

M. SC. Geophysics

12P/204/30

Question Booklet No. 208

(To be filled up by the candidate by blue/black ball-point pen)

Roll No.

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Roll No.

(Write the digits in words)

Serial No. of OMR Answer Sheet

Day and Date

(Signature of Invigilator)

INSTRUCTIONS TO CANDIDATES

(Use only **blue/black ball-point pen** in the space above and on both sides of the Answer Sheet)

1. Within 10 minutes of the issue of the Question Booklet, check the Question Booklet to ensure that it contains all the pages in correct sequence and that no page/question is missing. In case of faulty Question Booklet bring it to the notice of the Superintendent/Invigilators immediately to obtain a fresh Question Booklet.
2. Do not bring any loose paper, written or blank, inside the Examination Hall *except the Admit Card without its envelope*.
3. A separate Answer Sheet is given. *It should not be folded or mutilated. A second Answer Sheet shall not be provided. Only the Answer Sheet will be evaluated.*
4. Write your *Roll Number and Serial Number of the Answer Sheet by pen* in the space provided above.
5. **On the front page of the Answer Sheet, write by pen your Roll Number in the space provided at the top, and by darkening the circles at the bottom. Also, wherever applicable, write the Question Booklet Number and the Set Number in appropriate places.**
6. No overwriting is allowed in the entries of Roll No., Question Booklet No. and Set No. (if any) on OMR sheet and also Roll No. and OMR Sheet No. on the Question Booklet.
7. Any change in the aforesaid entries is to be verified by the invigilator, otherwise it will be taken as unfair means.
8. Each question in this Booklet is followed by four alternative answers. *For each question, you are to record the correct option on the Answer Sheet by darkening the appropriate circle in the corresponding row of the Answer Sheet, by ball-point pen as mentioned in the guidelines given on the first page of the Answer Sheet.*
9. For each question, darken only one circle on the Answer Sheet. If you darken more than one circle or darken a circle partially, the answer will be treated as incorrect.
10. *Note that the answer once filled in ink cannot be changed. If you do not wish to attempt a question, leave all the circles in the corresponding row blank (such question will be awarded zero mark).*
11. For rough work, use the inner back page of the title cover and the blank page at the end of this Booklet.
12. Deposit *only the OMR Answer Sheet* at the end of the Test.
13. You are not permitted to leave the Examination Hall until the end of the Test.
14. If a candidate attempts to use any form of unfair means, he/she shall be liable to such punishment as the University may determine and impose on him/her.

No. of Questions/प्रश्नों की संख्या : 150

Time/समय : 2½ Hours/घण्टे

Full Marks/पूर्णांक : 450

Note/नोट : (1) Attempt as many questions as you can. Each question carries **3** marks. **One** mark will be deducted for each incorrect answer. **Zero** mark will be awarded for each unattempted question.

अधिकाधिक प्रश्नों को हल करने का प्रयत्न करें। प्रत्येक प्रश्न **3** अंक का है। प्रत्येक गलत उत्तर के लिए एक अंक काटा जाएगा। प्रत्येक अनुत्तरित प्रश्न का प्राप्तांक शून्य होगा।

(2) If more than one alternative answers seem to be approximate to the correct answer, choose the closest one.

यदि एकाधिक वैकल्पिक उत्तर सही उत्तर के निकट प्रतीत हों, तो निकटतम सही उत्तर दें।

1. All values of $(-1)^{1/3}$ are

(1) $1, \frac{1}{2}(1 \pm \sqrt{3})$

(2) $-1, \frac{1}{3}(1 \pm \sqrt{2})$

(3) $-1, \frac{1}{2}(1 \pm \sqrt{3})$

(4) $1, \frac{1}{3}(1 \pm \sqrt{2})$

2. Roots of $x^7 + 1 = 0$ are for $r = 0, 1, 2, 3, 4, 5$ and 6

(1) $\cos\left(\frac{2r\pi + \pi}{7}\right) + i \sin\left(\frac{2r\pi + \pi}{7}\right)$

(2) $\cos\left(\frac{3r\pi + \pi}{7}\right) + i \sin\left(\frac{3r\pi + \pi}{7}\right)$

(3) $\cos\left(\frac{2r\pi + \pi}{7}\right) - i \sin\left(\frac{2r\pi + \pi}{7}\right)$

(4) $\cos\left(\frac{3r\pi + \pi}{7}\right) - i \sin\left(\frac{3r\pi + \pi}{7}\right)$

3. If $\frac{\sin \theta}{\theta} = \frac{2165}{2166}$, then angle θ is nearly equal to

(1) 2

(2) 3

(3) 4

(4) 5

4. The value of

$$\lim_{n \rightarrow 0} \frac{\sin n\theta - n \sin \theta}{\theta (\cos n\theta - \cos \theta)}$$

is

(1) $\frac{n}{2}$

(2) $\frac{n}{3}$

(3) $\frac{2n}{3}$

(4) $\frac{3n}{2}$

5. The value of $i \log \frac{x-i}{x+i}$ is

(1) $2\pi - \tan^{-1} x$

(2) $2\pi + \tan^{-1} x$

(3) $\pi + 2 \tan^{-1} x$

(4) $\pi - 2 \tan^{-1} x$

6. Principal value of $(i)^i$ is

(1) e^π

(2) $e^{-\pi}$

(3) $e^{-\pi/2}$

(4) $e^{\pi/2}$

7. $\cos \frac{2\pi}{7}, \cos \frac{4\pi}{7}, \cos \frac{8\pi}{7}$ are the roots of equation

(1) $8x^3 - 4x^2 + 4x + 1 = 0$

(2) $8x^3 + 4x^2 - 4x + 1 = 0$

(3) $8x^3 - 4x^2 - 4x + 1 = 0$

(4) $8x^3 + 4x^2 - 4x - 1 = 0$

where $x = \cos \theta$.

