KGCET - 2K25

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FOR ENGINEERING ASPIRANTS

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MATHS

1. If $A=\begin{bmatrix}0 & 1\\ 1 & 0\end{bmatrix}$ then $A^5=$

1) I 2) O 3) A 4) A^2

2. If x,y,z not all zeros and the equations $x+y+z=0$, $(1+a)x+(2+a)y-8z=0$, $x-(1+a)y+(2+a)z=0$ have non-trivial solution then $a=$

1) $2+\sqrt{15}$ 2) $3\pm\sqrt{15}$ 3) $\sqrt{15}$ 4) $-5\pm2\sqrt{2}$

3. Range of $\sqrt{9-x^2}$ is

1) $[0,3]$ 2) $[-3,3]$ 3) $[-3,0]$ 4) R

4. If $f:R^+\to R$ such that $f(x)=\log_5 x$ then $f^{-1}(x)=$

1) $\log_x 10$ 2) 5^x 3) 3^{-x} 4) $3^{1/x}$

5. If $\overline{AB}=(3,-2,2)$, $\overline{BC}=(-1,0,-2)$ are the adjacent sides of a parallelogram, then the obtuse angle between its diagonals is

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

6. The locus of the point equidistant from two given points a and b is given by

1) $\left[\left(\bar{r}-\frac{\bar{a}+\bar{b}}{2}\right).(\bar{a}+\bar{b})\right].(\bar{a}-\bar{b})=0$ 2) $\left[\left(\bar{r}-\frac{\bar{a}+\bar{b}}{2}\right).(\bar{a}+\bar{b})\right].(\bar{a}+\bar{b})=0$

3) $\left[\left(\bar{r}-\frac{\bar{a}+\bar{b}}{2}\right).(\bar{a}-\bar{b})\right].(\bar{a}+\bar{b})=0$ 4) $\left[\left(\bar{r}-\frac{\bar{a}+\bar{b}}{2}\right).(\bar{a}-\bar{b})\right].(\bar{a}-\bar{b})=0$

7. If $A=\begin{bmatrix}\alpha^2 & 5\\ 5 & -\alpha\end{bmatrix}$ and $\det(A^{10})=1024$ then $\alpha=$

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

8. In a ΔABC, $2ac\sin\frac{A-B+C}{2}=$

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

9. $8\sin^2 x+3\cos^2 x=5\Rightarrow\cot x=$

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

10. $\cos35^0+\cos85^0+\cos155^0=$

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

11. The vector $\bar{b}$ which is collinear with the vector $\bar{a}=(2,1,-1)$ and satisfies the relation $\bar{a}.\bar{b}=3$ is____

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

12. Angle between the planes $x-y+z=3$, $x+y+z=4$ is

1) $\cos^{-1}\frac{1}{3}$ 2) $\cos^{-1}\frac{4}{41}$ 3) $\sin^{-1}\frac{4}{27}$ 4) $\sin^{-1}\frac{4}{41}$

13. If $|\bar{a}|=1,\ |\bar{b}|=2,\ (\bar{a},\bar{b})=\frac{2\pi}{3}$ then $\left\{(\bar{a}+3\bar{b})\times(3\bar{a}-\bar{b})\right\}^2=$

1) 425 2) 375 3) 325 4) 300

14. Let $\bar{a}=\bar{i}+\bar{j},\ \bar{b}=2\bar{i}-\bar{k}$. Then the point of intersection of the lines $\bar{r}\times\bar{a}=\bar{b}\times\bar{a}$ and $\bar{r}\times\bar{a}=\bar{a}\times\bar{b}$ is

1) $3\bar{i}+\bar{j}-\bar{k}$ 2) $3\bar{i}-\bar{j}-\bar{k}$ 3) $3\bar{i}-3\bar{j}-\bar{k}$ 4) $3\bar{i}+3\bar{j}+\bar{k}$

15. If $\bar{a}=2\bar{i}+\bar{j}+3\bar{k},\ \bar{b}=3\bar{i}+2\bar{j}+\bar{k},\ \bar{c}=\bar{i}-\bar{j}-4\bar{k},\ \bar{d}=\bar{i}+2\bar{j}-\bar{k}$ then $(\bar{a}\times\bar{b})\times(\bar{c}\times\bar{d})=$

1) $24(\bar{i}+\bar{j}-2\bar{k})$ 2) $24(\bar{i}-\bar{j}-\bar{k})$ 3) $12(2\bar{i}+\bar{j}-3\bar{k})$ 4) $12(\bar{i}-\bar{j}+3\bar{k})$

16. If $\alpha\bar{a}+\beta\bar{b}+\gamma\bar{c}=\bar{0}$ then $(\bar{a}\times\bar{b})\times\left\{(\bar{b}\times\bar{c})\times(\bar{c}\times\bar{a})\right\}=$

1) $\bar{0}$ 2) A vector perpendicular to the plane of $\bar{a},\bar{b},\bar{c}$

3) A scalar quantity 3) $2\left[\bar{a}\ \bar{b}\ \bar{c}\right]$

17. If any triangle ABC, $r^2\cot\frac{A}{2}\cot\frac{B}{2}\cot\frac{C}{2}=$

1) 2Δ 2) Δ 3) Δ^2 4) 5Δ

18. the minimum and maximum value of $\sin^2(60^0-x)+\sin^2(60^0+x)$ are

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

19. $\cot\theta=\dfrac{2\tan 7\frac{1}{2}^0}{1-\tan^2 7\frac{1}{2}^0}$, then $\sin 3\theta=$

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

20. If $\log_e(\sqrt{5}+2)=\sinh^{-1}(k)$ then $k=$

1) 1 2) 5 3) 3 4) 2

21. If the distance from P to the points $(5,-4),(7,6)$ are in the ratio 2 : 3, then the locus of P is

1) $5x^2+5y^2-12x-86y+17=0$ 2) $5x^2+5y^2-34x+120y+29=0$

3) $5x^2+5y^2-5x+y+14=0$ 4) $3x^2+3y^2-20x+38y+87=0$

22. A square formed by the lines $x=0,y=0,\ x=1,\ y=1$ then equation of its diagonals will be

1) $y=x,\ x+y=1$ 2) $y=x,\ x+y=2$ 3) $2y=x,\ x+y=\frac{1}{2}$ 4) $y=2x,\ x+y=\frac{1}{4}$

23. The equation of the plane passing through a point with position vector $\hat{i}+2\hat{j}+3\hat{k}$ and parallel to the plane $\vec{r}.(3\hat{i}+4\hat{j}+5\hat{k})=0$ is

1) $3x+4y-5z+26=0$ 2) $3x+4y+5z-26=0$

3) $3x-4y+5z-26=0$ 4) $3x+4y-5z-26=0$

24. The d.c's of the normal to the plane $2x-y+2z+5=0$ are

1) $(3,-2,6)$ 2) $\left(\frac{2}{7},\frac{3}{7},\frac{-6}{7}\right)$ 3) $\left(\frac{3}{7},\frac{-2}{7},\frac{6}{7}\right)$ 4) $\left(\frac{2}{3},\frac{-1}{3},\frac{2}{3}\right)$

