FINAL ANSWER KEY

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1. Let A and B denote the sets of students in a school who play cricket and football respectively. If $n(A) = 45, n(B) = 35$ and $n(A \cap B = 13)$, then $\mathrm{n}((A \cap B)' \cap (A \cup B))$=

A) 43

B) 48

C) 50

D) 52

E) 54

Correct Answer : Option E

2. Let $f(x) = \sqrt{7 - x}$ and $g(x) = \sqrt{x - 5}$. Then the domain of the function $h(x) = f(x)g(x)$ is

A) [5,7]

B) $(-\infty, 7]$

C) $[5, \infty)$

D) [-7,-5]

E) $(-\infty, \infty)$

Correct Answer : Option A

3. Let A be the set of odd integers in [0,10] and let B be the set of prime numbers in [0,10] .
If $R = \{(a, b) \in A \times B : a + b \ is \ odd\}$, then n(R)=

A) 1

B) 2

C) 3

D) 4

E) 5

Correct Answer : Option E

4. Let $f: \left[\frac{-\pi}{2}, \frac{\pi}{2}\right] \to (-\infty, \infty)$ be given by $f(x) = tan(x)sin(x)$. Then $f(x)$ is

A) an even function but not 1-1 function

B) an odd function

C) an even function

D) an odd function but not an onto function

E) 1-1 and an odd function

Correct Answer : Option C

5. Let $z = \frac{a - \frac{i}{2}}{i - 2}$, where a is a real number and $i = \sqrt{-1}$. If Im(z)=0 , then the value of a is equal to

A) 1
B) 2
C) 3
D) 4
E) 0

Correct Answer : Option A

6. In a complex plane, if two vertices of an equilateral triangle are at $-3(1+i)$ and $3(1 - i)$, then the area of the triangle (in sq.units) is equal to

A) 18
B) $9\sqrt{3}$
C) $6\sqrt{3}$
D) $3\sqrt{3}$
E) 9

Correct Answer : Option B

7. The value of $\left[\frac{5i}{(3+i)(3-i)}\right]^{2026}$ is equal to

A) $\frac{1}{2^{2026}}$
B) $\frac{1}{2^{1013}}$
C) $\frac{-1}{2^{1013}}$
D) $\frac{i}{2^{2026}}$
E) $\frac{-1}{2^{2026}}$

Correct Answer : Option E

8. If $z \mid z \mid = 24 + 7i$, where z is a complex number, then the value of |z| is equal to

A) 5
B) 7
C) 12
D) 15
E) 25

Correct Answer : Option A

9. A geometric series has common ratio $\frac{1}{3}$. If the sum of first four terms is 200, then the first term is

A) 90
B) 100
C) 115
D) 145
E) 135

Correct Answer : Option E

10. The sum of the second and third terms of a G.P. is 8 and the fourth term is 4. The common ratio $r \neq 1$ is

A) $\frac{-1}{2}$
B) $\frac{1}{2}$
C) $\frac{-1}{4}$
D) $\frac{-1}{3}$
E) $\frac{1}{4}$

Correct Answer : Option A

11. If $\sum_{k=1}^{n} \log_{10}\left(5^{k}\right) = 661\log_{10}(5)$, then the value of n is equal to

A) 8
B) 9
C) 10
D) 11
E) 12

Correct Answer : Option D

12. The first and the twentieth terms of a G.P. are 512 and $\frac{1}{1024}$ respectively. Then the common ratio is

A) $\frac{1}{2}$
B) 2
C) $\frac{1}{4}$
D) 4

E) $\frac{1}{8}$

Correct Answer : Option A

13. If *k*, 6 and *k+5* are the first three terms of a geometric series, then the possible values of the common ratio are

A) $\frac{1}{2}, 2$

B) 2,-2

C) $\frac{1}{3}, 3$

D) $\frac{3}{2}, \frac{-2}{3}$

E) $\frac{2}{3}, \frac{-3}{2}$

Correct Answer : Option D

14. In a business meeting, each person shakes hands with each other person once. A person arrives after 5 people have left and he shakes hands only with those present. If the total number of handshakes is exactly 100, then the initial number of people in the party, is

A) 12

B) 13

C) 14

D) 15

E) 16

Correct Answer : Option C

15. The number of 3-digit numbers greater than 500, that can be formed using the digits 3, 4, 5, and 7, with repetition, is

