Geophysics

10P/204/1

Question Booklet No......................

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

Roll No. | | | | | | | | |

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 *both the Question Booklet and the 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.

[उपर्युक्त निर्देश हिन्दी में अन्तिम आवरण-पृष्ठ पर दिये गए हैं]

[No. of Printed Pages : 30+2

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. If $x=(1/3)^2$, then $(27)^{3x}$ is

(1) 3 (2) 9 (3) 1/9 (4) 1/3

2. If $4x^2+56x+1+c$ is a perfect square, then c equals

(1) 0 (2) 1 (3) 195 (4) 256

3. If $x > 0, y > 0$, then $\frac{x+y}{2} - \sqrt{xy}$ is equal to

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

4. A value of $\sqrt{1+\sin 2x}$ equals

(1) $\sin x - \cos x$ (2) $\sin x + \cos x$ (3) $\sin x + \tan x$ (4) $\sin x - \tan x$

5. The value of $\sec 72° / \csc 18°$ is

(1) $\tan 18°$ (2) $\tan 72°$ (3) 1 (4) ∞

6. If a, b, c are all different from 0 and

$$\Delta = \begin{vmatrix} 1+a & 1 & 1 \\ 1 & 1+b & 1 \\ 1 & 1 & 1+c \end{vmatrix}$$

then the value of $a^{-1} + b^{-1} + c^{-1}$ is

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

7. The order and degree of the differential equation

$$\left(1+\frac{dy}{dx}\right)^{1/5} = x\frac{d^2y}{dx^2}$$

are respectively

(1) (2, 5) (2) (5, 2) (3) (2, 1/5) (4) (1, 2)

8. The value of

$$\int_0^{\pi/2} \frac{dx}{1+\tan^3 x}$$

is

(1) 0 (2) 1 (3) $\pi/4$ (4) π

9. If $[x]$ denotes the greatest integer less than or equal to x for $x>0$, then

$$\int_0^n [x]\, dx$$

is equal to

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

10. In the partial fraction decomposition of $\frac{2}{1-x^2}$ the coefficient a of $\frac{1}{1-x}$ and the coefficient b of $\frac{1}{1+x}$ are related by

(1) $a+b=1$ (2) $a-b=2$ (3) $a=b$ (4) $a=-b$

11. If a is the smallest positive value for which $\cos a = 0$, then $\sin(2a-x)$ is

(1) $\sin x$ (2) $\cos x$ (3) $-\sin x$ (4) $-\cos x$

12. A section of the sphere by a plane in general is

(1) a line (2) a circle (3) a cone (4) a cylinder

13. The pair of planes represented by the equation $ax^2+by^2+cz^2+2fyz+2gzx+2hxy=0$ are perpendicular to each other if

(1) $a-b+c=0$ (2) $a+b-c=0$ (3) $a-b-c=0$ (4) $a+b+c=0$

14. The conjugate of the complex number represented by $i^i \, (i^2 = -1)$ is

(1) i^i (2) i (3) $-i$ (4) 0

15. The intercepts which the plane $lx + my + nz = p$ makes with the coordinate axes are

(1) $\left(\frac{l}{p}, \frac{m}{p}, \frac{n}{p}\right)$ (2) $\left(\frac{p}{l}, \frac{p}{m}, \frac{p}{n}\right)$ (3) (pl, pm, pn) (4) (l, m, n)

16. If $f(x) = (1+x)^n$, then the value of

$$f(0) + f'(0) + \frac{f''(0)}{2!} + \cdots + \frac{f^{(n)}(0)}{n!}$$

is

(1) $n(n-1)$ (2) $n(n+1)$ (3) 2^n (4) 2^{n-1}

17. The resultant of two forces of equal magnitude is equal to any one of the forces in magnitude. Then the angle between these forces is equal to

(1) $\pi/2$ (2) $\pi/3$ (3) 0 (4) $2\pi/3$

18. The pair of tangents drawn to a hyperbola from its centre are called

(1) conjugate diameters (2) diagonals

(3) asymptotes (4) diameters

19. The equation of the directrix to the conic

$$\frac{l}{r} = 1 + e\cos\theta$$

is

(1) $\frac{l}{e} = r\cos\theta$ (2) $r = l\sin\theta$ (3) $r = l\cos\theta$ (4) $r = \frac{l}{e}\cos\theta$

20. The general equation of the cone of second degree through the axes is

(1) $ax+by+cz=0$ (2) $axy+byz+czx=0$

(3) $ax^2+by^2+cz^2=0$ (4) $xyz=0$

21. The locus of the tangent lines drawn to a sphere and parallel to a given line is

(1) a sphere (2) a cone (3) an ellipsoid (4) a cylinder

22. The number of normals that can be drawn to a conicoid from a given point is

(1) 1 (2) 3 (3) 4 (4) 6

23. If

$$f(x)=\int_0^1 \frac{\sin xy}{y}\,dy$$

then $f'(x)$ equals

(1) $\sin x$ (2) $\cos x$ (3) $\frac{\sin x}{x}$ (4) $\frac{\sin x}{y}$

24. If

$$\nabla=\frac{\partial}{\partial x}\vec{i}+\frac{\partial}{\partial y}\vec{j}+\frac{\partial}{\partial z}\vec{k}$$

then for a vector field $\vec{V}$, curl $\vec{V}$ is

(1) $\nabla\cdot\vec{V}$ (2) $\nabla\times\vec{V}$ (3) 0 (4) $\nabla\vec{V}$

25. If f is a scalar field of class C'', then curl (grad (f)) is

(1) ∇f (2) $\nabla^2 f$ (3) $\nabla^3 f$ (4) $\nabla^4 f$

26. If $\vec{a}, \vec{b}, \vec{c}$ are three mutually perpendicular vectors of magnitude 2, 3, 5, then $[\vec{a}, \vec{b}, \vec{c}]$ is