25. $\lim\limits_{x\to 0} x^3\cos\frac{2}{x}=$

1) 0 2) 1 3) ∞ 4) does not exist

26. If the function $f(x)=\dfrac{e^{x^2}-\cos x}{x^2}$ for $x\neq 0$ is continuous at $x=0$ then $f(0)=$

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

27. $f(x)=\dfrac{p+q^{\frac{1}{x}}}{r+s^{\frac{1}{x}}}, s>1, q>1, r\neq 0,\ f(0)=1$ is left continuous at $x=0$ then

1) $p=0$ 2) $p=r$ 3) $p=q$ 4) $p\neq q$

28. If $f(x)=\begin{cases}1 & x<0\\ x^2 & x\geq 0\end{cases}$ then at $x=0$

1) f' is differentiable 2) f is continuous

3) f is differentiable 4) f is not continuous

29. The number of distinct term in $\left(x^3+\dfrac{1}{x^3}+1\right)^{200}$ is

1) 201 2) 400 3) 401 4) 500

30. If $y=(\log x)^x$ then $\dfrac{dy}{dx}=$

1) $(\log x)^x\left[\log(\log x)+\dfrac{1}{\log x}\right]$ 2) $(\log x)^x\left[\log(\log x)-\dfrac{1}{\log x}\right]$

3) $-(\log x)^x\left[\log(\log x)+\dfrac{1}{\log x}\right]$ 4) $-(\log x)^x\left[\log(\log x)-\dfrac{1}{\log x}\right]$

31. Given two points $Q(3,4), R(1,2)$. What is the point $P(x,y)$ on the line $2x-y-1=0$ for which $PQ+PR=QR$ holds

1) $(2,3)$ 2) $(-3,-7)$ 3) $(-2,-5)$ 4) $(4,7)$

32. Pressure P and Volume V of a gas are connected by the relation $PV^{\frac{1}{4}}=C$ (constant). The percentage increase in p corresponding to a diminition of $\dfrac{1}{2}\%$ in the volume is

1) $\dfrac{1}{2}$ 2) $\dfrac{1}{4}$ 3) $\dfrac{1}{8}$ 4) $\dfrac{1}{16}$

33. The point on the curve $x^2+y^2-2x-3=0$ at which the tangent is parallel to x-axis is

1) $(1,0),(-1,-4)$ 2) $(0,-1),(-2,3)$ 3) $(2,13),(-2,-3)$ 4) $(1,2),(1,-2)$

34. The curves $xy=4;\ x^2-y^2=15$

1) touch each other 2) cut each other orthogonally

3) intersect at an angle $\dfrac{\pi}{3}$ 4) intersect at an angle $\dfrac{\pi}{4}$

35. If k is the diameter of a circle and A is the area of a sector of the circle whose vertical angle is θ then $\dfrac{dA}{dt}=$

1) $\dfrac{k^2}{8}\left(\dfrac{d\theta}{dt}\right)$ 2) $\left(\dfrac{k^2}{4}\right)\left(\dfrac{d\theta}{dt}\right)$ 3) $\left(\dfrac{k^2}{4}\right)\left(\dfrac{d\theta}{dt}\right)$ 4) $k\left(\dfrac{d\theta}{dt}\right)$

36. A point is moving along $y^3=27x$. The interval in which the abscissa changes at slower rate than ordinate is

1) $(-2,2)$ 2) $(-\infty,\infty)$ 3) $(-1,1)$ 4) $(-\infty,-3)\cup(3,\infty)$

37. Rolle's theorem cannot be applicable for

1) $f(x)=\sqrt{4-x^2}$ in $[-2,2]$ 2) $f(x)=[x]$ in $[-1,1]$

3) $f(x)=x^2+3x-4$ in $[-4,1]$ 4) $f(x)=\cos 2x$ in $[0,\pi]$

38. A point on the curve $f(x)=\sqrt{x^2-4}$ defined in $[2,4]$, where the tangent is parallel to the chord joining two points on the curves is

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

39. The function $f(x)=\sin^2 x\cos^3 x$ attains a maximum when $x=$

1) $\tan^{-1}\frac{2}{3}$ 2) $\tan^{-1}\sqrt{\frac{2}{3}}$ 3) $\tan^{-1}\frac{3}{2}$ 4) $\tan^{-1}\sqrt{\frac{3}{2}}$

40. If the transformed equation of a curve is $9X^2+16Y^2=144$ when the axes are rotated through an angle of 45^0 then the original equation of a curve is

1) $25x^2+14xy+25y^2=288$ 2) $25x^2+14xy-25y^2=288$

3) $25x^2-14xy+25y^2=288$ 4) $25x^2-14xy-25y^2=288$

41. If the roots of the quadratic equation $x^2-4x-\log_3 a=0$ are real, then the least value of a is

1) 81 2) $\frac{1}{81}$ 3) $\frac{1}{64}$ 4) 9

42. Number of solutions of the equation $|x|^2-3|x|+2=0$ is ……

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

43. the points in the $\left\{z\in C: Arg\left(\frac{z-2}{z-6i}\right)=\frac{\pi}{2}\right\}$ lie on the curve which is a (where C denotes the set of all complex numbers)

1) Circle 2) Pair of straight line 3) Parabola 4) Hyperbola

44. $4+5\left(-\frac{1}{2}+\frac{i\sqrt{3}}{2}\right)^{334}+3\left(-\frac{1}{2}+\frac{i\sqrt{3}}{2}\right)^{365}=$

1) $1-i\sqrt{3}$ 2) $-1+i\sqrt{3}$ 3) $i\sqrt{3}$ 4) $-i\sqrt{3}$

45. The biquadratic equation, two of whose roots are $1+i, 1-\sqrt{2}$ is

1) $x^4-4x^3+5x^2-2x-2=0$ 2) $x^4-4x^3-5x^2+2x+2=0$

3) $x^4+4x^3-5x^2+2x-2=0$ 4) $x^4+4x^3+5x^2-2x+2=0$

46. If $f(x)=0$ is a R.E. of first type and odd degree then a factor of $f(x)$ is

1) $x-2$ 2) $x-1$ 3) x 4) $x+1$

47. In the expansion of $\left(\sqrt{a}+\frac{1}{\sqrt{3a}}\right)^n$ if the ratio of the binomial coefficient of the 4th term to the binomial coefficient of the 3rd term is $\frac{10}{3}$, the 5th term is

1) $55a$ 2) $45a^2$ 3) $50a^2$ 4) $55a^2$

48. The sum of the series $1+\frac{k}{3}+\frac{k(k+1)}{3.6}+\frac{k(k+1)(k+2)}{3.6.9}+\ldots$ is

1) $\left(\frac{2}{3}\right)^4$ 2) $\left(\frac{3}{2}\right)^k$ 3) $\frac{2}{3}$ 4) $\frac{3}{2}$