A) 32

B) 16

C) 18

D) 12

E) 24

Correct Answer : Option A

16. If ${}^{n}P_{5} = 360360$, then ${}^{n}C_{5} =$

A) 3030

B) 3330

C) 3300

D) 3000

E) 3003

Correct Answer : Option E

17. If the coefficient of x^4 in the binomial expansion of $(4x + a)^7$ is -1120 , then the value of a is equal to

A) $\frac{1}{2}$

B) $\frac{1}{4}$

C) $\frac{-1}{2}$

D) $\frac{1}{8}$

E) $\frac{-1}{8}$

Correct Answer : Option C

18. Let A and B be two square matrices each of order 3. If $|AB| = 21$ and $|A^{-1}| = -7$, then the value of $|B|$ is equal to

A) 3

B) -3

C) 147

D) -63

E) -147

Correct Answer : Option E

19. Let $A = \begin{pmatrix} 9 & 2 & k \\ 1 & -1 & -3 \\ k-1 & 1 & 3 \end{pmatrix}$ and $X = \begin{pmatrix} x \\ y \\ z \end{pmatrix}$. If the homogeneous system of simultaneous equations $AX = 0$ has a nontrivial solution, then the possible values of k are

A) 0,6

B) 0,3

C) 0,5

D) 0,1

E) 0,7

Correct Answer : Option A

20. Let $A = \begin{bmatrix} 3 & 5 \\ -2 & -3 \end{bmatrix}$. If $BA^2 = A$, where B is a 2×2 matrix, then $B =$

A) $\begin{bmatrix} -3 & -5 \\ 2 & 3 \end{bmatrix}$

B) $\begin{bmatrix} 3 & -5 \\ 2 & -3 \end{bmatrix}$

C) $\begin{bmatrix} 3 & -2 \\ 5 & -3 \end{bmatrix}$

D) $\begin{bmatrix} 3 & 2 \\ -5 & -3 \end{bmatrix}$

E) $\begin{bmatrix} 3 & 5 \\ -2 & -3 \end{bmatrix}$

Correct Answer : Option A

21. Let $f(x)=\begin{vmatrix} -1 & x & 3 \\ 0 & 1 & 2x \\ 1 & -1 & 1 \end{vmatrix}$. Then the value of $f(-1)$ is equal to

A) 6

B) -4

C) -2

D) 2

E) 0

Correct Answer : Option E

22. Let A and P be the area and perimeter of a rectangle respectively. The length and breadth of the rectangle are (x + 2) cm and (x − 2) cm. If $A \leq 140cm^2$ and $P \geq 20cm$, then the range of possible values of x is

A) [5,12]

B) [2,12]

C) [5,10]

D) [2,6]

E) [6,12]