8. The equation whose roots are $-3, -1, \frac{5}{3}$ is

(1) $3x^3 + 7x^2 - 11x - 15 = 0$

(2) $3x^3 - 7x^2 + 11x - 15 = 0$

(3) $3x^3 + 11x^2 - 7x + 15 = 0$

(4) $3x^3 - 11x^2 + 7x + 15 = 0$

9. The eigenvalues of the matrix

$$A = \begin{bmatrix} \cos \theta & \sin \theta \\ \sin \theta & -\cos \theta \end{bmatrix}$$

are

(1) 0, 1

(2) 1, -1

(3) 0, -1

(4) 1, 1

10. The eigenvalues of the matrix

$$A = \begin{bmatrix} 1 & -1 & 4 \\ 3 & 2 & -1 \\ 2 & 1 & -1 \end{bmatrix}$$

are

(1) 1, 2, 3

(2) -1, 2, 3

(3) 1, -2, 3

(4) 1, 2, -3

11. The characteristic equation of the matrix

$$A = \begin{bmatrix} 3 & 0 \\ 8 & -1 \end{bmatrix}$$

is

(1) $\lambda^2 - 2\lambda - 3 = 0$

(2) $\lambda^2 + 2\lambda - 3 = 0$

(3) $\lambda^3 - 3\lambda + 2 = 0$

(4) $\lambda^2 + 3\lambda - 2 = 0$

12. The eigenvalues of a triangular matrix are just the

- (1) diagonal elements of matrix
- (2) reciprocal of diagonal elements of matrix
- (3) diagonal elements of matrix with opposite sign
- (4) None of these

13. The rank of the matrix

$$A = \begin{bmatrix} 6 & 1 & 3 & 8 \\ 4 & 2 & 6 & -1 \\ 10 & 3 & 9 & 7 \\ 16 & 4 & 12 & 15 \end{bmatrix}$$

is

- (1) 2
- (2) 3
- (3) 4
- (4) 1

14. The value of the determinant

$$A = \begin{vmatrix} 1 & 1 & 1 \\ a & b & c \\ a^2 & b^2 & c^2 \end{vmatrix}$$

is

- (1) $(a+b)(b+c)(c+a)$
- (2) $a^2b^2c^2$
- (3) $(1-a)(1-b)(1-c)$
- (4) $(a-b)(b-c)(c-a)$

15. If $x=2$ is a root of the equation

$$\begin{vmatrix} x & -6 & -1 \\ 2 & -3x & x-3 \\ -3 & 2x & x+2 \end{vmatrix} = 0$$

then other roots are

- (1) 1, 3
- (2) -1, 3
- (3) 1, -3
- (4) -1, -3

16. The system of equations $x+y+z=1$, $x+2y+4z=\lambda$, $x+4y+10z=\lambda^2$ has a solution $x=2k+1$, $y=-3k$, $z=k$ for which value of λ ?
 (1) $\lambda=0$ (2) $\lambda=-1$ (3) $\lambda=+1$ (4) $\lambda=2$
17. If the roots of the equation $x^3+3px^2+3qx+r=0$ are in GP, then
 (1) $p^2r=q^2$ (2) $pr^3=q^3$ (3) $pr^2=q^2$ (4) $p^3r=q^3$
18. If the roots of the equation $x^n-1=0$ are $1, \alpha, \beta, \gamma, \dots$, then the value of $(1-\alpha)(1-\beta)(1-\gamma)\dots$ is
 (1) $\frac{n}{3}$ (2) $3n$ (3) n^2 (4) n
19. The system of equations $x+2y+z=8$, $2x+y+3z=13$, $3x+4y-\lambda z=\mu$ has infinite solution for the following values of λ, μ
 (1) $3\lambda+11=0, \mu=22$ (2) $3\lambda+22=0, \mu=11$
 (3) $\lambda \neq -\frac{11}{3}, \mu \neq 22$ (4) $\lambda \neq \frac{11}{2}, \mu \neq 22$
20. For which real value of λ the system of equations $x+2y+3z=\lambda x$, $3x+y+2z=\lambda y$, $2x+3y+z=\lambda z$ has a non-zero solution?
 (1) 3 (2) -3 (3) 6 (4) -6
21. If $y=(\sin^{-1} x)^2$, then the value of $(1-x^2)y_2 - xy_1$ is
 (1) 0 (2) 4 (3) 2 (4) -2
22. If $y=x^{n-1} \log x$, then the value of $D^n y$ is
 (1) $(n-1)!/x$ (2) $(n-1)!\log x$ (3) $n!/x$ (4) $n!\log x$

23. The curve $x^3 + x^2y - xy^2 - y^3 - 3x - y - 1 = 0$ has the asymptotes

- (1) $y = x, y = x + 1, y = -x - 1$ (2) $y = x, y = x - 1, y = x + 1$
 (3) $y = x, y = x - 1, y = -x - 1$ (4) $y = x, y = -x + 1, y = -x - 1$

24. The curve $\frac{a^2}{x^2} - \frac{b^2}{y^2} = 1$ has the asymptotes

- (1) $x = \pm a, y = \pm b$ (2) $x = \pm a$
 (3) $y = \pm b$ (4) $x = \pm a, y = \pm bi$

25. The radius of curvature of a parabola $y^2 = 4ax$ at the point (x, y) is

- (1) $\frac{2}{\sqrt{a}}(x+a)^{3/2}$ (2) $2\sqrt{a}(x+a)^{3/2}$
 (3) $\frac{2}{\sqrt{a}}(x+a)^{-3/2}$ (4) $2\sqrt{a}(x+a)^{-3/2}$

26. The radius of curvature of a cycloid $x = a(t + \sin t), y = a(1 - \cos t)$ at any point t is

- (1) $4a \sin\left(\frac{t}{2}\right)$ (2) $2a \sin\left(\frac{t}{2}\right)$ (3) $4a \cos\left(\frac{t}{2}\right)$ (4) $2a \cos\left(\frac{t}{2}\right)$

27. Function $u = x^3y^2(1-x-y)$ has maximum value at the point

- (1) $\left(\frac{1}{2}, \frac{1}{2}\right)$ (2) $\left(\frac{1}{3}, \frac{1}{3}\right)$ (3) $\left(\frac{1}{2}, \frac{1}{3}\right)$ (4) $\left(\frac{1}{3}, \frac{1}{2}\right)$

28. If $x^x y^y z^z = c$, then the value of $\frac{\partial^2 z}{\partial x \partial y}$ at $x = y = z$ is

- (1) $(x \log ex)$ (2) $-(x \log ex)$ (3) $(x \log ex)^{-1}$ (4) $-(x \log ex)^{-1}$

29. For the function $f(x) = \sqrt{x^2 - 4}$ in the interval $[2, 4]$ the value of constant c by Lagrange mean value theorem is

- (1) $\sqrt{3}$ (2) $\sqrt{6}$ (3) $2\sqrt{3}$ (4) $\sqrt{5}$

30. $\int_0^1 \int_0^1 (x^2 + y^2) dx dy$ has the value

- (1) 1 (2) 0 (3) $\frac{1}{3}$ (4) $\frac{2}{3}$

31. $\int_0^1 \int_{y^2}^1 \int_0^{1-x} x dz dx dy$ has the value

- (1) $\frac{1}{16}$ (2) $\frac{4}{21}$ (3) $\frac{1}{10}$ (4) $\frac{4}{35}$

32. The whole area of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is

- (1) πab (2) $2\pi ab$ (3) $3\pi ab$ (4) $\frac{\pi}{2} ab$

33. The whole length of the curve $x^2(a^2 - x^2) = 8a^2y^2$ is

- (1) $\pi a\sqrt{2}$ (2) $\pi a 2\sqrt{2}$ (3) $\frac{\pi}{2} a\sqrt{2}$ (4) $\frac{\pi}{3} a\sqrt{2}$

