_0 e^2}{\epsilon_0 m}\right)$

(C) $\omega_p = \left(\frac{n_0 e^2}{\epsilon_0 m}\right)^{3/2}$

(D) $\omega_p = \left(\frac{\epsilon_0 m}{n_0 e^2}\right)^{1/2}$

19. A resonance occurs at a point in the plasma where

(A) $\omega_h^2 = \omega_p^2 + \omega_c^2 = \omega^2$

(B) $\omega_h^2 = \omega_p + \omega_c = \omega$

(C) $\omega_h^2 = (\omega_p + \omega_c)^{1/2} = \omega^{1/2}$

(D) $\omega_h^2 = \omega_p^2$

20. Experimental consequences of electromagnetic wave propagation inside a plasma are

(A) The Whistler mode

(B) Faraday Rotation

(C) (A) and (B) are correct

(D) None of these

21. Debye length is expressed as :

(A) $\lambda_D = \left(\frac{\epsilon_0 KT}{2 n_0 e^2}\right)^{\frac{1}{2}}$

(B) $\lambda_D = \left(\frac{\epsilon_0 n_0 T}{2K e^2}\right)^{\frac{1}{2}}$

(C) $\lambda_D = \left(\frac{2 \epsilon_0 e^2}{n_0 KT}\right)^{\frac{1}{2}}$

(D) None of the above

22. The phenomenon of confinement of a Plasma or conducting fluid by self magnetic field is:

(A) Compton effect

(B) Photoelectric effect

(C) Pinch effect

(D) None of the above

23. The plasma parameters can be determined either from line spectra or continuous spectra as in the :

(A) Optical spectral investigation of plasma

(B) Magnetic spectral investigation of plasma

(C) Electrical spectral investigation of plasma

(D) None of the above

24. Hard X-rays are emitted due to interaction or bombardment of glass walls and electrodes by :

(A) The "Runway" electrons

(B) The "OFF way" electrons

(C) The "Run way" photons

(D) None of the above

25. When the charged particle enters parallel to the homogeneous magnetic field, the path of the charged particle is :

(A) Parabola

(B) Circle

(C) Undeflected straight line

(D) None of the above

26. If a charged particle is moving under the influence of space varying electric field $(\vec{E} = E_0(\cos kx)\hat{x})$ the guiding centre drifts is :

(A) $V_E = \frac{\vec{E} \times \vec{B}}{B^2}$

(B) $V_E = \left(1 + \frac{1}{4} r_L^2 \nabla^2\right) \frac{\vec{E} \times \vec{B}}{B^2}$

(C) $V_E = \frac{1}{q} \frac{\vec{E} \times \vec{B}}{B^2}$

(D) None of these

27. First adiabatic invariant is :

(A) Electric moment

(B) Magnetic moment

(C) Electric polarisation

(D) None of the above

28. Second adiabatic invariant is :

(A) Linear momentum

(B) Angular momentum

(C) Torque

(D) None of the above

29. Third adiabatic invariant is:

(A) Total magnetic flux enclosed by the drift surface

(B) Total electric flux enclosed by the drift surface

(C) Electric field intensity

(D) None of the above

30. Adiabatic invariance of magnetic moment is violated when :

(A) Angular frequency ω is not small compared with Larmor frequency ω_t

(B) Angular frequency ω is not large compared with Larmor frequency ω_t

(C) Angular frequency ω is equal to Larmor frequency ω_t

(D) None of the above

31. Diffusion constant D in the absence of magnetic field is expressed as :

(A) $D = \frac{KT}{m\nu_c}$

(B) $D = \frac{K\nu_c}{mT}$

(C) $D = \frac{KmT}{\nu_c}$

(D) None of the above

32. Diffusion coefficient D_H in the presence of magnetic field is expressed as:

(A) $D = \frac{D_H}{1+\omega_H^2\mu_0^2}$

(B) $D_H = \frac{D}{1+\omega_H^2\mu_0^2}$

(C) $D_H = \frac{D}{1-\omega_H^2\mu_0^2}$ ✓

(D) None of the above

33. The Boltzmann equation is :

(A) $\frac{\partial f}{\partial t} + \vec{v}.\vec{\nabla} f + \frac{\vec{F}}{m}\frac{\partial f}{\partial v} = \left(\frac{\partial f}{\partial t}\right)_c$ •