Correct Answer : Option A

23. The set of all x satisfying the inequality $8 + 3x > 4(x - 3) + 2$ is

A) $(18, \infty)$

B) $(20, \infty)$

C) $(-\infty, 18)$

D) $(-\infty, 20)$

E) $(-20, 18)$

Correct Answer : Option C

24. If $\operatorname{cosec} t + \cot t = \frac{5}{2}$, then the value of $\tan t$ is equal to

A) $\frac{10}{21}$

B) $\frac{21}{20}$

C) $\frac{20}{21}$

D) $\frac{21}{10}$

E) $\frac{10}{42}$

Correct Answer : Option C

25. If $sin\,\theta = \frac{3}{5}$ and $cos\,\theta < 0$, then the value of $tan\,\theta$ is

A) $-\frac{3}{4}$

B) $-\frac{3}{5}$

C) $\frac{3}{4}$

D) $-\frac{4}{3}$

E) $\frac{4}{3}$

Correct Answer : Option A

26. $sin15^o sin45^o sin75^o =$

A) $\frac{\sqrt{2}}{4}$

B) $\frac{\sqrt{2}}{2}$

C) $\frac{\sqrt{2}}{8}$

D) $-\frac{\sqrt{2}}{8}$

E) $-\frac{\sqrt{2}}{4}$

Correct Answer : Option C

27. The value of $\sin\left(x + \frac{7\pi}{4}\right) + \sin\left(x - \frac{7\pi}{4}\right)$ is equal to

A) $\sqrt{2}sinx$

B) $-\sqrt{2}cosx$

C) $-\sqrt{2}sinx$

D) $\sqrt{2}cosx$

E) $-2cosx$

Correct Answer : Option A

28. If $5\pi - 6cos^{-1}\left(\sqrt{3}(2x-1)\right) = 0$, then the value of x is equal to

A) $\frac{1}{2}$

B) 2

C) $\frac{1}{4}$

D) 4

E) 0

Correct Answer : Option C

29. The value of $tan\left(tan^{-1}(3) + tan^{-1}(7)\right)$ is equal to

A) $-\frac{1}{2}$

B) $\frac{1}{2}$

C) $\frac{1}{5}$

D) $-\frac{1}{5}$

E) 0

Correct Answer : Option A

30. The value of x that satisfies the equation $sin^{-1}(x) = cos^{-1}\left(\frac{3x}{4}\right)$ is

A) $\frac{4}{5}$

B) $\frac{3}{5}$

C) $\frac{4}{9}$

D) $\frac{3}{9}$

E) $\frac{2}{5}$

Correct Answer : Option A

31. Let *O* be the origin and let *P* be a point on the line $x + \sqrt{3}y = 10$. If *OP* is perpendicular to the line, then the angle between *OP* and the *y*-axis is

A) 15^o

B) 30^o

C) 45^o

D) 60^o

E) 75^o

Correct Answer : Option B

32. Let *A*(-4,3),*B*(0,5) and *C*(-1,2) be three points. The equation of the straight line which passes through *C* and bisects the straight-line segment *AB* is

A) $y + 2x = 0$

B) $y - 2x + 2x = 0$

C) $y + 2x - 4 = 0$

D) $y + 2x + 4 = 0$

E) $y - 2x = 0$

Correct Answer : Option A

33. A point *C* lies on the perpendicular bisector of the straight-line segment joining the points *A(-3,-6)* and *B(13,-6)* . If the point *C* lies in the first quadrant and the distance between the point *C* and the midpoint of *AB* is 8 units, then the coordinates of *C* are

A) (5,1)

B) (5,2)

C) (5,3)

D) (5,4)

E) (5,5)

Correct Answer : Option B

34. The equation of a circle is $x^2 + y^2 + 6x - 8y - 24 = 0$. If a chord of the circle subtends an angle of 60^o at the centre of the circle, then the length of the chord is

A) 7 units

B) 6 units

C) 5 units

D) 8 units

E) 9 units

Correct Answer : Option A

35. If the eccentricity and the length of latus rectum of an ellipse are, respectively, $\frac{1}{5}$ and $\frac{48}{5}$, then the length of the major axis of the ellipse is

A) 5

B) 6

C) 8

D) 10

E) 12

Correct Answer : Option D

36. The coordinates of the focus of the parabola given by the equation $4y - x^2 + 4x - 12 = 0$ are

A) (2,3)
B) (3,2)
C) (3,3)
D) (3,7)
E) (7,2)

Correct Answer : Option A

37. The latus rectum of the hyperbola $\frac{(3x-7)^2}{9} - \frac{(4y+3)^2}{8} = 1$ is

A) $\frac{1}{2}$
B) $\frac{16}{3}$
C) 4
D) $\frac{4}{3}$
E) 1

Correct Answer : Option E

38. Let $|\vec{a}| = 6$ and $|\vec{b}| = 10$. If $\vec{a}$ and $\vec{b}$ make angles $25^o$and 85^o , respectively, with the *x*-axis, then the value of $|\vec{a} + \vec{b}|$ is equal to

A) 14
B) 12
C) 13
D) 11
E) 15

Correct Answer : Option A

39. The projection of $\vec{b}$ on $\vec{a}$ is 12. If the angle between $\vec{a}$ and $\vec{b}$ is 60^o , then $|\vec{b}|$=

A) 6
B) 12
C) 18
D) 20
E) 24

Correct Answer : Option E

40. Let $\vec{a} = 2\hat{\imath} + 2\hat{\jmath} - 5\hat{k}$ and $\vec{b} = 2\hat{\imath} + \hat{\jmath} + \alpha\ \hat{k}$. If $|\vec{a} + \vec{b}| = \sqrt{29}$. Then the possible values of α are

A) ± 2
B) ± 3
C) 3,7
D) ± 5
E) -3,-7

Correct Answer : Option C

41. If the position vectors of the points *P* and *Q* are, respectively, $5\vec{a} - 6\vec{b}$ and $\vec{a} + 2\vec{b}$, then the point *R* with position vector $2\vec{a}$ divides the line segment joining *P* and *Q* internally in the ratio