34. The volume of the solid generated by revolving the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ about the x -axis is

- (1) $\frac{2}{3}\pi ab^2$ (2) $\frac{4}{3}\pi ab^2$ (3) $\frac{2}{3}\pi ab^3$ (4) $\frac{4}{3}\pi ab^3$

35. The area of a loop of the curve $r^2 = a^2 \cos 2\theta$ is

- (1) a^2 (2) $\frac{a^2}{2}$ (3) $2a^2$ (4) $3a^2$

36. The cardioid $r = a(1 + \cos \theta)$ revolves about the initial line, then the volume of solid generated is

(1) $\frac{5\pi a^3}{3}$ (2) $\frac{7\pi a^3}{3}$ (3) $\frac{8\pi a^3}{3}$ (4) $\frac{10\pi a^3}{3}$

37. The Cartesian coordinates of the point whose polar coordinates are $(2\sqrt{2}, \pi/4)$, are

(1) $\left(2, \frac{1}{\sqrt{2}}\right)$ (2) $(\sqrt{2}, 2)$ (3) $\left(\sqrt{2}, \frac{1}{2}\right)$ (4) $(2, 2)$

38. The equation of straight line passing through points whose polar coordinates are $(3, 30^\circ)$ and $(4, 90^\circ)$ is

(1) $\frac{1}{r} = \frac{5}{\sqrt{3}} \cos \theta + \frac{1}{12} \sin \theta$ (2) $\frac{1}{r} = \frac{5}{12\sqrt{3}} \cos \theta + \frac{1}{4} \sin \theta$

(3) $\frac{1}{r} = \frac{3}{\sqrt{5}} \cos \theta + \frac{1}{4} \sin \theta$ (4) $\frac{1}{r} = \frac{5}{2\sqrt{3}} \cos \theta + \frac{1}{12} \sin \theta$

39. The condition that the straight line $\frac{1}{r} = a \cos \theta + b \sin \theta$ may touch the circle $r = 2c \cos \theta$ is

(1) $bc + 2ac = 1$ (2) $bc + 2a^2c^2 = 1$

(3) $b^2c^2 + 2ac = 1$ (4) $b^2c^2 + 2a^2c^2 = 1$

40. Equation $\frac{l}{r} = 2 \sin^2 \frac{\theta}{2}$ represents a/an

(1) ellipse (2) hyperbola (3) parabola (4) straight line

41. Equation of tangent of conic $\frac{l}{r} = 1 + e \cos \theta$ at a point $\theta = \alpha$ is

(1) $\frac{l}{r} = e \cos (\theta - \alpha)$ (2) $\frac{l}{r} = e \cos (\theta - \alpha) + \cos \theta$

(3) $\frac{l}{r} = e \cos \theta + \cos (\theta - \alpha)$ (4) $\frac{l}{r} = 1 + e \cos (\theta - \alpha)$

42. Equation to the normal of conic $\frac{l}{r} = 1 + e \cos \theta$ at a point $\theta = \alpha$ is

(1) $\frac{el \sin \alpha}{r(1 + e \cos \alpha)} = -e \sin \theta + \sin (\theta - \alpha)$ (2) $\frac{el \sin \alpha}{r(1 + e \cos \alpha)} = e \sin \theta + \sin (\theta - \alpha)$

(3) $\frac{el \sin \alpha}{r(1 + e \cos \alpha)} = \sin \theta - e \sin (\theta - \alpha)$ (4) $\frac{el \sin \alpha}{r(1 + e \cos \alpha)} = -e \sin \theta - \sin (\theta - \alpha)$

43. The equation of director circle of a conic $\frac{l}{r} = 1 + e \cos \theta$ is

(1) $r^2(1 - e^2) + 2elr \cos \theta - 2l^2 = 0$ (2) $r^2(1 + e^2) - 2elr \cos \theta + 2l^2 = 0$

(3) $2r^2(1 - e^2) + elr \cos \theta - 2l^2 = 0$ (4) $2r^2(1 + e^2) + 2elr \cos \theta + 2l^2 = 0$

44. Equation of cylinder whose generator is parallel to line $\frac{x}{1} = \frac{y}{-2} = \frac{z}{3}$ and guiding curve is $x^2 + 2y^2 = 1, z = 0$ is

(1) $3x^2 + 6y^2 + 3z^2 + 2zx - 8yz - 3 = 0$ (2) $3x^2 + 6y^2 - 3z^2 + 2zx + 8yz + 3 = 0$

(3) $3x^2 + 6y^2 + 3z^2 - 2zx + 8yz + 3 = 0$ (4) $3x^2 + 6y^2 + 2z^2 - 2z - 8yz + 3 = 0$

45. Equation of right circular cylinder whose radius is a , axis X -axis is

(1) $x^2 + y^2 = a^2$ (2) $x^2 + z^2 = a^2$ (3) $y^2 + z^2 = a^2$ (4) $x^2 + y^2 + z^2 = a^2$

46. Enveloping cylinder of a surface with that surface
 (1) intersects (2) touches
 (3) intersects in a curve (4) None of these
47. The equation of right circular cylinder whose axis is $x + y = 0$, $x + y + 3z = 6$ and radius 4 is
 (1) $x^2 + y^2 - 2z^2 + 2xy + 8z - 24 = 0$ (2) $x^2 + y^2 - 2z^2 - 2xy + 8z + 24 = 0$
 (3) $x^2 + y^2 + 2z^2 - 2xy - 8z + 24 = 0$ (4) $x^2 + y^2 + 2z^2 + 2xy - 8z - 24 = 0$
48. If $r = a \cos ti + a \sin tj + tk$, then $\frac{d^2r}{dt^2}$ is
 (1) $a \cos ti + a \sin tj$ (2) $-a \cos ti - a \sin tj$
 (3) $-a \cos ti + a \sin tj$ (4) $a \cos ti - a \sin tj$
49. The necessary and sufficient condition that a vector $a(t)$ has a fixed direction is
 (1) $a \cdot \frac{da}{dt} = 0$ (2) $a \cdot \frac{da}{dt} \neq 0$ (3) $a \times \frac{da}{dt} = 0$ (4) $a \times \frac{da}{dt} \neq 0$
50. If $r = (\cos nt) i + (\sin nt) j$, then $r \times \frac{dr}{dt}$ is
 (1) ni (2) nj (3) nk (4) 0
51. If $a = x^2 yz i - 2xz^3 j + xz^2 k$ and $b = 2zi + yj - x^2 k$, then $\frac{\partial^2}{\partial x \partial y} (a \times b)$ at the point $(1, 0, -2)$ is
 (1) $4i + 8j$ (2) $4i - 8j + 2k$ (3) $-4i - 8j$ (4) $4i + 8j - 2k$
52. If $\phi(x, y, z) = 2x^2 y^3 - 3y^2 z^3$, then gradient $\nabla \phi$ at the point $(1, -1, 1)$ is
 (1) $-4i - 12j + 9k$ (2) $4i + 12j - 9k$ (3) $4i - 12j - 9k$ (4) $-4i + 12j + 9k$