(1) 30 (2) 10 (3) 0 (4) 1

27. If $\vec{i}+2\vec{j}+\vec{k}, \vec{i}+a\vec{j}+\vec{k}, -\vec{i}+3\vec{k}$ are coplanar, then the value of a is

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

28. If $(\vec{a}\times\vec{b})\times\vec{c}=-2\vec{a}+3\vec{b}$ and $\vec{a}\cdot\vec{b}=5$, then $\vec{a}\times(\vec{b}\times\vec{c})=$

(1) $-5\vec{c}-3\vec{b}$ (2) $5\vec{c}+3\vec{b}$ (3) $5\vec{c}-3\vec{b}$ (4) $-5\vec{c}+3\vec{b}$

29. If $\phi(x, y, z)$ is a solution of Laplace equation, then

(1) $\nabla\phi$ is both solenoidal and irrotational

(2) $\nabla\phi$ is irrotational only

(3) $\nabla\phi$ is neither solenoidal nor irrotational

(4) $\nabla\phi$ is solenoidal only

30. If ϕ is any differentiable function of three variables x, y, z and $\vec{r}=x\vec{i}+y\vec{j}+z\vec{k}$, then $\nabla\phi\cdot d\vec{r}=$

(1) 0 (2) ϕ (3) $|\vec{r}|$ (4) $d\phi$

31. The line $\vec{r}=\vec{a}+3\vec{b}$ is parallel to the plane $\vec{r}\cdot\vec{n}=5$ if

(1) $\vec{b}\cdot\vec{n}=0$ (2) $\vec{a}\cdot\vec{n}=0$ (3) $\vec{b}\cdot\vec{n}=1$ (4) $\vec{a}\cdot\vec{b}=0$

32. The unit normal to the surface $\phi(x, y, z)$ at (a, b, c) is $2abc\,\vec{i} + a^2c\,\vec{j} + a^2b\,\vec{k}$ and the maximum value of the directional derivative is 2, then

(1) $\phi(x, y, z) = x^2yz^2 + k$ (2) $\phi(x, y, z) = 2x^2yz + k$

(3) $\phi(x, y, z) = 2xyz + k$ (4) $\phi(x, y, z) = x^2 + yz + k$

33. If $\vec{a}$ is a constant vector, then

(1) curl $(\vec{r} \times \vec{a}) = 2\vec{a}$ and div $(\vec{r} \times \vec{a}) = |\vec{a}|$

(2) curl $(\vec{r} \times \vec{a}) = -2\vec{a}$ and div $(\vec{r} \times \vec{a}) = 1$

(3) curl $(\vec{r} \times \vec{a}) = -2\vec{a}$ and div $(\vec{r} \times \vec{a}) = 0$

(4) curl $(\vec{r} \times \vec{a}) = 2\vec{a}$ and div $(\vec{r} \times \vec{a}) = \vec{r} \cdot \vec{a}$

34. Let S be a closed surface, V is the volume enclosed by S and $\vec{n}$ is the unit surface normal, then

$$\iint_S \int \vec{r} \cdot \vec{n}\, dS =$$

(1) $3V$ (2) V (3) $2V$ (4) 0

35. If $\vec{F}$ is a smooth function and $\vec{r} = x\,\vec{i} + y\,\vec{j} + z\vec{k}$, then

(1) $\vec{F}, \nabla, \vec{r}$ are mutually perpendicular (2) $\vec{F}, \nabla, \vec{r}$ are co-planar

(3) $[\vec{F}, \nabla, \vec{r}\,] = 1$ (4) $[\vec{F}, \nabla, \vec{r}\,] = -1$

36. The equation of the plane which is the rotation by an angle 45° of the plane $3x+4z=0$ about its line of intersection with $y=0$ is

(1) $3x+7y+4z=0$ (2) $3x-7y+4z=0$ (3) $3x+y+4z=0$ (4) $3x+5y+4z=0$

37. The line

$$\frac{x-5}{l}=\frac{y-4}{m}=\frac{z-1}{n}$$

is parallel to the plane $5x+4y+z=0$ if

(1) $5l+4m+n=0$ (2) $\frac{5}{l}+\frac{4}{m}+\frac{1}{n}$ (3) $\frac{5}{l}=\frac{4}{m}=\frac{1}{n}$ (4) $\frac{5}{l}+\frac{4}{m}=\frac{1}{n}$

38. The number of straight lines perpendicular to both the skew-lines is

(1) zero (2) exactly two (3) more than two (4) only one

39. The equation of the cone with semivertical angle α and whose vertex is origin and the axis being x axis is

(1) $x^2=(y^2+z^2)\sin^2\alpha$ (2) $x^2=(y^2+z^2)\tan^2\alpha$

(3) $y^2+z^2=x^2\tan^2\alpha$ (4) $y^2+x^2=z^2\tan^2\alpha$

40. If the sums of the squares of the opposite sides of a tetrahedron are equal, then its opposite sides are

(1) parallel (2) at angles $\frac{\pi}{3}$ (3) perpendicular (4) at angles $\frac{\pi}{6}$

41. If one of the eigenvalues of $A=\begin{pmatrix}5 & 3\\ 3 & -3\end{pmatrix}$ is equal to the eigenvalue of $B=\begin{pmatrix}4 & 2\\ 2 & a\end{pmatrix}$, then the possible values of a are

(1) 4, −7/2 (2) 6, −3 (3) −1, −4 (4) 1, 2

42. The sum of the eigenvalues of the matrix $\begin{pmatrix} 3 & -5 \\ x & 2 \end{pmatrix}$ for negative real values of x is