(B) $\frac{\partial \vec{v}}{\partial t} + f.\vec{\nabla}\times\vec{v} + \frac{\vec{F}}{m}\frac{\partial f}{\partial v} = \left(\frac{\partial f}{\partial t}\right)_c$

(C) $\frac{\partial \vec{F}}{\partial t} + \vec{v}.\vec{\nabla} f + \frac{\vec{v}}{m}\frac{\partial f}{\partial v} = \left(\frac{\partial f}{\partial t}\right)_c$

(D) None of the above

34. Equation of Continuity is :

(A) $\frac{\partial n}{\partial t} + \vec{\nabla}.(n\vec{u}) = 0$

(B) $\frac{\partial \vec{u}}{\partial t} + \vec{\nabla}(nn) = 0$

(C) $\frac{\partial u}{\partial n} + \vec{\nabla}(nt) = 0$ •

(D) None of the above

35. Fluid equation of motion describing the flow of momentum is :

(A) $mn\left[\frac{\partial \vec{u}}{\partial t} + (\vec{u}.\vec{\nabla})\vec{u}\right]$
$= qn[\vec{E} + \vec{u}\times\vec{B}] - \vec{\nabla}.\vec{I} + \Delta\vec{P}$

(B) $qn\left[\frac{\partial \vec{u}}{\partial t} + (\vec{u}.\vec{\nabla})\vec{u}\right]$
$= mn[\vec{E} + \vec{u}\times\vec{B}] - \vec{\nabla}.\vec{I} + \Delta\vec{P}$

(C) $qm\left[\frac{\partial \vec{u}}{\partial t} + (\vec{u}.\vec{\nabla})\vec{u}\right]$
$= mn[\vec{E} + \vec{u}\times\vec{B}] - \vec{\nabla}.\vec{I} + \Delta\vec{P}$

(D) None of the above

36. At low frequencies of the field, when plasma is subjected to a constant magnetic field in such a way that magnetic field is in the direction perpendicular to the wave-vector the waves are called :

(A) Alfven waves •

(B) Plasma oscillations

(C) Magneto-sonic waves =

(D) None of the above

37. At low frequencies of the field, when plasma is subjected to a constant magnetic field such that the magnetic field is in the direction of propagation, the waves are called :

(A) Alfven waves •

(B) Magnetosonic waves

(C) Plasma oscillations ✓

(D) None of the above

38. The dispersion relation for the Magnetosonic wave is :

(A) $v_M^2 = c^2\left(\frac{v_A^2 + v_s^2}{v_A^2 + c^2}\right)$

(B) $v_A^2 = c^2\left(\frac{v_M^2 + v_s^2}{v_A^2 + v_s^2}\right)$

(C) $v_A^2 = c^2\left(\frac{v_M^2 + v_s^2}{v_M^2 + c^2}\right)$

(D) None of the above

Where v_m, v_s, v_A and c have their usual meanings.

39. What is a Plasma focus-

(A) A device used to heat Plasma

(B) A device used to generate Plasma

(C) A device used for magnetic confinement fusion

(D) A device used for Inertial confinement fusion

40. For Magnetosonic waves in the plasma, the correct relation between propagation constant (k) and magnetic field is :

(A) $k \parallel B_0$

(B) $k \perp B_0$

(C) $k . B_0 = 0$

(D) (B) and (C) are correct

41. What is a Plasma jet

(A) A device used for magnetic confinement fusion.

(B) A high speed stream of Plasma

(C) A device used to generate Plasma

(D) A device used for Inertial confinement fusion.