A) 3:2
B) 3:1
C) 2:1
D) 2:3
E) 3:4

Correct Answer : Option B

42. Let $\vec{a} = (sin^2\alpha)\hat{\imath} + (cos2\alpha)\hat{\jmath} + (cos^2\alpha)\hat{k}, 0 \leq \alpha \leq \frac{\pi}{2}$ and $\vec{b} = \hat{\imath} - 2\hat{\jmath} + \hat{k}$ .If $\vec{a}$ and $\vec{b}$ are perpendicular to each other, then the value of α is equal to

A) $\frac{\pi}{6}$
B) $\frac{\pi}{4}$
C) $\frac{\pi}{3}$
D) $\frac{\pi}{2}$
E) 0

Correct Answer : Option A

43. If the equation of the straight line passing through the point(a,1,3) and parallel to the vector $\frac{2}{3}\hat{\imath} + \frac{3}{2}\hat{\jmath} + \hat{k}$ is $\frac{3x+6}{b} = \frac{2y-2}{3} = \frac{z-3}{1}$, then the value of $a + b$ is equal to

A) 3
B) -3
C) -1
D) 1
E) 0

Correct Answer : Option E

44. The direction ratios of a straight line L_1 are 2,-1,2 and that of another straight line L_2 are 3,6,-2 . Then the angle between L_1 and L_2 is

A) $cos^{-1}\left(\frac{-4}{21}\right)$

B) $cos^{-1}\left(\frac{8}{21}\right)$

C) $cos^{-1}\left(\frac{5}{21}\right)$

D) $cos^{-1}\left(\frac{-4}{7}\right)$

E) $cos^{-1}\left(\frac{10}{21}\right)$

Correct Answer : Option A

45. The shortest distance between the straight line $\vec{r} = 3\hat{i} + 12\hat{j} + 5\hat{k} + \lambda(2\hat{i})$, $\lambda \in \mathbb{R}$ and the *x*-axis is

A) 7

B) 12

C) $3\sqrt{5}$

D) $5\sqrt{3}$

E) 13

Correct Answer : Option E

46. A committee of 4 people is selected from the members of a school council which consists of 5 students, 4 teachers and 3 administrators. The probability that the committee has no teachers is

A) $\frac{13}{99}$

B) $\frac{14}{99}$

C) $\frac{16}{99}$

D) $\frac{20}{99}$

E) $\frac{25}{99}$

Correct Answer : Option B

47. The events *A* and *B* are such that *P(A)=0.7,P(B')=0.8* and $P(A \cup B) = 0.8$ .Then $P($ $A' \cup B')$ is equal to

A) 0.9

B) 0.7

C) 0.5

D) 0.3

E) 0.1

Correct Answer : Option A

The following set of data is given.

48. 72, 72, 74, 80, 82, 82, 86, 88, 92, 92.

The mean deviation from the median is

A) 5

B) 6

C) 7

D) 8

E) 9

Correct Answer : Option B

49. The 10 letters of the word STATISTICS are arranged randomly. The probability that the 10-letter arrangement starts with CAT is

A) $\frac{1}{80}$

B) $\frac{1}{120}$

C) $\frac{1}{240}$

D) $\frac{1}{280}$

E) $\frac{1}{360}$

Correct Answer : Option C

50. The value of $\lim_{x \to 0} \frac{6sin(x) - 2sin(3x)}{3x^3}$ is equal to

A) $\frac{-8}{3}$

B) $\frac{8}{3}$

C) $\frac{-8}{9}$

D) $\frac{8}{9}$

E) 0

Correct Answer : Option B

51. If $\lim_{x \to 3} \frac{(2x - k)tan(x - 3)}{x^2 - 6x + 9} = 2$, then the value of 'k' is equal to

A) 2

B) 3

C) 4
D) 6
E) 8

Correct Answer : Option D

52. Let the functions f and g be defined by $f(x) = 3sinx, -\frac{\pi}{2} \leq x \leq \frac{\pi}{2}$ and $g(x) = 6 - 3x^2$,$x \in \mathbb{R}$. Then $f^{-1}\big(g(x)\big) =$

A) $sin^{-1}(2 - x^2)$
B) $3sin^{-1}(6 - 3x^2)$
C) $3sin^{-1}(2 - x^2)$
D) $sin^{-1}(6 - 3x^2)$
E) $\frac{1}{3}sin^{-1}(6 - 3x^2)$