49. If $\sum_{k=1}^{m}(k^2+1)k!=1999(2000!)$, then m is

1) 1999 2) 2000 3) 2001 4) 2002

50. The sum of the value of the digits at the ten's place of all the numbers formed with the help of 3, 4, 5, 6 taken all at a time is

1) 1080 2) 4320 3) 360 4) 180

51. If m parallel lines in a plane are intersected by n parallel lines then number of parallelograms formed is

1) $\frac{m!n!}{(2!)^2}$ 2) $\frac{m!n!}{(m-2)!(n-2)!}$

3) $\frac{m!n!}{(2!)^2(m-2)!(n-2)!}$ 4) $\frac{(m+n)!}{(m+n2)!2!}$

52. The number of odd proper positive divisors of $3^a 6^b 21^c$ is $(a,b,c,\in N)$

1) $(a+1)(b+1)(c+1)-2$ 2) $(a+b+c+1)(c+1)-1$

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

53. $\dfrac{2x^3+1}{(x-1)(x+1)(x+2)} =$

1) $2+\dfrac{1}{2(x-1)}+\dfrac{1}{2(x+1)}-\dfrac{5}{x+2}$ 2) $2-\dfrac{1}{2(x-1)}-\dfrac{1}{2(x+1)}-\dfrac{5}{x+2}$

3) $2+\dfrac{1}{2(x-1)}-\dfrac{1}{2(x+1)}-\dfrac{5}{x+2}$ 4) $\dfrac{1}{2(x-1)}+\dfrac{1}{2(x+1)}-\dfrac{5}{x+2}$

54. Which of the following is not a measure of dispersion?

1) Variance 2)Mean deviation 3) Mode 4) Standard Deviation

55. If $x_1, x_2, ..., x_n$ are n observations such that $\sum_{i=1}^{n} x_i^2 = 400$ and $\sum_{i=1}^{n} x_i = 80$ then the least value of n is

1) 12 2) 15 3) 16 4) 18

56. Two numbers are selected at random from 1, 2, 3, …. 100 without replacement. The probability that the minimum of the two numbers is less than 70 is

1) $\dfrac{30_{C_2}}{100_{C_2}}$ 2) $1-\dfrac{30_{C_2}}{100_{C_2}}$ 3) $\dfrac{31_{C_2}}{100_{C_2}}$ 4) $1-\dfrac{31_{C_2}}{100_{C_2}}$

57. Two events A and B have the probabilities 0.25 and 0.5 respectively. The probability that both A and B occur simultaneously is 0.14. the probability that neither A nor B occurs is

1) 0.39 2) 0.29 3) 0.19 4) 0.5

58. The value of C for which $P(X=k)=CK^2$ can serve the probability function of a random variable X that takes values $0,1,2,3,4$ is

1) $\dfrac{1}{30}$ 2) $\dfrac{1}{10}$ 3) $\dfrac{1}{3}$ 4) $\dfrac{1}{15}$

59. The probability of a man hitting the target is $\dfrac{1}{4}$. If the fires 7 times the probability of his hitting the target aleast once is

1) $\left(\dfrac{3}{4}\right)^7$ 2) $1-\left(\dfrac{3}{4}\right)^7$ 3) $\left(\dfrac{1}{4}\right)^7$ 4) $1-\left(\dfrac{1}{4}\right)^7$

60. If X is a poisson variate with parameter $\dfrac{3}{2}$, find $P(X \geq 2)$

1) $\dfrac{5}{2}e^{\frac{-3}{2}}$ 2) $1-\dfrac{5}{2}e^{\frac{-3}{2}}$ 3) $1-e^{\frac{-3}{2}}$ 4) $e^{\frac{-3}{2}}$

61. If the two circles $x^2+y^2+2gx+c=0$ and $x^2+y^2-2fy-c=0$ have equal radius then locus of (g, f) is

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

62. $y=Ae^x+Be^{-2x}$ satisfies which of the differential equation is

1) $\dfrac{d^2y}{dx^2}+\dfrac{dy}{dx}-2y=0$ 2) $\dfrac{d^2y}{dx^2}-\dfrac{2dy}{dx}+y=0$ 3) $\dfrac{d^2y}{dx^2}-\dfrac{2dy}{dx}-y=0$ 4) $\dfrac{dy^2}{dx^2}-\dfrac{dy}{dx}+2y=0$

63. The slope of the radical axis of the circles $(x+2)^2+(y+3)^2=25$ and $(x+1)^2+(y-1)^2=25$ is

1) $-\dfrac{1}{4}$ 2) $\dfrac{1}{4}$ 3) -4 4) $-\dfrac{1}{2}$

64. Two circles whose radii are r and R and whose distance between the centres is ' d ' cut each other orthogonally. Then the length of their common chord is

1) $\dfrac{2rR}{\sqrt{r+R}}$ 2) $\dfrac{rR}{\sqrt{r^2+R^2}}$ 3) $\dfrac{2rR}{\sqrt{r^2+R^2}}$ 4) $\dfrac{rR}{r^2+R^2}$

65. The focus and directrix of parabola are $(1,2)$ and $2x-3y+1=0$. Then the equation of the tangent at the vertex is

1) $4x-6y+5=0$ 2) $4x-6y+9=0$ 3) $4x-6y+11=0$ 4) $4x-6y+7=0$

66. Which of the following equations represents a parabola

1) $(x-y)^3=3$ 2) $\frac{x}{y}-\frac{y}{x}=0$ 3) $\frac{x}{y}+\frac{4}{x}=0$ 4) $(x+y)^2+3=0$

67. If a chord $4y=3x-48$ subtends an angle θ at the vertex of the parabola $y^2=64x$ then $\tan\theta$

1) $\frac{10}{9}$ 2) $\frac{13}{9}$ 3) $\frac{20}{9}$ 4) $\frac{16}{9}$

68. Given two fixed points A and B and AB = 6. Then simplest form of the equation to the locus of P such that PA+PB =8 is

1) $\frac{x^2}{16}+\frac{y^2}{7}=1$ 2) $\frac{x^2}{16}+\frac{y^2}{9}=1$ 3) $\frac{x^2}{9}+\frac{y^2}{16}=1$ 4) $\frac{x^2}{12}+\frac{y^2}{21}=1$

69. The distances from the foci to a points $P(x_1,y_1)$ on the ellipse $\frac{x^2}{9}+\frac{y^2}{25}=1$ are

4) $4\pm\frac{2}{3}y_1$ 2) $5\pm\frac{4}{5}y_1$ 3) $5\pm\frac{4}{5}x_1$ 4) $4\pm\frac{2}{3}x_1$

70. The locus of point of intersection of perpendicular tangents to the ellipse $\frac{(x-1)^2}{16}+\frac{(y-2)^2}{9}=1$ is