53. If $\hat{r} = xi + yj + zk$, then gradient r^n is

- (1) $nr^{n-2}\hat{r}$ (2) $nr^{n-1}\hat{r}$ (3) nr^{n-2} (4) nr^{n-1}

54. The directional derivative of $\phi = (x^2 + y^2 + z^2)^{-1/2}$ at the point (3, 1, 2) in the direction of the vector $yzi + xzj + xyk$ is

- (1) $\frac{9}{14\sqrt{14}}$ (2) $-\frac{9}{14\sqrt{14}}$ (3) $-\frac{9}{49\sqrt{14}}$ (4) $\frac{9}{49\sqrt{14}}$

55. If $r = xi + yj + zk$, then $\text{div } r$ is

- (1) 1 (2) 0 (3) 3 (4) -3

56. If ϕ is differentiable vector function, then value of $\text{curl grad } \phi$ is

- (1) 1 (2) -1 (3) ϕ (4) 0

57. Any vector point function F is irrotational if

- (1) $\nabla \times F = 0$ (2) $\nabla \cdot F = 0$ (3) $\nabla \cdot (\nabla F) = 0$ (4) $\nabla F = 0$

58. If $F = \text{grad } \phi$, then $\text{curl } F$ is

- (1) -1 (2) +1 (3) 0 (4) ϕ

59. If $F = xyi + yzj + zzk$ and C is a curve $r = ti + t^2j + t^3k$, where t varies from -1 to 1, then $\int_C F \cdot dr$ is

- (1) $\frac{10}{3}$ (2) $\frac{7}{3}$ (3) $\frac{7}{10}$ (4) $\frac{10}{7}$

60. If S is any closed surface enclosing a volume V and $F = xi + 2yj + 3zk$, then $\iint_S F \cdot \hat{n} dS$ is

- (1) $2V$ (2) $3V$ (3) $5V$ (4) $6V$

61. For the vector $F = xi - yj + 2zk$ over the sphere $x^2 + y^2 + (z-1)^2 = 1$, the value of $\int_S F \cdot \hat{n} dS$ is

- (1) $\frac{4\pi}{3}$ (2) $\frac{6\pi}{3}$ (3) $\frac{8\pi}{3}$ (4) $\frac{10\pi}{3}$

62. The value of $\int_C [\cos x \sin y - xy] dx + \sin x \cos y dy$ by Green's theorem for circle C $x^2 + y^2 = 1$ is

- (1) 0 (2) 1 (3) 2 (4) 3

63. The solution of differential equation $y'' - 2y' + 2y = 0$ with the initial condition $y(0) = y'(0) = 1$ is

- (1) $y = e^t \sin t$ (2) $y = e^t \cos t$ (3) $y = e^{-t} \sin t$ (4) $y = e^{-t} \cos t$

64. The solution of differential equation $x'' + m^2 x = a \cos nt$, $t > 0$, $x(0) = x_0$, $x'(0) = x_1$ is

(1) $x = x_0 \cos mt + \frac{x_1}{m} \sin mt + \frac{a}{m^2 - n^2} (-\cos mt + \cos nt)$

(2) $x = x_0 \sin mt + \frac{x_1}{m} \cos mt + \frac{a}{m^2 - n^2} (-\cos mt + \cos nt)$

(3) $x = x_0 \cos mt - \frac{x_1}{m} \sin mt + \frac{a}{m^2 - n^2} (-\cos mt + \cos nt)$

(4) $x = x_0 \sin mt - \frac{x_1}{m} \cos mt + \frac{a}{m^2 - n^2} (-\cos mt + \cos nt)$

65. Which of the following is not the solution of the differential equation $(D^2 - 1)y = 0$?

- (1) e^x (2) $e^x + c$ (3) e^{-x} (4) $ae^x + be^{-x}$

66. The general solution of the differential equation $D^2y = 0$ is

- (1) $y = c_1 + c_2e^x$ (2) $y = (c_1 + c_2x)e^x$
 (3) $y = (c_1 + c_2x)e^{-x}$ (4) $y = c_1 + c_2x$

67. The solution of the differential equation $(D^2 + 1)y = \cos 2x$ is

- (1) $y = c_1 \cos x + c_2 \sin x + \frac{1}{3} \cos 2x$ (2) $y = c_1 \cos x - c_2 \sin x + \frac{1}{3} \sin 2x$
 (3) $y = c_1 \cos x + c_2 \sin x - \frac{1}{3} \cos 2x$ (4) $y = c_1 \cos x - c_2 \sin x - \frac{1}{3} \sin 2x$

68. The orthogonal trajectory of $xy = k^2$ is

- (1) $x^2 - y^2 = 2c$ (2) $2x^2 - 3y^2 = 2c$
 (3) $x^2 + y^2 = 3c$ (4) $2x^2 + 3y^2 = 2c$

69. The member of orthogonal trajectory of $x^2 + 3y^2 = cy$ which passes through the point (1, 2) is

- (1) $y^2 = x^2(3x - 1)$ (2) $2y^2 = x^2(3x + 1)$
 (3) $y^2 = x^2(3x + 1)$ (4) $2y^2 = x^2(3x - 1)$

70. The solution of the integral equation

$$F(t) = a \sin t - 2 \int_0^t F(u) \cos(t-u) du$$

is

- (1) ate^{-t} (2) ate^t (3) ate^{-2t} (4) ate^{2t}

71. The solution of the integral equation

$$F(t) = e^{-t} - 2 \int_0^1 \cos(t-u) F(u) du$$

is

(1) $e^{-t}(1-t)^3$ (2) $e^t(1-t)^2$ (3) $e^t(1-t)^3$ (4) $e^{-t}(1-t)^2$

72. The solution of differential equation $(D+1)^2 y = t$, given that $y = -3$, when $t=0$ and $y = -1$, when $t=1$ is

(1) $y = -2 + t - e^{-t} + te^{-t}$ (2) $y = -2 + t + e^{-t} - te^{-t}$
 (3) $y = -2 + t - 2e^{-t} + te^{-t}$ (4) $y = -2 + t + 2e^{-t} + te^{-t}$