(1) 2 (2) 5 (3) −3 (4) −1

43. If the rank of the matrix

$$\begin{pmatrix} 1 & 2 & -1 \\ 2 & a & 6 \\ 0 & 0 & -8 \end{pmatrix}$$

is 2, then the value of a is

(1) −1 (2) −6 (3) 4 (4) 0

44. The solutions of

$$\begin{vmatrix} x+a & b & c \\ a & b+x & c \\ a & b & x+c \end{vmatrix} = 0$$

are

(1) $0, (a+b+c)$ (2) $0, -(a+b+c)$ (3) a, b, c (4) $-a, -b, -c$

45. The system of equation $x+2y+\lambda=6$, $2x+y+2z=6$, $x+y+z=5$ has no solution when λ is equal to

(1) 1 (2) 1/2 (3) −1/2 (4) −3/2

46. The solution of the differential equation $y\,dx+(x+x^2y)\,dy=0$ is

(1) $-\frac{1}{x}+\log y=c$ (2) $-\frac{y}{x}+\log y=c$ (3) $-\frac{1}{xy}+\log xy=c$ (4) $-\frac{1}{xy}+\log y=c$

47. The total area of the astroid $x^{2/3}+y^{2/3}=a^{2/3}$ is

(1) $3\pi/8$ (2) $3\pi a^2/8$ (3) $3\pi a^2/2$ (4) $4\pi a^2$

48. The volume in cubic units generated when the plane region bounded by $x=0$, $y=0$, $x+y=z$ is rotated about the axis is

(1) $8\pi/4$ (2) $16\pi/2$ (3) $\pi/3$ (4) $2\pi/3$

49. The problem of maximizing $z=6x+5y$ subject to constraints $2x+y\le 2$, $5x+3y\ge 20$, $x\ge 0$, $y\ge 0$ has

(1) exactly one solution (2) infinitely many solutions

(3) no solutions (4) only finitely many solutions

50. A particle moves along a line so that its acceleration equals twice the cube of its velocity. Then the value of $\dfrac{d^2t}{ds^2}$ is

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

51. The maximum area of a rectangle that can be inscribed in the ellipse

$$\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$$

is

(1) $2ab$ (2) $2\sqrt{ab}$ (3) ab (4) a^2b^2

52. If $z=e^{x^3+y^3}$, then

$$x\frac{\partial z}{\partial x}+y\frac{\partial z}{\partial y}$$

is

(1) $3z$ (2) $3z\log z$ (3) $3\log z$ (4) $3\dfrac{\log z}{z}$

53. If $\omega \neq 1$ is a cube root of unity, then

$$\frac{1}{1+2\omega}-\frac{1}{1+\omega}+\frac{1}{2+\omega}$$

is

(1) 1 (2) -1 (3) ω (4) 0

54. The equation of the hyperbola through $(2, 4)$ with $x=1$ and $y=-1$ as asymptotes is

(1) $xy=12$ (2) $xy+x-y=11$

(3) $xy-x+y=12$ (4) $(x-1)(y+1)=12$

55. The integrating factor of

$$\frac{dy}{dx}\log x+\frac{y}{x}=\sin 2x$$

is

(1) $\log 2x$ (2) $\log x$ (3) $\sin 2x$ (4) $\log\cos 2x$

56. The area enclosed by the curves $y^2=4ax$ and $x^2=4by$ is

(1) $16ab$ (2) $16ab/3$ (3) $8ab$ (4) $8ab/3$

57. The area cut off from the parabola $y^2=4ax$ by the line $y=mx$ is

(1) $8a^2/3m^3$ (2) $8a^2/3m^2$ (3) $16a^2/3m^3$ (4) $16a^2/3m^2$

58. The volume generated by rotating the region bounded by $y=x$, $x=0$, $y=1$ about the x-axis is

(1) π (2) 2π (3) $3\pi/2$ (4) $2\pi/3$

59. The particular integral of $(D^2+4)y=\cos 2x$ is

(1) $\dfrac{x\sin 2x}{4}$ (2) $\dfrac{x\cos 2x}{4}$ (3) $\dfrac{\sin 4x}{2}$ (4) $\dfrac{\sin 2x}{4}$

60. If $A=\cos^2\theta+\sin^4\theta$, then for all real θ

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

61. A ball is dropped from a height of 200 m. After each rebound it attains 1/5th of its height from which it falls. The total distance travelled by the ball before it comes to rest is

(1) 350 m (2) 300 m (3) 400 m (4) 600 m

62. The length of the tangent from $(a, 0)$ to the circle $x^2+y^2=a^2$ is

(1) 0 (2) a (3) 1 (4) $1/a$

63. The minimum value of $x^{1/x}(x>0)$ is

(1) 1 (2) $\sqrt{2}$ (3) $\pi^{1/\pi}$ (4) $e^{1/e}$

64. If

$$\alpha=\cos\frac{2\pi}{n}+i\sin\frac{2\pi}{n}$$

for an even positive integer n, then the value of $(1+\alpha)(1+\alpha^2)\cdots(1+\alpha^{n-1})$ is

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

65. If $x^3+ax^2+bx+c=0$ and $x^3+px^2+qx+r=0$ have two non-zero roots in common, then the non-common roots α, β of these equations satisfy

(1) $r\alpha = c\beta$ (2) $r+\alpha = c+\beta$ (3) $p\alpha = q\beta$ (4) $p+\alpha = q+\beta$

66. In the binomial expansion of

$$\left(\sqrt{\frac{x}{3}}+\frac{3}{2x^2}\right)^{10}$$

the term independent of x is

(1) 7/10 (2) 10/7 (3) 4/5 (4) 5/4

67. The Laplace transform of the function

$$\frac{(3-x)\,e^{-x/3}}{8}$$

at s is

(1) $\frac{s}{1+3s}$ (2) $\frac{1}{s\,(s+3)^2}$ (3) $\frac{s}{(1+3s)^2}$ (4) $\frac{s}{(3+s)^2}$