1) $(x-1)^2+(y-2)^2=25$ 2) $(x-1)^2+(y-2)^2=7$

3) $(x+1)^2+(y+2)^2=25$ 4) $(x+1)^2+(y+2)^2=7$

71. Find the value of' k ' if the angle between the straight lines represented by $2x^2+5xy+3y^2+6x+7y+4=0$ is $\tan^{-1}k$

1) $\pm\frac{1}{5}$ 2) $\frac{1}{5}$ only 3) $-\frac{1}{5}$ only 4) 0

72. The points on the ellipse $\frac{x^2}{25}+\frac{y^2}{9}=1$ whose eccentric angles differ by a right angle are

1) $(5\cos\theta,3\sin\theta),(5\sin\theta,3\cos\theta)$ 2) $(5\cos\theta,3\sin\theta),(-5\sin\theta,3\cos\theta)$

3) $(5\cos\theta,-3\sin\theta),(5\sin\theta,3\cos\theta)$ 4) $(25\cos\theta,-3\sin\theta),(5\sin\theta,3\cos\theta)$

73. If the latusrectum of a hyperbola subtends a right angle at its centre then its $e=$

1) $\frac{\sqrt{3}+1}{2}$ 2) $\frac{\sqrt{7}+1}{2}$ 3) $\frac{\sqrt{5}+1}{2}$ 4) $\frac{\sqrt{5}}{2}$

74. Equation of one of the tangents passing through $(2,8)$ to the hyperbola $5x^2-y^2=5$ is

1) $3x+y-14=0$ 2) $3x-y+2=0$ 3) $x+y+3=0$ 4) $x-y+6=0$

75. $\int\frac{\cos x}{\cos 3x}dx=$

1) $\frac{1}{2\sqrt{3}}\log\left|\frac{1+\tan x}{1-\tan x}\right|+c$ 2) $\frac{1}{2\sqrt{3}}\log\left|\frac{1+\sqrt{3}\tan x}{1-\sqrt{3}\tan x}\right|+c$

3) $\frac{1}{\sqrt{3}}\log\left|\frac{1+\sqrt{3}\tan x}{1-\sqrt{3}\tan x}\right|+c$ 4) $\frac{2}{\sqrt{3}}\log\left|\frac{1-\sqrt{3}\tan x}{1+\sqrt{3}\tan x}\right|+c$

76. $\int x^{1/3}\left(2+x^{2/3}\right)^{1/4}dx$ is equal to

1) $\frac{2}{3}\left(2+x^{2/3}\right)^{9/4}+\frac{12}{5}\left(2+x^{2/3}\right)^{5/4}+c$ 2) $\frac{2}{3}\left(2+x^{2/3}\right)^{9/4}-\frac{12}{5}\left(2+x^{2/3}\right)^{5/4}+c$

3) $\frac{1}{3}\left(2+x^{2/3}\right)^{9/4}-\frac{12}{5}\left(2+x^{2/3}\right)^{5/4}+c$ 4) $\frac{1}{3}\left(2+x^{2/3}\right)^{9/4}+\frac{12}{5}\left(2+x^{2/3}\right)^{5/4}+c$

77. If $\int_{\sqrt{2}}^{x} \frac{dx}{x\sqrt{x^2-1}} = \frac{\pi}{12}$, then $x =$

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

78. $\lim_{n\to\infty} \sum_{r=1}^{n} \frac{1}{\sqrt{4n^2-r^2}}$

1) $\frac{\pi}{2}$ 2) $\frac{\pi}{3}$ 3) $\frac{\pi}{6}$ 4) $\frac{\pi}{5}$

79. The area bounded by the lines $y = 2+x,\ y = 2-x$ and $x = 2$ is

1) 3 2) 4 3) 8 4) 16

80. I.F of $\left(1+x^3\right)\frac{dy}{dx} + 3x^2 y = \sin^2 x$

1) $1+x^3$ 2) $\frac{1}{1+x^3}$ 3) $3x^2$ 4) $\frac{1}{x^3}$

PHYSICS

81. If the determine formula of energy X Speed is $\left[M^a L^b T^c\right]$ then a, b , c are

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

82. An aero plane flies 400m north and 300m south and flies 1200m upward, then net displacement is

1) 1400m 2) 1500m 3) 1200m 4)1100m

83. The dot product of unit vectors $\hat{n}_1$ *and* $\hat{n}_2$ that are parallel to $5\hat{i}+12\hat{j}$ *and* $3\hat{i}+4\hat{j}$ respectively is

1) 63/65 2) 63 3) 63/4225 4) 63/845

84. A book is lying on a table. What is the angle between the normal reaction acting on the book on the table and the weight of the book?

1) 0^0 2) 450 3) 90^0 4) 180^0

85. The potential energy of an object is $u(x) = (5x^2 - 4x^3)J$ where x is the position in meter . The position at which the force becomes zero is

1) 1/2 m 2) 5/6 m 3) 1/3 m 4) 2/3 m

86. A particle of mass m_1 collides with a particle of mass m_2 at rest after the elastic collision the two particles moves at an angle of 90^0 with respect to each other. The ratio m_2 / m_1 is

1) 1.0 2) 1.5 3) 2.0 4) 2.5

87. In carbon monide molecular the carbon and the oxygen atoms are separated by distance $1.2A^0$. The distance of the centre of mass from the carbon atom is

1) $0.48A^0$ 2) $0.51A^0$ 3) $0.56A^0$ 4) $0.69A^0$

88. Three point masses each of mass m are placed at the cornes of an c quilateral triangle of side b, the moment of inertia of the system about an axis coinciding with one side of the triangle is

1) $3mb^2$ 2) mb^2 3) $\left(\frac{3}{4}\right)mb^2$ 4) $\left(\frac{2}{3}\right)mb^2$

89. The orbital period of geostationary satellite is

1) 2 hr 2) 5 hr 3) 24 hr 4) 12 hr

90. A pendulum is oscillating at a frequency of 8 Hz. Suddenly the string of the pendulum is clamped at its midpoint the new frequency of oscillation is

1) 16 Hz 2) 13.8 Hz 3) 11.28 Hz 4) 5.7 Hz

91. Three wires A , B,C made of different materials alongated by 1.5,2.5,3.5mm under a load of 5 kg. The diameters of the wires are same. The most elastic material is

1) A 2) B 3) C 4) All of the above

92. Clouds appear to float in air due to

1) low density 2) air current 3) viscosity of air 4) Buoyancy

93. A rain drop of radius r is falling through air starting from rest The work done by all the forces on the drop, when it attained terminal velocity ,is proportional to

1) r^3 2) r^7 3) r^5 4) r^4

94. A soap bubble of initial radius 'R' is to be blown up. The surface tension of the soap film is T. The surface energy needed to double the diameter of the bubble is