42. The correct expression for velocity of Alfven waves in plasma is-

(A) $V_A = \frac{B}{(\mu_0 \rho)^{1/2}}$

(B) $V_A = \frac{B^2}{(\mu_0 \rho)^{1/2}}$

(C) $V_A = \frac{B}{(\mu_0 \rho)}$

(D) $V_A = \frac{B}{(\mu_0 \rho)^2}$

43. What will be the value of Debye length for a glow discharge, with $n=10^{16}\ m^{-3}$, KTe = 2eV

(A) 1.05×10^{-6} m

(B) 1.05×10^{-4} m

(C) 1.05×10^{-2} m

(D) 1.05×10^{-8} m

44. The expression for one-dimensional Maxwellian distribution for velocity is given by

(A) $f(u) = A \exp.\left(\frac{-\frac{1}{2} mu^2}{KT}\right)$

(B) $f(u) = A \exp.\left(\frac{-KT}{mu^2}\right)$

(C) $f(u) = AT^2 \exp.\left(\frac{-\frac{1}{2} mu^2}{KT}\right)$

(D) $f(u) = AT \exp.\left(\frac{-\frac{1}{2} mu^2}{KT}\right)$

45. The equation governing propagation of Alfven waves is :

(A) $\frac{\partial^2 B_{1y}}{\partial t^2} = \frac{B_0^2}{\mu_0 \rho} + \frac{\partial^2 B_{1y}}{\partial z^2} + \frac{1}{\sigma \mu_0} \frac{\partial^3 B_1 y}{\partial z^2 \partial t}$

(B) $\frac{\partial^2 B_{1y}}{\partial z^2} = \frac{B_0^2}{\mu_0 \rho} + \frac{\partial^2 B_{1y}}{\partial t^2} + \frac{1}{\sigma \mu_0} \frac{\partial^3 B_1 y}{\partial z^2 \partial t}$

(C) $\frac{\partial^3 B_{1y}}{\partial z^2 \partial t} = \frac{\partial^2 B_{1y}}{\partial t^2} + \frac{B_0^2}{\mu_0 \rho} \frac{\partial^2 B_1 y}{\partial z^2}$

(D) None of the above

46. Magnetic pressure in Plasma is expressed as :

(A) $P_m = \frac{B^2}{2\mu_0}$

(B) $P_m = B / 2\mu_0^2$.

(C) $P_m = B^2 / 2\mu_0^3$

(D) None of the above

47. The magnetic energy per unit volume in the fluid plays the role of :

(A) Magnetic pressure

(B) Magnetic field intensity

(C) Magnetic flux

(D) None of the above

48. A cut off occurs in a plasma when the refractive index goes to :

(A) Infinite

(B) Zero

(C) One

(D) None of the above

49. What is a Plasma Sheath-

(A) A thin layer of Plasma that forms around a space craft or other objects in a Plasma.

(B) A device used to generate Plasma.

(C) A device used for magnetic confinement fusion

(D) A device used for Inertial confinement fusion.

50. For a ordinary waves in plasma, the correct dispersion relation is-

(A) $w^2 = w_p^2 + c^2k^2$

(B) $w^2 = w_p + ck$

(C) $w^2 = w_p^{3/2} + c^2k^2$

(D) $w^2 = w_p^{1/2} + ck$

51. For plasma density $\eta=10^{18}$ m^{-3}, the value of plasma frequency is-

(A) 50 GHz

(B) 56.5 GHz

(C) 10 GHz

(D) 9 GHz

52. In plasma system, hydromagnetic waves are associated with-

(A) Low frequency ion oscillations

(B) High frequency ion oscillations

(C) Low frequency electron oscillations

(D) High frequency electron oscillations

53. At cut off a wave is generally-

(A) Reflected

(B) Absorbed

(C) Transmitted

(D) None of the above

54. A resonance occurs in a plasma when the refractive index becomes :

(A) Zero

(B) Infinite

(C) One

(D) None of the above

55. At Resonance a wave is generally-

(A) Reflected

(B) Transmitted

(C) Absorbed

(D) None of the above

56. Plasma diagnostic single probe method is used to measure :

(A) Electron density and electron temperature

(B) Photon density and Photon temperature

(C) Proton density and Proton pressure

(D) None of the above

57. Plasma diagnostic Double probe method is used to measure :

(A) Photon density and Photon pressure

(B) Electron density and electron temperature

(C) Proton mass and Proton pressure

(D) None of the above

58. Plasma diagnostic Radio-frequency probe method is useful to measure :

(A) Photon density and Photon temperature

(B) Electron density, electron temperature and collision frequency

(C) Ion density, Ion pressure and Ion collision frequency

(D) None of the above

59. In double probe method of Plasma diagnostic the equation of Saturation current is-

(A) $I_r = A n_i e \left(\frac{K T_i}{2\pi m}\right)^{1/2}$

(B) $I_r = A e \left(\frac{K T_i}{2\pi m}\right)$

(C) $I_r = \left(\frac{K T_i}{2\pi m}\right)$

(D) None of these

60. The dispersive relation for a low density plasma is $\omega^2 = \omega_p^2 + c^2k^2$, where ω_p is plasma frequency. The relationship between the group velocity (v_g) and phase velocity (v_p) is