68. If the Laplace transform of $f(x)$ is $\frac{3}{s^2+4s+6}$, then $f(x)=$

(1) $\frac{3}{\sqrt{2}}e^{-2x}\sin(x\sqrt{2})$ (2) $\frac{3}{\sqrt{2}}e^{-2x}\cos(x\sqrt{2})$

(3) $\frac{3}{\sqrt{2}}e^{2x}\sin(x\sqrt{2})$ (4) $\frac{1}{\sqrt{2}}e^{-2x}\sin(x\sqrt{2})$

69. The solution of the differential equation

$$\frac{dQ}{dt} + 0\cdot 04Q = 3\cdot 2e^{-0\cdot 04t}$$

with initial condition $Q(0) = 0$ is

(1) $3\cdot 2e^{-0\cdot 04t}$ (2) $3\cdot 2te^{-0\cdot 04t}$ (3) $3\cdot 2t^2e^{0\cdot 04t}$ (4) $3\cdot 2te^{0\cdot 04t}$

70. If $z = i\log(3-\sqrt{5})$, then $\sin z =$

(1) $\frac{5\sqrt{5}-8}{9i}$ (2) $\frac{5\sqrt{5}+10}{9i}$ (3) $\frac{5\sqrt{5}-9}{8i}$ (4) $\frac{5\sqrt{5}+10}{8i}$

71. If

$$x_r = \cos\left(\frac{\pi}{2^r}\right) - i\sin\left(\frac{\pi}{2^r}\right)$$

then the value of $x_1 x_2 \cdots \infty$ is

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

72. A force of 50 kg is required to pull a block of wood weighing 150 kg on a rough horizontal surface. The coefficient of friction is

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

73. The centre of gravity G of three particles of equal mass placed at the three vertices of a right-angled isosceles triangle right angled at A whose hypotenuse is equal to 10 units is on the median through A such that AG is

(1) $\frac{7}{3}$ (2) $\frac{8}{3}$ (3) $\frac{11}{3}$ (4) $\frac{10}{3}$

74. If a particle is projected with a velocity 98 m/s making an angle 45° with the horizontal, its time of flight is given by

(1) $\frac{10}{\sqrt{2}}$ (2) $10\sqrt{2}$ (3) $20\sqrt{2}$ (4) 10

75. In the indirect impact of collision of perfectly elastic spheres, after collision their velocities are

(1) kept constant (2) interchanged (3) doubled (4) reduced to zero

76. A geostationary satellite is orbiting the earth at a height of $6R$ above the surface of the earth, where R is the radius of the earth. The time period of another satellite at a height of $2 \cdot 5R$ from the surface of the earth is

(1) $6\sqrt{2}$ hours (2) 10 hours (3) 8 hours (4) $4\sqrt{3}$ hours

77. Imagine a light planet revolving round a very massive star in a circular orbit of radius R with a period of revolution T. If the gravitational force of attraction between the planet and star is proportional to $R^{-5/2}$, then

(1) T^2 is proportional to R^3 (2) T^2 is proportional to $R^{7/2}$

(3) T^2 is proportional to $R^{3/2}$ (4) T^2 is proportional to $R^{7/4}$

78. A boat which has a speed of 5 km/hr in still water crosses a river of width 1 km along the shortest possible path in 15 minutes. The velocity of river water is

(1) 1 km/hr (2) $\sqrt{41}$ km/hr (3) 3 km/hr (4) 4 km/hr

79. A shell is fired from a canon with a velocity V at an angle θ with the horizontal direction. At the highest point in its path it explodes into two pieces of equal masses. One of the pieces retraces its path to the canon. The speed of the other piece immediately after the explosion is

(1) $3V\cos\theta$ (2) $2V\cos\theta$ (3) $V\cos\theta$ (4) $4V\cos\theta$

80. A thin circular ring of mass M and radius R is rotating about its axes with an angular speed ω. Two particles having mass m each are now attached at diametrically opposite points. The angular speed of the ring will become

(1) $\frac{\omega M}{M+m}$ (2) $\frac{\omega(M+2m)}{M}$ (3) $\frac{\omega M}{M+2m}$ (4) $\frac{\omega(M+m)}{M}$

81. A force F acts tangentially at the highest point of a sphere of mass M kept on a rough horizontal plane. If the sphere rolls without slipping, the linear acceleration of the centre of mass of the sphere will be

(1) $\frac{7F}{10M}$ (2) $\frac{5F}{7M}$ (3) $\frac{7F}{5M}$ (4) $\frac{10F}{7M}$

82. A tuning fork of frequency 512 Hz is vibrated with a sonometer wire and 6 beats per sec are heard. The beat frequency reduces if the tension in the string of sonometer is slightly increased. The original frequency of vibration of sonometer is

(1) 518 (2) 506 (3) 524 (4) 500

83. Newton's first law of motion is not valid

(1) in the inertial frame of reference

(2) in a frame moving with uniform velocity

(3) in a stationary frame

(4) in a noninertial frame of reference

84. For the sharpness of resonance the quality factor Q of the resonant circuit should be

(1) low (2) high (3) zero (4) of any value

85. Indicate the false statement about series resonant *LCR* circuit

(1) At resonance the impedance of the circuit is minimum

(2) Series resonant circuit is called acceptor

(3) This circuit exhibits current magnification

(4) At resonance the power factor is unity

86. The equation

$$\frac{d^2y}{dt^2} + u\frac{dy}{dt} + 25y = 0$$

represents

(1) damped oscillatory motion

(2) deadbeat nonoscillatory motion

(3) critically damped motion

(4) undamped oscillatory motion

87. A tuning fork of frequency 340 is allowed to vibrate just above a 120 cm high tube. Water is being filled slowly in the tube. What minimum height of water will be necessary for resonance (speed of sound in air 340 m/sec)?