1) $12\pi R^2T$ 2) $4\pi R^2T$ 3) $16\pi R^2T$ 4) $24\pi R^2T$

95. When 50 g of water at 10^0C is mixed with 50g of water at 100^0C. The resultant temperature is

1) 80^0C 2) 55^0C 3) 25^0C 4) 45^0C

96. The door an operating refrigerator is kept open as a result the temperature of the room will

1) remains unchanged 2) increase 3)decrease 4) depth on the contents inside the refrigerator

97. A diatonic gas (γ =1.4) does 300J work when it is expanded isobarically. The heat given to the gas in this process is

1) 1050 J 2) 950 J 3) 600 J 4) 550 J

98. Temperature of a cold reservoir of a Carnot engine is 127^0C. If the efficiency of the Carnot engine is 20% then the temperature of the hot reservoir is

1) 500^0C 2) 227^0C 3) 273^0C 4) 400^0C

99. If a gas has 'n' degrees of forcedown. Then the ratio of $\frac{CP}{CV}$ is

1) $\frac{n+2}{2}$ 2) $\frac{2n+1}{n}$ 3) $\left(\frac{n+2}{n}\right)$ 4) $\frac{n+4}{2n}$

100. Two closed pipes have the same fundamental frequency. One is filled with oxygen and the other with hydrogen at the same temperature. Ratio of their length respectively is

1) 1:4 2) 4:1 3) 1:2 4) 2:1

101. A ray of light incident at 30^0 from a medium of refractive index 2 into a medium of refractive index 1. Then angle of refraction is.

1) 30^0 2) 60^0 3) 45^0 4) 90^0

102. Two Convex lenses of focal lengths f1 and f2 from images with magnification m1 and m2, when used individually for an object kept at the same distance from the lenses . then f1\f2 is.

1) $\frac{m_1(1-m_1)}{m_2(1-m_2)}$ 2) $\frac{m_1(m_2-1)}{m_2(m_1-1)}$ 3) $\frac{m_2(1-m_1)}{m_1(1-m_2)}$ 4) $\frac{m_2(1-m_2)}{m_1(1-m_1)}$

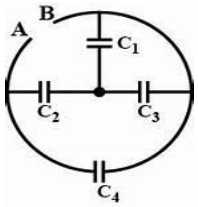
103. In a young's double slit experiment if the slit separation is twice the wave length of light used then the maximum number of inference maxima is.

1) 2 2) 3 3)5 4)7

104. A particle of mass m and charge q travelling with a velocity V along the x-axis enters a uniform electric Filed $\overline{E}$ directed along the Y-axis . what will be the trajectory of the particle?

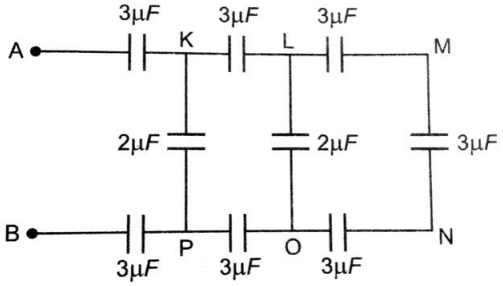
1) circular 2) Elliptical 3) parabolic 4) Helical

105. In the arrangement of capacitors shows in the fig. If each capacitor is 9PF, then the effective capacitors between the points A and B is



1)10 PF 2) 15 PF 3) 20 PF 4) 5 PF

106. The equivalent capacitance between A and B in the given circuit is



1) 3 μF 2) 1 μF 3) 2 μF 4) 1.5 μF

107. A cell can supply current of 1A and 0.5A via resistances of 2.5 Ω 10 Ω respectively. The internal resistance of the cell is.
1)2 Ω 2)3 Ω 3) 4 Ω 4) 5 Ω

108. Balancing point of a potentiometer shifts from a length of 60 Cm to 40 cm by shunting the cell with a 40m resistance what is the internal resistance of the cell?
1) 1 Ω 2) 2 Ω 3) 4 Ω 4) 6 Ω

109. A charged particle moves through a magnetic field perpendicular to its direction then
1) Kinetic energy changes but the momentum is constant
2) The momentum changes but the kinetic Energy is constant.
3) Both momentum and Kinetic energy of the particles are not constant.
4) Both momentum and kinetic energy of the particles are constant.

110. A voltmeter of 250 mv range has a resistance of 10 Ω is converted into an ammeter of 250 mA range. The value of necessary shunt is (nearly).
1)2 Ω 2) 0.1 Ω 3) 1 Ω 4) 10 Ω

111. The current in a coil changes from 3A to 1A in 0.1 sec. in coil of self-inductance of 8mH. The emf induced in the coil is
1) 16V 2) $1.6\times10^{-2}V$ 3) $16\times10^{-2}V$ 4) 2 V

112. The reactance of an inductor at 50 HZ is 10 Ω. The reactance of it at 200Hz
1) 10 Ω 2 40 Ω 4) 2.5 Ω 4 20 Ω

113. Practically ozone layer abords radiations of wave length.
1) less than $3\times10^{-7}m$ 2) greater than $3\times10^{-7}m$ 3) equal to $3\times10^{-7}m$ 4) all of the above.

114. If the wave length of a photon is 4000 A^0. Then its energy will be ……
1) $4.975\times10^{-19}J$ 2) $5.95\times10^{-19}J$ 3) $3.95\times10^{-19}J$ 4) $6.95\times10^{-19}J$

115. A photon of energy 4eV imparts all its energy to an electron that leaves a metal surface with1.1 ev of kinetic energy. The work function of the metal is.
1) 2.9 eV 2) 5.1 eV 3) 3.64 eV 4) 4.4 eV

116. The ratio of longest wave length lines in the Balmer and paschen series of hydrogen spectrum is.
1) $\frac{5}{36}$ 2) $\frac{7}{20}$ 3) $\frac{7}{144}$ 4) $\frac{5}{27}$

117. Which of the following is a emitted , when $^{239}_{94}Pu$ Decays into $_{94}Pu^{235}$?
1) Gamma ray 2) Neutron 3) Electron 4) Alpha particle.