Correct Answer : Option A

53. Let $f(x) = 2\sqrt{2}sinx + 2\sqrt{2}cosx, x \in \mathbb{R}$ .Then the value of $f\left(\frac{\pi}{12}\right)$ is equal to

A) $\sqrt{3}$
B) $2\sqrt{3}$
C) $\frac{\sqrt{3}}{2}$
D) $\sqrt{2}$
E) $2\sqrt{2}$

Correct Answer : Option B

54. If $f(x) = \begin{cases} x^2, & \text{if } x \leq 2 \\ 4x - \alpha, & \text{if } x > 2 \end{cases}$ is continuous at $x = 2$, then the value of α is equal to

A) 2
B) 5
C) 3
D) 4
E) 0

Correct Answer : Option D

55. If $y = sin\left(tan^{-1}\left(\frac{1}{\sqrt{x^2 - 1}}\right)\right)$,x > 1,then $\frac{dy}{dx} =$

A) $\frac{1}{x^2}$
B) $\frac{1}{x^4}$

C) $\frac{-1}{x^2}$

D) $\frac{-1}{x^4}$

E) $\frac{1}{x^3}$

Correct Answer : Option C

56. Let $f(x) = \frac{sinx}{x}$ for $x \neq 0$. Then the value of $f'\left(\frac{\pi}{2}\right)$ is equal to

A) $\frac{-4}{\pi^2}$

B) $\frac{4}{\pi}$

C) $\frac{-2}{\pi}$

D) $\frac{2}{\pi}$

E) 0

Correct Answer : Option A

57. The point P lies on the curve with equation $y = x\sqrt{2log_e(x)}, x > 0$. If $\frac{dy}{dx} = 2$ at $x = k$, then the value of k is equal to

A) $-\sqrt{e}$

B) e

C) $\sqrt{e}$

D) $2e$

E) $\frac{e}{2}$

Correct Answer : Option C

58. If $s = \sqrt{t+1}, x = log\ s$ and $y = 6x + 3$, then $\frac{dy}{dt} =$

A) $\frac{2}{\sqrt{t+1}}$

B) $\frac{6}{t+1}$

C) $3\sqrt{t+1}$

D) $\frac{3}{t+1}$

E) $\frac{3}{\sqrt{t+1}}$

Correct Answer : Option D

59. If $y = \sqrt{x} + 2cos(\sqrt{x})$, then the value of $\frac{dy}{dx}$ at $x = \frac{\pi^2}{4}$ is equal to

A) $-\frac{1}{2\pi}$

B) $-\frac{1}{\pi}$

C) $\frac{\pi}{3}$

D) $-\frac{2}{\pi}$

E) $-\frac{2}{\pi}$

Correct Answer : Option B

60. If $f(x) = x - 7, g(x) = 11 - x$, and $h(x) = f(x)g(x)$, then the maximum value of h is

A) 7

B) 9

C) 8

D) 4

E) 0

Correct Answer : Option D

61. A ladder AB, of length 13*m*, has one end *A* on a levelled horizontal ground and the other end *B* resting against a vertical wall. If the end *A* begins to slip away from the wall with constant speed 0.25 *m/s*, and the end *B* slips down the wall, then the speed of the end *B*, when *B* has reached a height of 5*m* above the ground, is

A) 0.6 *m/s*

B) 0.5 *m/s*

C) 0.45 *m/s*

D) 0.4 *m/s*

E) *0.35 m/s*

Correct Answer : Option A

62. Let $f(x) = -x^3 + 9x^2 - \alpha x - 13$, where $x \in \mathbb{R}$ and α is a constant. If the function f is increasing only in the interval (1,5) , then the value of α is equal to