73. Which relation is not true for a common catenary?

(1) $y = c \cosh\left(\frac{x}{c}\right)$ (2) $x = c \log(\sec \psi + \tan \psi)$
 (3) $y = c \sec \psi$ (4) $s = c \sin \psi$

74. If a body is slightly displaced from its position of equilibrium and the forces acting on it in its displaced position are in equilibrium, the body is said to be in

(1) stable equilibrium (2) unstable equilibrium
 (3) neutral equilibrium (4) limiting equilibrium

75. If V_1, V_2 are the velocities at the ends of a focal chord of a projectile path and V the horizontal component of velocity, then

(1) $\frac{1}{V_1^2} - \frac{1}{V_2^2} = \frac{1}{V^2}$ (2) $\frac{1}{V_1^2} + \frac{1}{V_2^2} = \frac{1}{V^2}$
 (3) $\frac{1}{V_1^2} - \frac{1}{V_2^2} > \frac{1}{V^2}$ (4) $\frac{1}{V_1^2} - \frac{1}{V_2^2} < \frac{1}{V^2}$

76. Galilean transformations and Maxwell's electromagnetic theory

- (1) are consistent (2) are inconsistent
 (3) complement each other (4) reinforce each other

77. A synchronous relay satellite reflects TV signals and transmits TV programmes from one part of the world to the other part because

- (1) period of revolution of the satellite around the earth is greater than the period of rotation of the earth about its axis
 (2) period of revolution of the satellite around the earth is less than the period of rotation of the earth about its axis
 (3) period of revolution of the satellite around the earth is equal to the period of rotation of the earth about its axis
 (4) mass is less than that of the mass of the earth

78. Two uniform circular discs A and B of equal masses and thickness are made of materials of densities d_A and d_B respectively. If their moments of inertia about an axis passing through the centre and normal to the circular face are I_A and I_B respectively, then

(1) $\frac{I_A}{I_B} = \frac{d_A}{d_B}$ (2) $\frac{I_A}{I_B} = \frac{d_B}{d_A}$ (3) $\frac{I_A}{I_B} = \frac{d_A^2}{d_B^2}$ (4) $\frac{I_A}{I_B} = \frac{d_B^2}{d_A^2}$

79. A planet revolves around the sun in an elliptic orbit with semi-major and semi-minor axes a and b respectively. Then its time period T of revolution around the sun satisfies the rule

(1) $T^2 \propto b^3$ (2) $T^2 \propto a^3$
 (3) $T^2 \propto \left(\frac{a+b}{2}\right)^3$ (4) $T^2 \propto \left(\frac{a-b}{2}\right)^3$

85. In the absence of external force, if a_{cm} and v_{cm} are the acceleration and velocity in the centre of mass system, the conservation of momentum for a system of particles is expressed as

$$(1) \quad mv_{\text{cm}} = 0$$

$$(2) \quad mv_{\text{cm}} = F_{\text{ext}}$$

$$(3) \quad mv_{\text{cm}} = \text{constant}$$

$$(4) \quad ma_{\text{cm}} = 0$$

86. The centre of mass of a system of n -particles of total mass M is defined as a point whose position vector in an inertial frame S is given by

$$(1) \quad R_{\text{cm}} = \sum_{i=1}^{i=n} m_i r_i$$

$$(2) \quad R_{\text{cm}} = \frac{1}{M} \sum_{i=1}^{i=n} m_i r_i$$

$$(3) \quad R_{\text{cm}} = \frac{1}{M} \sum_{i=1}^{i=n} r_i$$

$$(4) \quad R_{\text{cm}} = \sum_{i=1}^{i=n} r_i$$

87. For an observer rotating the earth, the effective acceleration due to gravity is

$$(1) \quad a' = g$$

$$(2) \quad a' = g - 2\omega v'$$

$$(3) \quad a' = \omega \times (\omega \times r)$$

$$(4) \quad a' = g_0 \omega \times (\omega \times r)$$

where ω is the angular velocity of the earth, v' the velocity of the rotating observer and g_0 is the acceleration due to gravity in the absence of the rotational motion of the earth about its axis.

88. The rotation of a Foucault's pendulum denotes

(1) the spinning motion of the earth

(2) the earth to be stationary

(3) the rotational motion of the earth

(4) precessional motion of the earth

89. Two colliding particles in the centre of mass frame

- (1) will approach as well as move away from each other with equal and opposite momentum
- (2) will only approach each other with equal and opposite momentum
- (3) will only separate from each with equal and opposite momentum
- (4) will precess after collision

90. A boy of mass M stands on a platform of radius R capable of free rotation about its axis. The moment of inertia of the platform is I . Assume the system is at rest. If a friend of the boy throws a ball of mass m with a velocity v and if the boy catches it, the angular velocity of the system in the process is

$$(1) \omega = \frac{mv^2R}{(M+m)R^2} \qquad (2) \omega = \frac{mvR}{I+(M+m)R^2}$$

$$(3) \omega = \frac{mvR}{(M+m)R} \qquad (4) \omega = \frac{mvR^2}{(M+m)R}$$

91. When the length of a simple pendulum is increased by 44%, the percentage increase in its time period is given as

- (1) 20 (2) 60 (3) 40 (4) 15

92. A simple pendulum with a brass bob has a time period T , is immersed in a liquid and allowed to oscillate. If the density of the liquid is $1/8$ times that of brass, then the new time period for oscillation will be

(1) $\frac{8}{7}T$ (2) $2T$ (3) T (4) $\sqrt{\frac{8}{7}}T$

93. Two bodies M and N of equal masses, are suspended from two separate massless springs of spring constants k_1 and k_2 respectively. If they oscillate with equal maximum velocities, then the ratio of frequency of M to that of N is

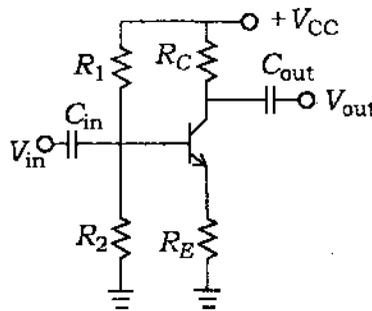
(1) k_1/k_2 (2) k_2/k_1 (3) $\sqrt{k_1/k_2}$ (4) $\sqrt{k_2/k_1}$