118. For an n-p-n transistor structure which of the following statements is Not True?
1) Emitter is heavily doped and moderate in size
2) Base is lightly doped and thin in size
3) Collector is lightly doped and large in size
4) Collector is moderately doped and large in size

119. The logic operation performed by the following circuit is

1) NOR 2) AND 4) NAND 4) OR

120. The frequency suitable beyond the horizon communication using sky ware is
11)10 KHz 2) 10 MHz 3) 1 GHz 4) 1000GHz

CHEMISTRY

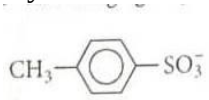
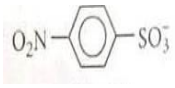
121. (*I*) $H_2O+O_3\rightarrow H_2O+2O_2$
(*II*) $H_2O_2+Ag_2O\rightarrow 2Ag+H_2O+O_2$
Role of hydrogen peroxide in the above reactions is respectively

1) Oxidising in (I) and reducing in (II) 2) reducing in (I) and oxidising in (II)
3) reducing in (I) and (II) 4) oxidising in (I) and (II)

122. If 10^{21} molecules are removed from 200 mg of CO_2, the number of moles of CO_2 left is

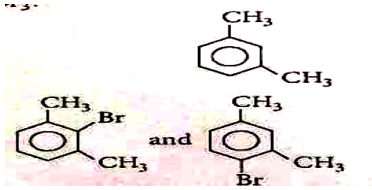
1) 2.88×10^{-3} 2) 28.8×10^{-3} 3) 0.288×10^{-3} 4) 1.66×10^{-2}

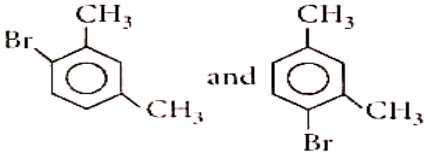
123. Leaving tendency of the following groups in decreasing order is

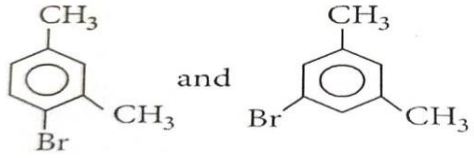
I. CI^- II.  III. OH^- IV. 

1) $IV > II > I > III$ 2) $I > II > III > IV$
3) $II > IV > I > III$ 4) $I > IV > II > III$

124. What products are formed when the following compound is treated with Br_2 in the presence of $FeBr_3$

1) 

2) 

3) 

4) None of these

125. *T e ions* $O^{2-}, F^-, Na^+, Mg^{2+}$ *and* AI^{3+} are isoelectronic. T eir ionic radii show

1) a decrease from O^{2-} *to* F^- and then increase from Na^+ *to* AI^{3+}
2) a significant increase from O^{2-} *to* AI^{3+}
3) a significant decrease from O^{2-} *to* AI^{3+}
4) an increase from O^{2-} *to* F^- and then decrease from Na^+ *to* AI^{3+}.

126. Acidity of diprotic acids in aqueous solutions increases in the order

1) $H_2S < H_2Se < H_2Te$ 2) $H_2Se < H_2S < H_2Te$
3) $H_2Te < H_2S < H_2Se$ 4) $H_2Se < H_2Te < H_2S$

127. The correct order of increasing basicity of the given conjugate bases $(R = CH_3)$ *is*

(*A*) $RCOO^- < HC \equiv C^- < NH_2^- < R^-$
(*B*) $RCOO^- < HC \equiv C^- < R^- < NH_2^-$
(*C*) $R^- < HC \equiv C^- < RCOO^- < NH_2^-$
(*D*) $RCOO^- < NH_2^- < HC \equiv C^- < R^-$

128. A mong the following mixtures, dipole-dipole as the major interaction is present in
1) benzene and ethanol
2) acetonitrile and acetone
3) KCI and water
4) benzene and carbon tetrachloride.

129. The enthalpy of neutralization of NH_4OH and CH_3COOH is $-10.5\,kcal\ mol^{-1}$ and enthalpy of Neutralization of CH_3COOH with strong base is $-12.5\,kcal\ mol^{-1}$. *T* e enthalpy of ionization of NH_4OH Wiil be

1) $4.0\,kcal\ mol^{-1}$ 2) $3.0\,kcal\ mol^{-1}$ 3) $2.0\,kcal\ mol^{-1}$ 4) $3.2\,kcal\ mol^{-1}$

130. The correct order of the oxidation states of nitrogen in $NO, NO_2,$ *and* N_2O_3 *is*

1) $NO_2 < NO < N_2O_3 < N_2O$ 2) $N_2O < NO < N_2O_3 < NO$
3) $O_2 < N_2O_3 < NO < N_2O$ 4) $N_2O < N_2O_3 < NO < N_2O$

131. When $LiNO_3$ is heated, it gives oxide, Li_2O ,where as other alkali metal nitrates decompose to give

Corresponding

1) nitrite 2) peroxide 3) both nitrite and oxide 4) none of these

132. An explosion takes place when $conc.H_2SO_4$ is added to $KMnO_4$ which of the following is formed?

1) Mn_2O_7 2) $Mn\ O_2$ 3) $Mn\ SO_4$ 4) Mn_2O_3

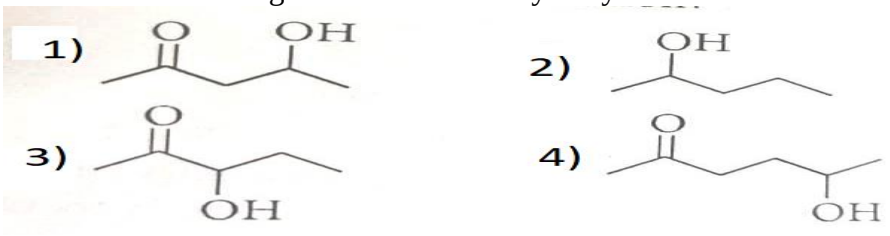
133. Antiseptics and disinfectants either kill or prevent growth of micro-organisms. Identify which of the following Statement is not true

1) Dilute solution of boric acid and hydrogen peroxide are strong antiseptics.
2) Disinfectants harm the tissues.
3) $A\ 0.2\%$ solution of phenol is an antiseptic while 1.0% solution is disinfectant.
4) Tincture of iodine is a powerful antiseptic.

134. When a liquid X is treated with Na_2CO_3 solution, a mixture of two salts Y and Z are produced in the solution. The mixture on acidification with sulphuric acid and distillation, produces the liquid X again Identify X.

1) Cl_2 2) Br_2 3) Hg 4) l_2

135. Which of the following will be most readily dehydrated in acidic condition



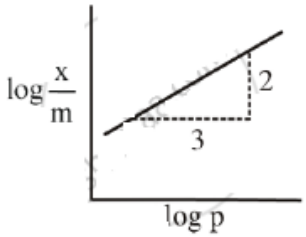
136. An element occurs in two crystalline forms $\alpha\ and\ \beta$. α-form has a fcc structure with $a = 3.68\ A$ and $\beta - form$ has a bcc structure with $a = 2.92\ A$ calculate the ratio of their densities.

1) 1:1 2) 1:2 3) 2:1 4) 2:3

137. The increasing order of atomic radii of the following group 13 elements is

1) $Al < Ga < In < TI$ 2) $Ga < Al < In < TI$ 3) $Al < In < Ga < TI$ 4) $Al < Ga < TI < In$

138. Adsorption of a gas follows Freundlich adsorption isotherm x is the mass of the gas adsorption on mass m of the adsorbent. The plot of $\log\frac{x}{m}$ versus log P is shown in the given graph $\frac{x}{m}$ is proportional to



1) $p^{2/3}$ 2) $p^{3/2}$ 3) p^3 4) p^2

139. $SiCl_4$ is easily hydrolysed but CCI_4 is not. This is because

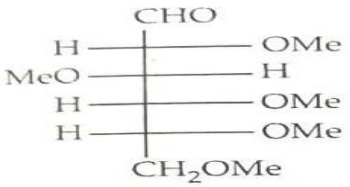
1) bonding in $SiCI_4$ is ionic
2) silicon is non-metallic
3) silicon can extend its coordination number beyond four but carbon cannot
4) silicon can form hydrogen bonds but carbon cannot.