(1) 25 cm (2) 75 cm (3) 50 cm (4) 45 cm

88. A machine gun is mounted on a car on a horizontal frictionless surface. The mass of the system (car + gun) at a particular instant is 200 kg. At that same instant the gun is firing bullets of mass 10 gm each at the rate 10 bullets per sec with relative velocity of 500 metres per sec with respect to car. What is the acceleration of the car?

(1) 0·25 metre/sec^2

(2) 0·2 metre/sec^2

(3) 0·50 metre/sec^2

(4) 0·4 metre/sec^2

89. A mass M is moving with a constant velocity parallel to the x-axis. Its angular momentum with respect to the origin

(1) is zero
(2) remains constant
(3) goes on increasing
(4) goes on decreasing

90. A cage with a parrot setting in it is suspended from a spring balance. The parrot starts flying. The reading of the spring will

(1) increase
(2) decrease
(3) not change
(4) depend on direction of flight

91. A pendulum is hanging from the ceiling of a car moving with an acceleration a_0 with respect to horizontal road. The angle made by the string with the vertical will be

(1) zero
(2) $\cos^{-1}(a_0/g)$
(3) $\sin^{-1}(a_0/g)$
(4) $\tan^{-1}(a_0/g)$

92. A solid cylinder of mass M and radius R is rolling down on an inclined plane without slipping. If the height of the point on the inclined plane from where the cylinder starts rolling is h from the bottom, then the speed of the centre of mass of the cylinder when the cylinder reaches the bottom is

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

93. A uniform disk of radius R and mass M is mounted on an axle supported in fixed frictionless bearings. A light cord is wrapped around the rim of the disk and a body of mass m is hanged from the cord, then the angular acceleration of the disk will be

(1) $\left(\frac{2m}{M+2m}\right)\frac{g}{R}$
(2) $\left(\frac{M}{M+2m}\right)\frac{g}{R}$
(3) $\left(\frac{2M}{m+2M}\right)\frac{g}{R}$
(4) $\left(\frac{m}{M+2m}\right)\frac{g}{R}$

94. Two blocks A and B of masses m_A and m_B coupled by a spring are resting on a horizontal frictionless table. If the blocks are pulled apart stretching the spring and then released. The ratio of the kinetic energy of blocks k_A/k_B at any instant of time will be

(1) m_A/m_B (2) m_B/m_A (3) $m_A/(m_A+m_B)$ (4) $m_B/(m_A+m_B)$

95. A particle of mass m is moving in a vertical circle of radius R inside a track. There is no friction. When m is at its lowest position its speed is v_0. What is the minimum value of v_0 for which m will go completely around the circle without leaving contact with the track?

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

96. P-type semiconductor is formed by doping Si or Ge with

(1) boron and indium
(2) phosphorus and arsenic
(3) aluminium and cobalt
(4) boron and selenium

97. On reverse biasing a P-N junction diode

(1) potential barrier increases but depletion width decreases

(2) potential barrier decreases but the depletion width increases

(3) Both the depletion width and potential barrier decrease

(4) Both the depletion width and potential barrier increase

98. A full-wave rectifier uses diodes with forward resistance of each diode being 200 ohms. The rectifier supplies current to a load resistance of 1000 ohms and is operated by a 36-0-36 center tap transformer. The output DC voltage is

(1) 18 V (2) 27 V (3) 36 V (4) 72 V

99. A transistor having $\alpha = 0{\cdot}975$ and a reverse saturation current $I_{CO} = 10\,\mu A$ is operated in *CE* configuration. If the base current is 250 μA, then the collector current is

(1) 10·15 mA (2) 9·75 mA (3) 11·64 mA (4) 8·56 mA

100. As compared with *CC* and *CB* amplifiers *CE* amplifier is more used because

(1) its voltage gain is higher

(2) its current gain is higher

(3) its current gain as well as voltage gain are higher

(4) it is easier to design

101. In the frequency response of a *CE* amplifier the upper cutoff is obtained due to the

(1) blocking capacitance (2) bypass capacitance

(3) coupling capacitance (4) junction capacitance

102. When a large load current flows in a capacitor filter system, then

(1) ripple factor increases but percentage regulation improves

(2) ripple factor increases and percentage regulation becomes poor

(3) ripple factor decreases but percentage regulation improves

(4) ripple factor decreases and percentage regulation becomes poor

103. The displacement current is necessary in order to apply the Ampere's law for magnetic field due to

(1) change of polarization with time

(2) change of electric field with time

(3) magnetization currents in magnetic materials

(4) material medium in motion

104. Which one of the following is not a correct boundary condition?

(1) Tangential component of $\vec{E}$ is continuous at the interface

(2) Tangential component of $\vec{H}$ is continuous at the interface

(3) Normal component of $\vec{B}$ is continuous at the interface

(4) Normal component of $\vec{D}$ is continuous at the interface

105. Which one of the following is not a Maxwell's equation?

(1) $\oint \vec{D} \cdot \overrightarrow{dS} = q$

(2) $\oint \vec{B} \cdot \overrightarrow{dl} = \mu_0 I$

(3) $\oint \vec{H} \cdot \overrightarrow{dl} = I + \frac{\partial}{\partial t} \int \vec{D} \cdot \overrightarrow{dS}$

(4) $\oint \vec{E} \cdot \overrightarrow{dl} = -\frac{\partial}{\partial t} \int \vec{B} \cdot \overrightarrow{dS}$

106. For plane electromagnetic waves in vacuum, which of the following statements is not true?

(1) These are transverse in nature

(2) Electric and magnetic field waves are in phase

(3) Electric and magnetic field waves are not in phase

(4) $\vec{E} \times \vec{H}$ points in the direction of propagation

107. The intrinsic impedance of a dielectric magnetic medium specified by ε and μ is

(1) $\frac{1}{\sqrt{\mu\varepsilon}}$ (2) $\sqrt{\mu\varepsilon}$ (3) $\sqrt{\frac{\mu}{\varepsilon}}$ (4) $\sqrt{\frac{\varepsilon}{\mu}}$