94. A circuit having an impedance of $1/\pi$ H and resistance of $100\ \Omega$ is supplied a.c. power at 50 cycles/sec frequency. The reactance and impedance of the circuit are
- (1) $100\ \Omega, 100\ \Omega$ (2) $100\ \Omega, 141.1\ \Omega$
(3) $141.1\ \Omega, 100\ \Omega$ (4) $141.1\ \Omega, 141.1\ \Omega$
95. Undamped oscillations are produced in those $L-C-R$ circuits which have
- (1) provisions for compensating losses
(2) $R-C$ phase shift network
(3) low Q factor
(4) coils with low L/R ratio
96. The resultant of two simple harmonic motions $y = y_0 \sin(\omega t)$ and $x = x_0 \sin(\omega t)$ will be
- (1) an ellipse (2) a circle (3) a figure of 8 (4) a straight line
97. During wave motion, the pressure of a wave is
- (1) a maximum at rarefactions (2) a minimum at compressions
(3) a constant through (4) a maximum at compressions
98. Two periodic waves $y = 10 \sin(200\pi t)$ and $x = 10 \sin(205\pi t)$ have their displacement in centimetres and time measured in seconds. The time interval between maximum and minimum sounds after superposition is
- (1) 0.1 sec (2) 0.2 sec (3) 0.4 sec (4) 0.9 sec
99. The response of conduction electrons to an electromagnetic field is determined by the constitutive relation $j = \sigma E$. If σ increases with temperature, the medium is
- (1) a conductor (2) an insulator
(3) a semiconductor (4) a dielectric

- 100.** Skin depth refers to that distance travelled by an electromagnetic wave in a metal for which its amplitude reduces by a factor — from the maximum value at the surface.
- (1) $1/e$ (2) $2e/3$ (3) $4\pi/3$ (4) $1/2\pi$
- 101.** A rectangular waveguide having a breadth of 5 cm and thickness of 3 cm internally has an electromagnetic signal propagating through it. Then the cut-off frequency for the waveguide is
- (1) $f_c = 2$ GHz (2) $f_c = 1$ GHz (3) $f_c = 3$ GHz (4) $f_c = 5$ GHz
- 102.** Poynting's theorem can be considered as a statement of conservation of — in electrodynamics.
- (1) charge (2) energy
(3) probability density (4) volume
- 103.** The electrical conductivity of a semiconductor increases when the electromagnetic radiation of wavelengths shorter than 2480 nm is incident on it. The band gap energy in electron volts of the semiconductor is
- (1) 1.1 eV (2) 2.5 eV (3) 0.5 eV (4) 0.7 eV
- 104.** In a full-wave rectifier circuit, operating from 50 Hz mains frequency, the fundamental frequency in the ripple would be
- (1) 50 Hz (2) 100 Hz (3) 25 Hz (4) 70.7 Hz
- 105.** If μ_e and μ_h are the electron and hole mobilities respectively in a semiconductor, which one of the following is true?
- (1) $\mu_e > \mu_h$ (2) $\mu_e = \mu_h$ (3) $\mu_e < \mu_h$ (4) $\mu_e > 0$ and $\mu_h > 0$
- 106.** In a full-wave rectifier, if the input a.c. current frequency is ν the output frequency is
- (1) 2ν (2) $\nu/2$ (3) 4ν (4) zero

107. If the temperature of a transistor rises by 10°C , which of the following current doubles?
- (1) I_C (2) I_B (3) I_{CBO} (4) I_E
108. Electronic distribution of a silicon atom is
- (1) 2, 10, 2 (2) 2, 8, 4 (3) 2, 7, 5 (4) 2, 4, 8
109. The depletion region of a $P-N$ junction diode is formed
- (1) during the process of manufacture
(2) under forward bias
(3) under reverse bias
(4) under a reduction of temperature
110. The width of the depletion layer of a $P-N$ junction diode
- (1) decreases with light doping
(2) increases with light doping
(3) is independent of applied voltage
(4) is increased under reverse bias
111. Avalanche breakdown is a phenomenon occurring primarily due to
- (1) collision (2) doping (3) ionisation (4) recombination
112. The emitter region of a transistor is generally doped the heaviest because it
- (1) has to dissipate the maximum power
(2) has to supply the charge carriers
(3) is the first region of the transistor
(4) must possess low resistance

- 113.** When the emitter-base junction of a transistor is reverse biased, the collector current
 (1) is reversed (2) is increased (3) is decreased (4) becomes zero
- 114.** The basic reason for using an emitter bypass capacitance in a CE amplifier circuit is to
 (1) keep the emitter at a.c. ground
 (2) prevent excessive degeneration from taking place
 (3) decrease the voltage gain
 (4) bypass low frequency signal component
- 115.** The main use of an emitter follower circuit is as a/an
 (1) power amplifier (2) impedance matching device
 (3) low-input impedance circuit (4) follower of signals
- 116.** What will happen to the circuit shown in the figure below, if the potential divider resistance R_2 is open circuited?



- (1) Output signal will become zero
 (2) Q-point gets affected there by producing
 (3) V_{in} will become zero
 (4) base current I_B will reduce to zero

117. The primary function of a filter is to
- (1) minimize a.c. input variations
 - (2) suppress odd harmonics
 - (3) stabilize d.c. level of the output voltage
 - (4) remove ripples from the rectified output
118. Two coherent light beams of intensity I and $4I$ are superposed. The minimum and maximum possible intensities in the resultant beam are
- (1) $9I$ and I
 - (2) $9I$ and $3I$
 - (3) $5I$ and I
 - (4) $5I$ and $3I$
119. In placing a thin sheet of mica of thickness 12×10^{-5} cm in the path of one of the interfering beams in a Young's double slit experiment, the central fringe shifts equal to a fringe width. If the wavelength of light $\lambda = 600$ nm, the refractive index of mica is
- (1) $\mu = 1.61$
 - (2) $\mu = 1.48$
 - (3) $\mu = 1.5$
 - (4) $\mu = 1.56$
120. Dichorism means selective absorption of
- (1) unpolarised light
 - (2) scattered light
 - (3) dispersed light
 - (4) one of the polarised components
121. If in a bi-refracting crystal the magnitudes of E_x and E_y are equal and the phase angle between the two is 60° , then the waves are
- (1) linearly polarised light
 - (2) plane polarised light
 - (3) circularly polarised light
 - (4) elliptically polarised
122. Which of the following properties of light supports conclusively the wave theory of light?
- (1) Light obeys laws of reflection
 - (2) Speed of light is smaller in water than in vacuum
 - (3) Light shows interference
 - (4) Light shows photoelectric effect

123. A ray of light is incident on the surface of a glass plate of refractive index $\mu = 1.55$ at the polarising angle. The angle of refraction is

- (1) $0^\circ 0'$ (2) $147^\circ 11'$ (3) $32^\circ 49'$ (4) $57^\circ 11'$

124. From Brewster's law it follows that the angle of polarisation depends upon

- (1) wavelength of light
 (2) orientation of the plane of polarisation
 (3) orientation of the plane of vibration
 (4) refractive index of the medium