(A) $v_p = v_g$

(B) $v_p = v_g^{1/2}$

(C) $v_p . v_g = c^2$

(D) $v_g = v_p^{1/2}$

61. In plasma when Electromagnetic waves are travelling parallel to $\vec{B}_0$. The dispersion relation for R wave is-

(A) $\frac{c^2k^2}{\omega^2} = 1 - \frac{\omega_p^2 / \omega^2}{1 - (\omega_c/\omega)}$

(B) $\frac{c^2k^2}{\omega^2} = 1 - \omega_p^2 / \omega^2$

(C) $\frac{c^2k^2}{\omega^2} = 1 - \frac{\omega_c}{\omega}$

(D) $\frac{c^2k^2}{\omega^2} = 1 - \left(\frac{\omega_c}{\omega}\right)^2$

62. Plasma diagnostic Microwave probe Reflection method is useful in measuring:

(A) Electron temperature

(B) Electron density

(C) Collision frequency

(D) None of the above

63. Plasma diagnostic Microwave probe Transmission method is useful in measuring :

(A) Electron pressure

(B) Electron temperature

(C) Electron density and collision frequency

(D) None of the above

64. Plasma diagnostic Microwave probe Radiation method is used to measure:

(A) Electron temperature

(B) Electron density

(C) Collision frequency

(D) None of the above

65. The dielectric constant of a plasma is expressed of-

(A) $\varepsilon = 1 - \left(\frac{\omega_p}{\omega}\right)^2$

(B) $\varepsilon = 1 - \frac{\omega_p}{\omega}$

(C) $\varepsilon = 1 - \left(\frac{\omega_p}{\omega}\right)^3$

(D) $\varepsilon = -1$

66. When a magnetic field H is applied transversely in the direction of the discharge current the expression for electron temperature is given by

(A) $T_{eH} = T_e \left[1 + c_1 \frac{H^2}{P^2}\right]^{1/2}$

(B) $T_{eH} = T_e \left[1 + \frac{H}{P}\right]^{1/2}$

(C) $T_{eH} = T_e \left[1 + c_1 \frac{H}{P}\right]^{1/2}$

(D) None of these

67. Plasma diagnostic Spectroscopic-Doppler shift method is used to measure :

(A) Electron density

(B) Electron temperature

(C) Electron pressure

(D) None of the above

68. Plasma diagnostic Spectroscopic Stark effect is used to measure :

(A) Electron density

(B) Electron temperature

(C) Collision frequency

(D) None of the above

69. In Laser tool of plasma diagnostics the differential scattering cross-section for an unpolarized incident wave is given by

(A) $\frac{d\sigma}{d\Omega} = \frac{1}{4\pi} \sigma_{jh} \frac{3}{4} (1 + \cos^2 \theta)$

(B) $\frac{d\sigma}{d\Omega} = \frac{1}{4\pi} \sigma_{jh} (1 + \cos^2 \theta)$

(C) $\frac{d\sigma}{d\Omega} = \sigma_{ih} (1 + \cos^2 \theta)$

(D) None of these

70. If a charged particle moves in uniform magnetic field, the acceleration is maximum when-

(A) The angle between $\vec{V}$ and $\vec{B}$ is zero.

(B) The angle between $\vec{V}$ and $\vec{B}$ is 45^0.

(C) The angle between $\vec{V}$ and $\vec{B}$ is 90^0.

(D) None of these.

71. What is an Ion-

(A) An atom or molecule with a net electric charge.

(B) An atom or molecule with no electric charge.

(C) An atom or molecule that has been heated to high temperatures.

(D) An atom or molecules that has been pressurized.

72. What is the fourth state of matter

(A) Plasma

(B) Gas

(C) Solid

(D) Liquid

73. A charge particle is moving with velocity $\vec{u}$ in a magnetic field $\vec{B}$ experiences force $\vec{F}$, which of the following statement is false?