108. Poynting vector denotes

(1) power density entering or leaving a given volume

(2) electromagnetic energy density in a given volume

(3) electric field energy density in a given volume

(4) magnetic field energy density in a given volume

109. Electric and magnetic field vectors in a conducting media propagate

(1) without any phase difference

(2) $\vec{E}$ and $\vec{B}$ fields are attenuated

(3) $\vec{E}$ and $\vec{B}$ fields travel with different speeds

(4) $\vec{E}$ and $\vec{B}$ fields are transverse in nature

110. Skin depth for electromagnetic waves in a conductor

(1) increases with frequency
(2) decreases with frequency
(3) is independent of frequency
(4) increases with conductivity

111. Which of the following media can be considered to be a conductor at 8 MHz ?

(1) Soil with $\varepsilon = 15\varepsilon_0, \sigma = 10^{-2}\ (\Omega\text{m})^{-1}$

(2) Germanium with $\varepsilon = 16\varepsilon_0, \sigma = 0{\cdot}1\ (\Omega\text{m})^{-1}$

(3) Seawater with $\varepsilon = 80\varepsilon_0, \sigma = 25\ (\Omega\text{m})^{-1}$

(4) Wood with $\varepsilon = 2\varepsilon_0, \sigma = 10^{-6}\ (\Omega\text{m})^{-1}$

112. A plane electromagnetic wave is incident from air to glass. Which of the following statements is not true for incident, reflected and transmitted waves?

(1) All waves lie in same plane
(2) All waves have same frequency
(3) All waves have same wavelength
(4) All waves have different amplitudes

113. A plane polarized electromagnetic wave with its $\vec{E}$ vector parallel to the plane of incidence is incident from air to glass. If it is found that $\theta_i + \theta_t = \frac{\pi}{2}$, where θ_i is angle of incidence and θ_t is the angle of transmission, then

(1) the reflected wave will be in a direction perpendicular to transmitted wave

(2) there will not be any reflected wave

(3) the reflected wave will be plane polarized with $\vec{E}$ vector normal to plane of incidence

(4) the reflected wave will be in the direction of incident wave

114. A piece of coaxial cable has a 75 Ω characteristic impedance and a nominal capacitance of 40 pF/m. What is the inductance per metre?

(1) 0·125 μH (2) 0·625 μH (3) 0·225 μH (4) 0·325 μH

115. Indicate the false statement. The VSWR on a transmission line is infinity. The line is terminated in

(1) short circuit (2) complex impedance

(3) open circuit (4) a pure reactance

116. If we pour some drops of water between the plate and lens in Newton's ring experiment, then the rings

(1) will increase in diameter (2) will decrease in diameter

(3) will become elliptical (4) will disappear

117. If mirror M_2 in Michelson interferometer is moved through 0·233 mm, 792 fringes are counted. The wavelength of the light is

(1) 7000 Å (2) 6560 Å (3) 5880 Å (4) 5330 Å

118. A single slit is illuminated by light whose wavelengths are λ_a and λ_b so chosen that the first diffraction minima of λ_a coincide with the second diffraction minima of λ_b. The relationship between the two wavelengths is

(1) $\lambda_a = 2\lambda_b$ (2) $\lambda_b = 2\lambda_a$ (3) $\lambda_a = 4\lambda_b$ (4) $\lambda_b = 3\lambda_a$

119. If α is equal to half of the phase difference between rays diffracted from the top and bottom of the single slit, then the values of α at which intensity maxima for single-slit diffraction are obtained are given by

(1) $\sin\alpha = \alpha$ (2) $\tan\alpha = \alpha$ (3) $\cot\alpha = \alpha$ (4) $\sin^2\alpha = \alpha$

120. Two polarizing sheets have their polarizing directions parallel so that the intensity I_m of the transmitted light is maximum. Through what angle must either sheet be turned if the intensity is to drop by one-half ?

(1) $\pm 60°$ (2) $\pm 90°$ (3) $\pm 45°$ (4) $\pm 30°$

121. If we use the right-handed coordinate system, then what state of polarization is represented by these sets of equations as seen facing the source?

$$E_x = E \sin(kz - \omega t)$$
$$E_y = E \cos(kz - \omega t)$$

(1) Circular counterclockwise (2) Circular clockwise

(3) Elliptical counterclockwise (4) Elliptical clockwise

122. A circularly polarized light can be distinguished from unpolarized light by passing it through a

(1) polarizing sheet (2) half-wave plate

(3) quarter-wave plate (4) Nicol prism

123. A quartz quarter-wave plate is to be used with sodium light ($\lambda = 5890$ Å). What must be thickness ($m_e = 1{\cdot}553$ and $n_0 = 1{\cdot}544$) ?

(1) ·016 mm (2) ·032 mm (3) ·008 mm (4) ·024 mm

124. Indicate the false statement about the conclusions from Michelson-Morley experiment

(1) Hypothetical ether does not exist

(2) All motions are relative to a universal frame of reference

(3) The speed of light is same for all observers

(4) All motions are relative to a specified frame of reference

125. X-rays of wavelength 10 pm are scattered from a target. If the value of the constant $h/mC = 2\cdot425$ pm, then the maximum wavelength present in the scattered X-rays will be

(1) 10·2 pm (2) 12·425 pm (3) 14·85 pm (4) 17·25 pm

126. 10 gm of water at 0 °C is heated and transformed to 10 gm steam at 100 °C. If the latent heat of vaporization at 100 °C is 538 cal/gm, then the change in entropy is

(1) 14·44 cal/°K (2) 17·54 cal/°K (3) 4·56 cal/°K (4) 14·72 cal/°K

127. Which one of the following is not the correct Maxwell's thermodynamical equation?

(1) $\left(\frac{\partial S}{\partial V}\right)_T = \left(\frac{\partial P}{\partial T}\right)_V$