125. The maximum intensity produced by two coherent waves of intensity I_1 and I_2 will be

- (1) $I_1 + I_2$ (2) $I_1^2 + I_2^2$
 (3) $I_1 + I_2 + 2\sqrt{I_1 I_2}$ (4) zero

126. In Fraunhofer diffraction at a single slit, the directions of the secondary maxima are given by

- (1) $\sin \theta_n = \frac{(2n+1)\lambda}{2a}$ (2) $\cos \theta_n = \frac{2}{(2n+1)\lambda}$
 (3) $\sin \theta_n = (2n+1)\lambda \cdot 2a$ (4) $\sin \theta_n = \frac{a\lambda}{(2n+1)}$

127. In Fraunhofer diffraction at a single slit, the width of the central maximum is

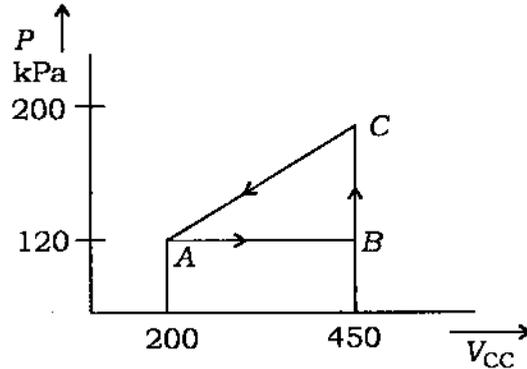
- (1) $W = \frac{a}{2f\lambda}$ (2) $W = \frac{2f\lambda}{a}$ (3) $W = 2fa\lambda$ (4) $W = \frac{f\lambda}{2a}$

128. Practically Fresnel diffraction can be observed only if

- (1) the source and the screen lie at infinity
 (2) high power convergent lenses are available
 (3) source and the screen are separated by finite distances
 (4) even the source is absent

129. The central spot in a Newton's fringe pattern appears dark because, due to reflection light suffers a phase change of
 (1) 90° (2) 180° (3) 270° (4) 45°
130. If for a Newton's rings pattern, the diameter of the n th dark ring is 8 mm and that of the $(n+10)$ th dark ring is 12 mm, the radius of the plano-convex lens is 3 m, then the wavelength of the incident light is
 (1) $\lambda = 666.7 \text{ nm}$ (2) $\lambda = 490.7 \text{ nm}$ (3) $\lambda = 583.6 \text{ nm}$ (4) $\lambda = 580.7 \text{ nm}$
131. When the principal section of the Nicol prism is perpendicular to the direction of vibrations of the incident ray
 (1) only purely plane polarised light comes out of the prism
 (2) only the extraordinary ray of light comes out of the prism
 (3) the extraordinary ray of light does not come out of the prism
 (4) no light emerges from the prism
132. For a plane polarised light incidenting on a bi-refringent crystal, the emergent beam will be circularly polarised if the phase difference is
 (1) $\delta = \left(n + \frac{1}{2}\right)\pi$ (2) $\delta = n\pi$ (3) $\delta = \left(n + \frac{3}{2}\right)\pi$ (4) $\delta = (2n+1)\pi$
133. If N_1 and N_2 are the population densities of the ground state and excited state and g_1 and g_2 are the statistical weight factors for these states, the condition for lasing action is
 (1) $\frac{N_2}{N_1} < \frac{g_2}{g_1}$ (2) $\frac{N_2}{N_1} > \frac{g_2}{g_1}$ (3) $\frac{N_1}{N_2} = \frac{g_1}{g_2}$ (4) $\frac{N_1}{N_2} > 1$
134. For an atomic system, the rates of the stimulated and spontaneous emission will be equal if
 (1) $e^{hv/kT} = 2$ (2) $e^{hv/kT} = 1/2$ (3) $e^{hv/kT} = \frac{\sqrt{3}}{4}$ (4) $e^{hv/kT} = 1$

135. The work done by a gas in the diagram shown in the figure below is



- (1) 30 J (2) 20 J (3) -20 J (4) -10 J

136. A tyre pumped to a pressure of 3.375 atmospheres, bursts suddenly. If the adiabatic constant is $\gamma = 1.5$, what is the final temperature?

- (1) 27 °C (2) 0 °C (3) -73 °C (4) -27 °C

137. A Carnot engine has an efficiency of 40% and a heat sink temperature of 27 °C. What should be the temperature if the efficiency is to be increased to 50%?

- (1) 25 K (2) 50 K (3) 75 K (4) 100 K

138. An ideal gas expands according to the law $PV^{3/2} = \text{constant}$. From this we can conclude that

- (1) the adiabatic exponent of the gas $k = 1.5$
 (2) the molar specific heat $C = C_v - 2R$
 (3) temperature increases during the process
 (4) such a process cannot occur

139. Which of the following parameters does not characterize the thermodynamic state of matter?

- (1) Work (2) Pressure (3) Temperature (4) Volume

140. A Carnot engine takes 3×10^6 calories of heat from a reservoir at 627°C and gives it to a sink at 27°C . The work done by the engine is

- (1) 8.4×10^6 J (2) 16.8×10^6 J (3) 4.2×10^6 J (4) zero

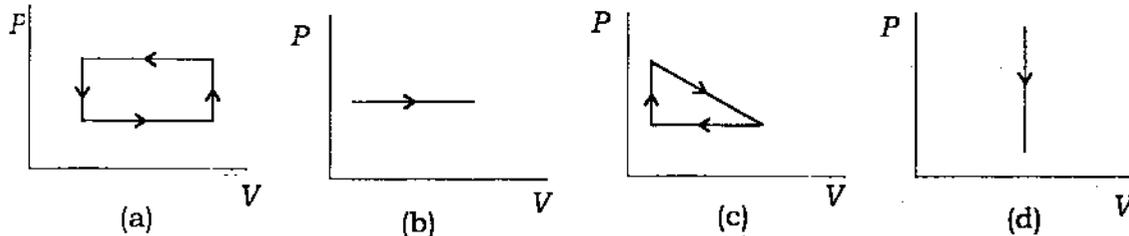
141. The ratio of the work done by an ideal diatomic gas to the heat supplied by the gas in an isobaric process is

- (1) 5 : 7 (2) 3 : 5 (3) 2 : 7 (4) 5 : 3

142. If C_p and C_v are the molar specific heats of a gas at constant pressure and volume respectively, the ratio of adiabatic and isothermal moduli of elasticity will be

- (1) $\frac{C_p - C_v}{C_p}$ (2) $\frac{C_p - C_v}{C_v}$ (3) $\frac{C_v}{C_p}$ (4) $\frac{C_p}{C_v}$