A) 12

B) 13

C) 14

D) 15

E) 16

Correct Answer : Option D

63. Let $f(x) = cos(5x)cos(3x) - sin(5x)sin(3x), 0 \leq x \leq \frac{\pi}{4}$. Then f attains its minimum at x =

A) $\frac{\pi}{4}$

B) $\frac{\pi}{5}$

C) $\frac{\pi}{6}$

D) $\frac{\pi}{7}$

E) $\frac{\pi}{8}$

Correct Answer : Option E

64. $\int \frac{secx\sqrt{secx}}{\sqrt{sinx} + \sqrt{cosx}}\, dx$=

A) $2\left(\sqrt{tanx} - log_e\left(\sqrt{tanx} + 1\right)\right) + C$

B) $2\left(\sqrt{tanx} + log_e\left(\sqrt{tanx + 1}\right)\right) + C$

C) $2\sqrt{tanx} - log_e\left(\sqrt{tanx} + 1\right) + C$

D) $2\sqrt{tanx} + log_e\left(\sqrt{tanx + 1}\right) + C$

E) $\sqrt{tanx} - log_e\left(\sqrt{tanx + 1}\right) + C$

Correct Answer : Option A

65. $\int \frac{10e^x}{(2e^x + 5)^3}\, d\,\mathrm{x}$ is equal to

A) $\frac{5}{2(2e^x + 5)^2} + C$

B) $\frac{-5}{(2e^x + 5)^2} + C$

C) $\frac{-10}{(2e^x + 5)^2} + C$

D) $\frac{-5}{2(2e^x + 5)^2} + C$

E) $\frac{5}{(2e^x + 5)^2} + C$

Correct Answer : Option D

66. $\int \frac{1}{(1 - cosx)(1 + secx)}\, dx =$

A) $cose\,\mathrm{c}\ x + C$

B) $-cosec\ x + C$

C) $sec\ x + C$

D) $-sec\ x + C$

E) $sec^2 x + C$

Correct Answer : Option B

67. $\int \left(27x^3(1-x^3)\right)^{\frac{2}{3}} dx =$

A) $-\frac{3}{4}(1-x^3)^{\frac{4}{3}} + C$

B) $-\frac{3}{5}(1-x^3)^{\frac{5}{3}} + C$

C) $-\frac{9}{3}(1-x^3)^{\frac{1}{3}} + C$

D) $-\frac{9}{4}(1-x^3)^{\frac{4}{3}} + C$

E) $-\frac{9}{5}(1-x^3)^{\frac{5}{3}} + C$

Correct Answer : Option E

68. The value of $\int 16x^3 log_e x dx$ is equal to

A) $4x^4 log_e(x) + x^4 + C$

B) $4x^4 log_e(x) - x^4 + C$

C) $4x^4 log_e(x) x^3 + C$

D) $4x^4 log_e(x) - \frac{4}{3}x^3 + C$

E) $4x^4 log_e(x) - 4x^4 + C$

Correct Answer : Option B

69. The value of $\int_0^1 \frac{t}{(t+1)^3} dt$ is equal to

A) $\frac{1}{8}$

B) $\frac{3}{8}$

C) $\frac{5}{8}$

D) $\frac{7}{8}$

E) $\frac{1}{4}$

Correct Answer : Option A

70. The value of $\int_0^3 |3x^2 - 3| dx$ is equal to

A) 16
B) 18
C) 20
D) 22
E) 24

Correct Answer : Option D

71. The area of the region bounded by $y = \sqrt{x}, y = -x$, and $x = 4$ (in square units) is

A) $\frac{8}{3}$
B) $\frac{20}{3}$
C) $\frac{40}{3}$
D) $\frac{26}{3}$
E) $\frac{32}{3}$

Correct Answer : Option C

72. The value of $\int_0^{2\pi} \frac{\sin 2x}{x(2\pi - x)} dx$ is equal to

A) π
B) $\frac{\pi}{2}$
C) $\frac{\pi}{4}$
D) $\frac{\pi}{8}$
E) 0

Correct Answer : Option E

73. If the solution of the differential equation $\frac{dy}{dx} = \frac{\alpha x^2 + 4x - 4}{2y - 4}$, when $y(1) = 3$, if $y^2 - 4y = x^3 + 2x^2 - 4x + c$, then the value of α is equal to

A) 1
B) -1
C) -3
D) 3

E) 2

Correct Answer : Option D

74. The integrating factor of the differential equation $\frac{dy}{dx} + \frac{2y}{20-x} = 10$ is

A) $\frac{1}{(20-x)^2}$

B) $\frac{1}{20-x}$

C) $20 - x$

D) $log_e \mid 20 - x|$

E) $log_e(20-x)^2$

Correct Answer : Option A

75. If the constraints of a Linear Programming Problem are :$x + y \leq 6, 2x + y \leq 8, x \geq 0, y \geq 0,$ then a corner point of the feasible region is

A) (6,0)

B) (0,8)

C) (2,4)

D) (4,2)

E) (1,5)