(2) $\left(\frac{\partial S}{\partial P}\right)_T = \left(\frac{\partial V}{\partial T}\right)_P$

(3) $\left(\frac{\partial T}{\partial V}\right)_S = -\left(\frac{\partial P}{\partial S}\right)_V$

(4) $\left(\frac{\partial T}{\partial P}\right)_S = \left(\frac{\partial V}{\partial S}\right)_P$

128. The change in the boiling point of water when the pressure is increased by 10^6 dynes/cm^2, on assuming normal boiling point 100 °C, specific volume of steam 1677 c.c./gm and latent heat of vaporization of water 540 cal/gm, will be about

(1) 28 °C (2) 12 °C (3) 15 °C (4) 40 °C

129. S-T diagrams can be plotted for

(1) irreversible processes only

(2) reversible processes only

(3) Both for reversible and irreversible processes

(4) throttling processes only

130. A solid sphere of copper cools at the rate of 2·8 °C/minute when its temperature is 127 °C. At what rate a solid sphere of copper of twice its radius and having temperature 127 °C will cool if in both cases the surroundings are maintained at 27 °C?

(1) 0·7 °C/min (2) 5·6 °C/min (3) 1·4 °C/min (4) 2·8 °C/min

131. The wavelength associated for a beam of electrons whose kinetic energy is 100 eV is (Given that the mass of electron $= 9 \cdot 1 \times 10^{-31}$ kg, charge of electron $1 \cdot 6 \times 10^{-19}$ coulomb and Planck's constant $h = 6 \cdot 6 \times 10^{-34}$ joules-sec)

(1) 1·8 Å (2) 2·4 Å (3) 3·6 Å (4) 1·2 Å

132. A light of wavelength 2000 Å falls on an aluminium surface. In aluminium 4·2 eV energy is required to remove an electron. The kinetic energy of the fastest emitted photoelectron is

(1) 1 eV (2) 2 eV (3) 3 eV (4) 4 eV

133. Indicate the false statement about the Nicol prism

(1) It is used as a polarizer

(2) It is used as an analyser

(3) Canada balsam is used to join the two pieces of prism so that the ordinary ray undergoes total internal reflection at the interface

(4) It is enclosed in a blackened cover to absorb the internally reflected beam

134. At what angle of incidence should a beam of sodium light be incident on the surface of diamond to produce completely polarized reflected light? Critical angle for diamond is 24·5°

(1) 36·5° (2) 54·5° (3) 67·5° (4) 45·5°

135. Indicate the false equation from the $T\,dS$ equations given below

(1) $T\,dS = C_V\,dT + T\left(\frac{\partial S}{\partial V}\right)_T dV$

(2) $T\,dS = C_V\,dT + T\left(\frac{\partial P}{\partial T}\right)_V dV$

(3) $T\,dS = C_P\,dT + T\left(\frac{\partial S}{\partial p}\right)_T dP$

(4) $T\,dS = C_P\,dT + T\left(\frac{\partial V}{\partial T}\right)_P dP$

136. In solar radiation the maximum wavelength is 4753 Å. If the constant appearing in Wien's displacement law is 0·00293 °K/m, then the temperature of the sun is

(1) 5040 °K (2) 5742 °K (3) 6060 °K (4) 6238 °K

137. Two equal resistances each of 10 kΩ are connected in series to a 100 V DC source. If the voltage across R_2 is measured with a voltmeter having a resistance of 50 kΩ, then the reading of the voltmeter will be

(1) 45·43 V (2) 41·65 V (3) 50·00 V (4) 55·45 V

138. The correct statement about the two-wire transmission line is

(1) A distortionless line is also lossless

(2) A lossless line is also distortionless

(3) A distortionless line attenuates signals of all frequencies equally

(4) A lossless line is not distortionless

139. Which one of the following equations is not consistent with Maxwell's equations of electromagnetism?

(1) $\vec{B} = \vec{\nabla} \times \vec{A}$ (2) $\vec{E} = -\vec{\nabla}\phi$ (3) $\vec{\nabla} \cdot \vec{J}_{\text{total}} = 0$ (4) $\vec{\nabla} \cdot \vec{D} = \rho$

140. Indicate the false statement regarding the early effect in case of BJT

(1) Base current decreases with increasing $|V_{CB}|$

(2) Emitter current increases with increasing $|V_{CB}|$

(3) α decreases with increasing $|V_{CB}|$

(4) β decreases with increasing $|V_{CB}|$

141. A black body emits radiation $e_{\lambda T}\, d\lambda$ per sec from a unit area of a black-body surface at temperature T in the wavelength range λ to $\lambda + d\lambda$ and $e_{\lambda G}\, d\lambda$ the corresponding energy. When the surface is at the standard gold point T_g (= 1063 °C), then using Planck's formula it can be shown that for λ in the visible light range

(1) $\ln (e_{\lambda T}/e_{\lambda g}) = \frac{hc}{k\lambda}\left(\frac{1}{T_g} - \frac{1}{T}\right)$

(2) $e_{\lambda T}/e_{\lambda g} = \frac{hc}{k\lambda}\left(\frac{1}{T} - \frac{1}{T_g}\right)$

(3) $\ln (e_{\lambda T}/e_{\lambda g}) = \frac{hc}{k\lambda}\left(\frac{1}{T} - \frac{1}{T_g}\right)$

(4) $\log (e_{\lambda T}/e_{\lambda g}) = \frac{hc}{k\lambda}\left(\frac{1}{T_g} - \frac{1}{T}\right)$

142. For a van der Waals' gas the Joule-Thomson coefficient is given by

(1) $\frac{1}{C_p}\left[b - \frac{2a}{RT}\right]$ (2) $\frac{1}{C_V}\left[\frac{2a}{RT} - b\right]$ (3) $\frac{1}{C_p}\left[\frac{2a}{RT} - b\right]$ (4) $\frac{1}{C_V}\left[b - \frac{2a}{RT}\right]$