143. In the following, the indicator diagrams representing maximum and minimum amounts of work done are respectively



- (1) (c) and (b) (2) (b) and (c) (3) (b) and (d) (4) (c) and (d)

144. If in defining the specific heat, temperature is represented in $^\circ\text{F}$ instead of $^\circ\text{C}$, then the value of specific heat will

- (1) decrease (2) increase
(3) remain unchanged (4) fluctuate

145. A body cools in 7 minutes from 60 °C to 40 °C. The temperature of the gas after the next 7 minutes will be ——— (Assume that the temperature of the surrounding $T = 0$ °C.)
- (1) 32 °C (2) 38 °C (3) 22 °C (4) 28 °C
146. A solid at a temperature T_1 is kept in an evacuated chamber at temperature T_2 , such that $T_1 > T_2$. The rate of growth of temperature is proportional to
- (1) $T_2 - T_1$ (2) $T_2^2 - T_1^2$ (3) $T_2^3 - T_1^3$ (4) $T_2^4 - T_1^4$
147. Two bodies are at temperatures 27 °C and 927 °C respectively. The heat energy radiated by them will be in the ratio
- (1) 1 : 256 (2) 1 : 64 (3) 1 : 4 (4) 1 : 16
148. X-rays of wavelength 0.1 Å are incident on a target and are scattered at an angle of 180°. If the Compton wavelength $\lambda_c = 2.426 \times 10^{-12}$ m, the wavelength of the scattered X-rays is
- (1) 0.149 Å (2) 0.074 Å (3) 0.032 Å (4) 0.052 Å
149. Ultraviolet light of wavelength 350 nm and intensity 1.00 W/m² is directed at a potassium surface having an area of 1.00 cm². If 0.50% of the incident photons produce photoelectrons, the number of photoelectrons emitted per second is
- (1) 17.6×10^{11} (2) 4.4×10^{11} (3) 8.8×10^{11} (4) 2.2×10^{11}
- (Assume the maximum kinetic energy of the photoelectrons as 5.68×10^{-19} J/photon.)
150. If the accelerating potential of an X-ray machine is V , then the shortest wavelength of the X-rays produced by it is
- (1) $\left(\frac{hc}{Ve}\right)$ (2) $\left(\frac{hc}{Ve}\right)^2$ (3) $\left(\frac{hc}{Ve}\right)^3$ (4) $\left(\frac{hc}{Ve}\right)^{2/3}$

अभ्यर्थियों के लिए निर्देश

(इस पुस्तिका के प्रथम आवरण-पृष्ठ पर तथा उत्तर-पत्र के दोनों पृष्ठों पर केवल नीली या काली बाल-प्वाइंट पेन से ही लिखें)

1. प्रश्न पुस्तिका मिलने के 10 मिनट के अन्दर ही देख लें कि प्रश्नपत्र में सभी पृष्ठ मौजूद हैं और कोई प्रश्न छूटा नहीं है। पुस्तिका दोषयुक्त पाये जाने पर इसकी सूचना तत्काल कक्ष-निरीक्षक को देकर सम्पूर्ण प्रश्नपत्र की दूसरी पुस्तिका प्राप्त कर लें।
2. परीक्षा भवन में *लिफाफा रहित प्रवेश-पत्र के अतिरिक्त*, लिखा या सादा कोई भी खुला कागज साथ में न लायें।
3. उत्तर-पत्र अलग से दिया गया है। *इसे न तो मोड़ें और न ही विकृत करें। दूसरा उत्तर-पत्र नहीं दिया जायेगा, केवल उत्तर-पत्र का ही मूल्यांकन किया जायेगा।*
4. अपना *अनुक्रमांक तथा उत्तर-पत्र का क्रमांक प्रथम आवरण-पृष्ठ पर पेन से निर्धारित स्थान पर लिखें।*
5. उत्तर-पत्र के प्रथम पृष्ठ पर पेन से अपना अनुक्रमांक निर्धारित स्थान पर लिखें तथा नीचे दिये वृत्तों को गाढ़ा कर दें। जहाँ-जहाँ आवश्यक हो वहाँ प्रश्न-पुस्तिका का क्रमांक तथा सेट का नम्बर उचित स्थानों पर लिखें।
6. ओ० एम० आर० पत्र पर अनुक्रमांक संख्या, प्रश्न-पुस्तिका संख्या व सेट संख्या (यदि कोई हो) तथा प्रश्न-पुस्तिका पर अनुक्रमांक सं० और ओ० एम० आर० पत्र सं० की प्रविष्टियों में उपरिलेखन की अनुमति नहीं है।
7. उपर्युक्त प्रविष्टियों में कोई भी परिवर्तन कक्ष निरीक्षक द्वारा प्रमाणित होना चाहिये अन्यथा यह एक अनुचित साधन का प्रयोग माना जायेगा।
8. प्रश्न-पुस्तिका में प्रत्येक प्रश्न के चार वैकल्पिक उत्तर दिये गये हैं। *प्रत्येक प्रश्न के वैकल्पिक उत्तर के लिये आपको उत्तर-पत्र की सम्बन्धित पंक्ति के सामने दिये गये वृत्त को उत्तर-पत्र के प्रथम पृष्ठ पर दिये गये निर्देशों के अनुसार पेन से गाढ़ा करना है।*
9. प्रत्येक प्रश्न के उत्तर के लिये केवल एक ही वृत्त को गाढ़ा करें। एक से अधिक वृत्तों को गाढ़ा करने पर अथवा एक वृत्त को अपूर्ण भरने पर वह उत्तर गलत माना जायेगा।
10. ध्यान दें कि एक बार स्याही द्वारा अंकित उत्तर बदला नहीं जा सकता है। यदि आप किसी प्रश्न का उत्तर नहीं देना चाहते हैं, तो सम्बन्धित पंक्ति के सामने दिये गये सभी वृत्तों को खाली छोड़ दें। ऐसे प्रश्नों पर शून्य अंक दिये जायेंगे।
11. रफ़ कार्य के लिये प्रश्न-पुस्तिका के मुखपृष्ठ के अन्दर वाले पृष्ठ तथा अंतिम पृष्ठ का प्रयोग करें।
12. परीक्षा के उपरान्त केवल *ओ०एम०आर० उत्तर-पत्र* परीक्षा भवन में जमा कर दें।
13. परीक्षा समाप्त होने से पहले परीक्षा भवन से बाहर जाने की अनुमति नहीं होगी।
14. यदि कोई अभ्यर्थी परीक्षा में अनुचित साधनों का प्रयोग करता है, तो वह विश्वविद्यालय द्वारा निर्धारित दंड का/की, भागी होगा/होगी।