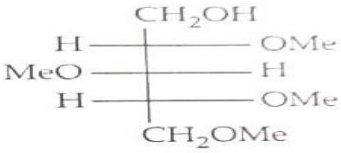
140. In which of the following coordination entities the magnitude of Δ_0 (CFSE in octahedral field) will be maximum

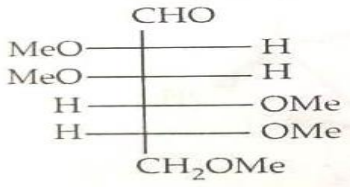
1) $\left[Co\left(C_2O_4\right)_3\right]^{3-}$ 2) $\left[Co\left(H_2O\right)_6\right]^{3-}$ 3) $\left[Co\left(NH_3\right)_6\right]^{3+}$ 4) $\left[Co\left(CN\right)_6\right]^{3-}$

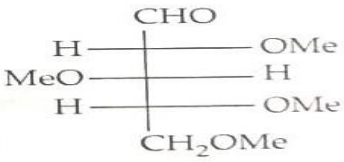
141. D-glucose $\xrightarrow[HCI]{CH_3CH_2SH} \xrightarrow[NaOH]{(CH_3)_2SO_4} \xrightarrow[CdCO_3]{HgCI_2} X$

The final product X is

1) 

2) 

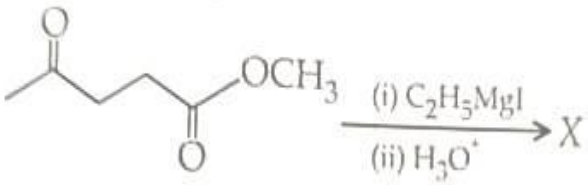
3) 

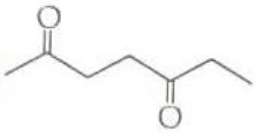
4) 

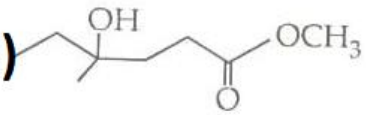
142. An amount of solid NH_4HS is placed in a flask already containing ammonia gas at a certain temperature and 0.50 atm Pressure. Ammonium hydrogen sulphide decomposes to yield NH_3 and H_2S gases in the flask. When the decomposition reaction reaches equilibrium, the total pressure in the flask rises to 0.84 atm. The Equilibrium constant for NH_4HS decomposition at this temperature is

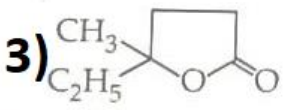
1) 0.30 2) 0.18 3) 0.17 4) 0.11

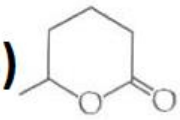
143. Give the structure of the compound X formed in the following reaction



1) 

2) 

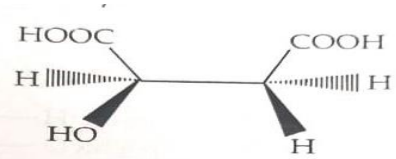
3) 

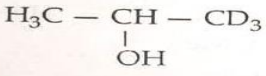
4) 

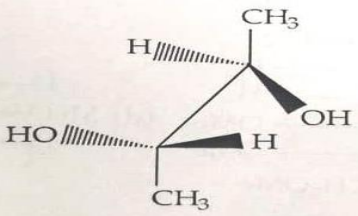
144. If S_1, S_2, S_3 *and* S_4 are the solubilities of $AgCI$ in water, in 0.01 M $CaCI_2$,in 0.01 M $NaCI$ and in 0.05M $AgNO_3$ respectively at a certain temperature, the correct order of solubility is

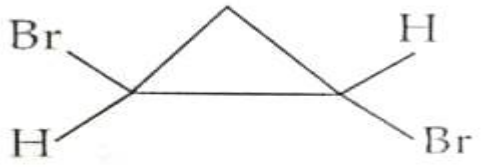
1) $S_1 > S_2 > S_3 > S_4$ 2) $S_1 > S_3 > S_2 > S_4$ 3) $S_1 > S_2 = S_3 > S_4$ 4) $S_1 > S_3 > S_4 > S_2$

145. Which of the following molecules will not show optical activity

1) 

2) 

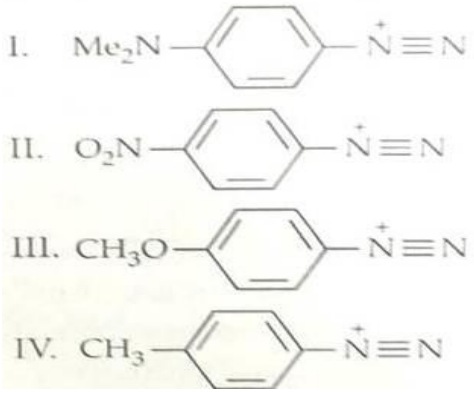
3) 

4) 

146. In Bohr series of lines of hydrogen spectrum, the third line from the red end corresponds to which one of the following inter orbit jumps of the electron, for Bohr orbits in an atom of hydrogen?

1) $3 \rightarrow 2$ 2) $5 \rightarrow 2$ 3) $4 \rightarrow 1$ 4) $2 \rightarrow 5$

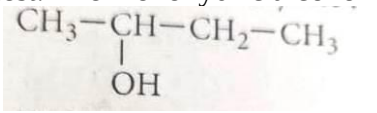
147. Consider the following ions:

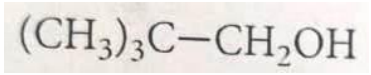


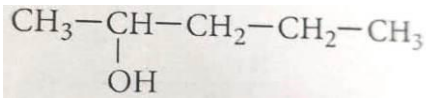
The reactivity order of these ions towards azo coupling reaction under similar conditions is

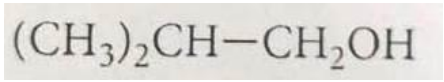
1) $I < IV < II < III$ 2) $I < III < IV < II$ 3) $III < I < II < IV$ 4) $III < I < IV < II$

148. 0.44 g of a monohydric alcohol when added to methyl magnesium iodide in ether liberates 112 cm^3 of Methane at $S.T.P$. with PCC the same alcohol forms a carbonyl compound that answers silver mirror test. The monohydric alcohol is

1) 

2) 

3) 

4) 

149. Consider a reaction $aG + bH \rightarrow products$. When concentration of both the reactants G and H is doubled. The rate increases eight times. However, when concentration of G is doubled keeping the concentration of H Fixed. The rate is doubled. The overall order of the reaction is