143. If $c_{\text{r.m.s.}}$, $\bar{c}$ and c_m denote respectively the r.m.s. speed, average speed and maximum provable speed of molecules in a gas obeying Maxwellian distribution of molecular speed, then

(1) $c_m > \bar{c} > c_{\text{r.m.s.}}$ (2) $\bar{c} > c_{\text{r.m.s.}} > c_m$ (3) $c_{\text{r.m.s.}} > \bar{c} > c_m$ (4) $c_{\text{r.m.s.}} > c_m > \bar{c}$

144. Indicate the false conclusion drawn from the heat capacity equation

$$C_p - C_V = -T\left(\frac{\partial V}{\partial T}\right)_P^2 \left(\frac{\partial P}{\partial V}\right)_T$$

(1) $C_P - C_V < 0$ (2) for a perfect gas $C_p - C_V = R$

(3) $C_P = C_V$ at absolute zero (4) $C_P = C_V$ for water at 4 °C

145. The Fourier series

$$F(x) = \frac{3}{2} + \frac{6}{\pi}\left(\sin\frac{\pi x}{5} + \frac{1}{3}\sin\frac{3\pi x}{5} + \frac{1}{5}\sin\frac{5\pi x}{5} + \cdots\right)$$

represents

(1) a square wave of amplitude 3 and period 5

(2) a square wave of amplitude $\frac{3}{2}$ and period 10

(3) a square wave of amplitude 3 and period 10

(4) a square wave of amplitude $\frac{3}{2}$ and period 5

146. The motor of a refrigerator has a power output of 200 watts. If the freezing temperature is at 270 °K and the outside air is at 300 °K, assuming ideal efficiency, what is the maximum amount of heat that can be extracted from the freezing compartment in 10 minutes?

(1) $1{\cdot}08 \times 10^3$ joules (2) $1{\cdot}2 \times 10^3$ joules

(3) $1{\cdot}2 \times 10^6$ joules (4) $1{\cdot}08 \times 10^6$ joules

147. Sand drops from a stationary hopper at a rate $\frac{dM}{dt}$ onto a conveyor belt moving with constant velocity $\vec{v}$ in the reference frame of laboratory. What force is required to keep the belt moving at speed $\vec{v}$?

(1) $\vec{v}\frac{dM}{dt}$ (2) $-\vec{v}\frac{dM}{dt}$ (3) $2v\frac{dM}{dt}$ (4) $-2v\frac{dM}{dt}$

148. The effective molecular diameter of air molecules is 2×10^{-8} cm and there are about 3×10^{19} molecules/cm^3. If the average speed of air molecules is 1×10^5 cm/sec, then average number of collisions of air molecules is

(1) 5×10^8/sec (2) 2×10^9/sec (3) 5×10^9/sec (4) 2×10^8/sec

149. If we combine two rectangular simple harmonic vibrations of time period in the ratio $1:2$ and phase difference of $\frac{\pi}{2}$, then the Lissajous' figures obtained will be

(1) ellipse (2) figure of eight (3) parabola (4) circle

150. What beats would you expect to hear if there were three sources of equal intensity with frequencies 400, 401 and 402 cycles per sec?

(1) 1 beat/sec (2) 2 beats/sec (3) 3 beats/sec (4) 0 beat/sec

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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 ***प्रश्न-पुस्तिका एवं 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।

1. 03 (Three) marks to be awarded for each correct answer.
2. 01 (One) mark to be deducted for each incorrect answer.
3. 00 (zero) mark to be awarded for each unattempted question.

KEY OF UET/PET-2010

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Q.	A.	Q.	A.	Q.	A.	Q.	A.	Q.	A.	Q.	A.	Q.	A.	Q.	A.	Q.	A.	Q.	A.
1	1	21	4	41	1	61	2	81	4	101	4	121	1	141	1	161		181	
2	3	22	4	42	2	62	1	82	2	102	2	122	3	142	3	162		182	
3	2	23	3	43	3	63	4	83	4	103	2	123	1	143	3	163		183	
4	2	24	2	44	2	64	1	84	2	104	4	124	2	144	1	164		184	
~~5~~	~~3~~	25	2	45	1	65	1	85	3	105	2	125	3	145	3	165		185	
6	1	26	1	46	4	66	4	86	1	106	3	126	2	146	4	166		186	
7	1	27	3	47	2	67	3	87	4	107	3	127	2	147	1	167		187	
~~8~~	~~3~~	28	4	48	1	68	1	88	1	108	1	128	1	148	3	168		188	
9	2	29	1	49	3	69	2	89	2	109	2	129	2	149	3	169		189	
10	3	30	4	50	4	70	3	90	2	110	2	130	3	150	1	170		190	

11	2	31	1	51	1	71	1	91	4	111	3	131	4	151		171		191	
12	1	32	2	52	2	72	3	92	2	112	3	132	2	152		172		192	
13	4	33	3	53	4	73	4	93	1	113	2	133	3	153		173		193	
14	1	34	1	54	2	74	2	94	2	114	3	134	3	154		174		194	
15	2	35	2	55	2	75	2	95	3	115	2	135	4	155		175		195	
16	3	36	4	56	2	76	1	96	1	116	2	136	3	156		176		196	
17	4	37	1	57	1	77	2	97	4	117	3	137	1	157		177		197	
18	3	38	4	58	4	78	4	98	2	118	1	138	2	158		178		198	
19	4	39	3	59	1	79	1	99	1	119	2	139	2	159		179		199	
20	2	40	3	60	2	80	3	100	3	120	3	140	3	160		180		200	

Q.No. 5 and 8 are cancelled.
6 (Six) marks to be awarded to all.