(A) $\vec{B}$ and $\vec{F}$ are normal to each other

(B) $\vec{F}$ depends on $\vec{u}$

(C) $\vec{F}$ can perform work

(D) $\vec{F}$ is deflecting force

74. Plasma diagnostic spectroscopic comparison of intensity of spectral lines method is used to measure:

(A) Electron temperature

(B) Electron density

(C) Collision frequency

(D) None of the above

75. Plasma diagnostic Laser-scattering method is used to measure :

(A) Collision frequency

(B) Electron density and Electron temperature

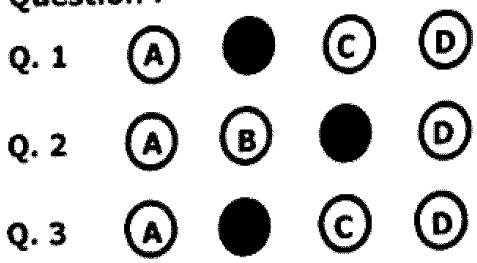
(C) Electron velocity

(D) None of the above

4. Four alternative answers are mentioned for each question as A, B, C & D in the booklet. The candidate has to choose the most appropriate answer and mark the same in the OMR Answer-Sheet as per the direction :

Example :

Question :



Illegible answers with cutting or over-writing or half filled circle will be cancelled.

5. In case the candidate does not fill the appropriate circle in the OMR Answer-Sheet and leave blank, 'Zero' mark will be given.

6. The candidate has to mark answers on the OMR Answer-Sheet with **black or blue ball point pen only** carefully as per directions.

7. **There will be no negative marking.**

8. Examinee must handover the answer-sheet to the invigilator before leaving the examination hall. Examinee can take away the Booklet along with them.

9. Rough-work, if any, should be done on the blank page provided for the purpose at the end of booklet.

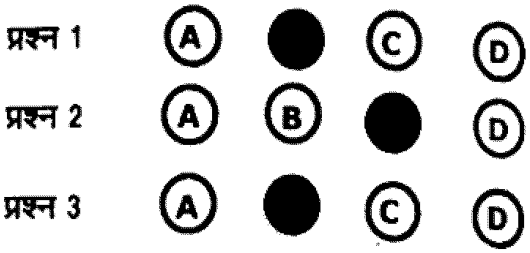
10. Write your Roll Number and other required details in the space provided on the title page of the booklet and on the OMR Answer-Sheet with ball point pen. **Do not use lead pencil.**

11. **To bring and use log-book, calculator, pager & cellular phone in examination hall is prohibited.**

4. प्रश्न-पुस्तिका में प्रत्येक प्रश्न के चार सम्भावित उत्तर A, B, C तथा D हैं। परीक्षार्थी को उन चारों विकल्पों मे से एक सबसे सही अथवा सबसे उपयुक्त उत्तर छाँटना है। उत्तर को OMR उत्तर-पत्रक में सम्बन्धित प्रश्न संख्या मे निम्न प्रकार भरना है :

उदाहरण :

प्रश्न :



अपठित उत्तर या ऐसे उत्तर जिन्हें काटा या बदला गया है, या गोले में आधा भरकर दिया गया उत्तर निरस्त कर दिया जाएगा।

5. यदि परीक्षार्थी OMR उत्तर-पत्रक में उपयुक्त गोले को नहीं भरता है और उत्तर-पत्रक को खाली छोड़ देता है, तो उसे 'शून्य' अंक प्रदान किया जाएगा।

6. अभ्यर्थी को प्रश्नों के उत्तर OMR उत्तर-पत्रक पर **केवल काले या नीले बाल प्वॉइंट पेन** से सतर्कतापूर्वक निर्देशानुसार अंकित करने होंगे।

7. **निगेटिव मार्किंग नहीं है।**

8. परीक्षार्थी उत्तर-पत्रक परीक्षा भवन छोड़ने से पहले कक्ष निरीक्षक को सौंप दें। परीक्षार्थी प्रश्न पुस्तिका अपने साथ ले जा सकते हैं।

9. रफ-कार्य, यदि कोई हो, रफ-कार्य के लिए दिए खाली पेज पर ही किया जाना चाहिए।

10. प्रश्न-पुस्तिका के मुखपृष्ठ पर तथा OMR उत्तर-पत्रक पर निर्धारित स्थान में अनुक्रमांक तथा अन्य विवरण बॉल प्वॉइंट पेन से ही भरें। **पेन्सिल का प्रयोग न करें।**

11. **परीक्षा कक्ष में लॉग-बुक, कैल्कुलेटर, पेजर तथा सैल्युलर फोन ले जाना तथा उसका उपयोग करना वर्जित है।**