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

150. Match the column I with column II and mark the appropriate choice.

Column I	Column II
1) Quick Lime	(I)setting fractured bones
2) plaster of Paris	(II)A constituent of chewing gum
3) Slaked lime	(III) manufacture of belching power
4) lime store	(IV) Manufacture of dyestuffs

(A) $(A) \rightarrow (i), (B) \rightarrow (iv), (C) \rightarrow (ii), (D) \rightarrow (iii)$

(B) $(A) \rightarrow (iv), (B) \rightarrow (i), (C) \rightarrow (iii), (D) \rightarrow (ii)$

(C) $(A) \rightarrow (ii), (B) \rightarrow (iii), (C) \rightarrow (i), (D) \rightarrow (iv)$

(D) $(A) \rightarrow (iii), (B) \rightarrow (ii), (C) \rightarrow (iv), (D) \rightarrow (i)$

151. The order of compounds of their reactivity towards HCN is

1) acetaldehyde <acetone<methyl tert-butyl ketone<di-tert-butyl ketone
2) di-tert-butyl ketone < methyl tert – butyl ketone < acetone < acetaldehyde
3) di-tert-butyl ketone < acetone <methyl tert-butyl ketone < acetaldehyde
4) acetone < acetaldehyde < di-tert-butyl ketone < methyl tert-butyl ketone.

152. which of the following is a correct method to convert P-toluidine to p-toluic acid

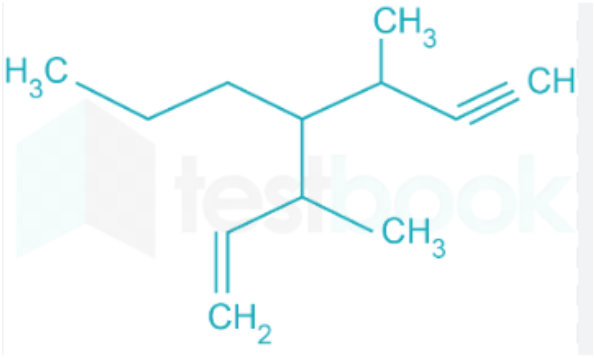
1) Diazotisation, CuCN , H_2 / pd

2) $CHCl_3 / NaOH, KCN, Sn / HCl$

3) $Diazotisation, CuCN / KCN, H_2O / H^+$

4) $Diazotisation, NaCN, NaOH$

153 . The IUPAC name for the following compound is



1) 3-methyl-4-(3-methylprop-1-enyl)-heptyne 2)3,5-dimethyl-4-propylhept-6-en-l-yne

3)3-methyl-4-(1-methylprop-2-ynyl)-1-heptene 4) 3,5-dimethyl-4-propylhept-1-en-6-yne

154. The main reactions occurring in blast furnace during extraction of iron from haematite are

(I) $Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$

(II) $FeO + SiO_2 \rightarrow FeSiO_3$

(III) $Fe_2O_3 + 3C \rightarrow 2Fe + 3CO$

(IV) $CaO + SiO_2 \rightarrow CaSiO_3$

1) $I, II \text{ and } III$ 2) $I \text{ and } IV$ 3) $I, III \text{ and } IV$ 4) $II \text{ and } III$

155. A dihaloalkane 'X' having formula $C_3H_6CI_2$,on hydrolysis gives a compound, that can reduce Tollen's reagent. The compound 'X' is

1) 1,2-dichloropropane

2) 1,1-dichloropropane

3) 1,3-dichloropropane

4) 2,2-dichloropropane

156. An organic compound is estimated through Dumas method and was found to evolved 6 moles of CO_2 ,4 moles of H_2O and 1 mole of nitrogen gas. The formula of the compound is

1) C_6H_8N 2) $C_{12}H_8N$ 3) $C_{12}H_8N_2$ 4) $C_6H_8N_2$

157. Among the following species, identify the isostructural pairs $NF_3, NO_3^-, BF_3, H_3O^+, HN_3$

1) $\left[NF_3, NO_3^-\right] and \left[BF_3, H_3O^+\right]$ 2) $\left[NF_3, HN_3\right] and \left[NO_3^-, BF_3\right]$

3) $\left[NF_3, H_3O^+\right] and \left[NO_3^-, BF_3\right]$ 4) $\left[NF_3, H_3O^+\right] and \left[HN_3, BF_3\right]$

158. Vapour pressure of dilute aqueous solution of glucose is 750 mm of mercury at 373 K. The mole fraction of Solute is

1) 1/76 2) 1/7.6 3) 1/38 4) 1/10

159. The Principal products obtained on heating iodine with concentrated caustic soda solution are

1) $NaOI + NaI$ 2) $NaIO_3 + NaI$ 3) $NaOI + NaIO_3 + NaI$ 4) $NaIO_4 + NaI$

160. Formation of polyethylene from calcium carbide takes place as follows:

$CaC_2 + 2H_2O \rightarrow Ca(OH)_2 + C_2H_2$

$C_2H_2 + H_2 \rightarrow C_2H_4$

$nC_2H_4 \rightarrow (-CH_2 - CH_2 -)_n$

The amount of polyethylene obtained from 64 kg of CaC_2 *is*

1) 7 *kg* 2) 14 *kg* 3) 21 *kg* 4) 28 *kg*

KEY SHEET

MATHEMATICS

1	2	3	4	5	6	7	8	9	10
3	4	1	2	4	1	2	2	3	2
11	12	13	14	15	16	17	18	19	20
1	1	4	1	1	1	2	3	1	4
21	22	23	24	25	26	27	28	29	30
2	1	2	4	1	2	2	4	3	1
31	32	33	34	35	36	37	38	39	40
1	3	4	2	1	3	2	2	2	3
41	42	43	44	45	46	47	48	49	50
2	1	1	3	1	4	4	2	1	1
51	52	53	54	55	56	57	58	59	60
3	2	1	3	3	4	1	1	2	2
61	62	63	64	65	66	67	68	69	70
2	1	1	3	1	3	3	1	2	1
71	72	73	74	75	76	77	78	79	80
1	2	3	2	2	2	3	3	2	1

PHYSICS									
81	82	83.	84	85	86	87	88	89	90
1	3	1	4	2	2	3	3	3	3
91	92	93	94	95	96	97	98	99	100
1	4	2	4	2	2	1	2	3	1
101	102	103	104	105	106	107	108	109	110
3	2	1	3	2	2	4	2	1	3
111	112	113	114	115	116	117	118	119	120
3	2	1	1	1	2	4	3	2	2
CHEMISTRY									
121	122	123	124	125	126	127	128	129	130
3	1	1	2	3	1	1	2	3	4
131	132	133	134	135	136	137	138	139	140
1	1	1	2	1	1	3	1	3	4
141	142	143	144	145	146	147	148	149	150
1	4	3	2	3	2	2	2	4	2
151	152	153	154	155	156	157	158	159	160
2	3	3	2	2	2	3	1	2	4