Correct Answer : Option C

76. Which of the following is not the unit of pressure ?

A) atm

B) bar

C) torr

D) newton

E) mm of Hg

Correct Answer : Option D

77. For a given mass *m*, linear velocity *v*, linear displacement *s*, linear acceleration *a* and time *t*, the dimensionally INCORRECT expression for power P is

A) $\frac{1}{2}mav$

B) $\frac{mv^2}{t}$

C) $\frac{1}{2}mv^2$

D) ma^2t

E) $\frac{mas}{t}$

Correct Answer : Option C

78. A particle starting with an initial velocity 2 ms^{-1} moves with a uniform linear acceleration 2 ms^{-2} . The particle velocities at the end of the 5 seconds and 10 seconds of its motion from the start, are in the ratio

A) 1 : 2

B) 11 : 16

C) 6 : 11

D) 2 : 1

E) 11 : 6

Correct Answer : Option C

79. The position of an object moving along the x axis is given by the equation $x=1+t^2$ (x in meter and t in second). At what time will the magnitude of its displacement and velocity be equal?

A) t = 1 s

B) t = 1.5 s

C) t = 3 s

D) t = 2 s

E) t = 4 s

Correct Answer : Option A

80. A particle projected with a velocity at an angle of 30° to the horizontal, travels a horizontal range R. If it is projected with the same velocity at 60° to the horizontal, its horizontal range will be

A) $\frac{R}{2}$

B) $\frac{R}{4}$

C) 2R

D) 3R

E) R

Correct Answer : Option E

81. A bullet of mass 0.05 kg entering a heavy wooden block with a speed of 100 ms^{-1} is stopped in a distance of 50 cm. The average resistive force exerted by the block on the bullet is

A) 100 N

B) 150 N

C) 5000 N

D) 500 N

E) 250 N

Correct Answer : Option D

82. A batsman hits a cricket ball of mass 0.15 kg travelling at a speed of 54 kmph. The ball reverses its direction. The impulse imparted to the ball in $kgms^{-1}$ is

A) 4.5
B) 45
C) 810
D) 8.1
E) 16.2

Correct Answer : Option A

83. A car moves at a speed of 72kmph, under a force of 600N. The power output of the car is

A) 43.2 kW
B) 12 kW
C) 8.33 kW
D) 1.2 kW
E) 14.4 kW

Correct Answer : Option B

84. A body of mass 2 kg at rest starts to move under the action of an applied horizontal force of 7 N on a table with coefficient of kinetic friction, 0.1. The kinetic energy of the body in 10 seconds is $(g = 10ms^{-2})$

A) 1225 J
B) 100 J
C) 2025 J
D) 625 J
E) 725 J

Correct Answer : Option D

85. Two masses 2 kg and 6 kg lie on the x-axis at distances of 3 m and 6 m, respectively, from the origin. The distances of the centre of mass of the system from the origin and from the 2 kg mass are in the ratio

A) 3 : 7
B) 1 : 4
C) 2 : 1
D) 7 : 3
E) 3 : 1

Correct Answer : Option D

86. A thin circular disc and a uniform thin circular ring have their masses and radii in the ratio 2 : 1 and 1 : 2 respectively. The ratio of their moments of inertia about their respective diameters is

A) 4 : 1
B) 1 : 1
C) 1 : 4
D) 2 : 1
E) 1 : 2

Correct Answer : Option C

87. The values of the acceleration due to gravity at depths of $\frac{R}{2}$ and $\frac{2R}{3}$ from the surface of the earth are in the ratio

A) 9 : 10
B) 3 : 2
C) 3 : 1
D) 1 : 3
E) 2 : 1

Correct Answer : Option B

88. Two planets revolve around the sun in elliptical orbits with their major axes in the ratio 2 : 3. Their periods of revolution around the sun are in the ratio

A) 2 : 3
B) 3 : 2
C) $2\sqrt{(3)}$: $3\sqrt{2}$
D) $2\sqrt{2}$: $3\sqrt{3}$
E) 4 : 9

Correct Answer : Option D

89. A steel rod of 1m length and 10^{-3} m^2 area of cross section is subjected to a linear force of 150 *kN*. The elongation of the rod is(Young's modulus of steel 1.5×10^{11} Nm^{-2})

A) 1 cm
B) 0.5 mm
C) 1 m
D) 1 mm
E) 0.8 cm

Correct Answer : Option D

90. The terminal velocity of a steel ball of radius r and density ρ falling through an oil column of density σ and viscosity η is

A) directly proportional to r
B) inversely proportional to r
C) directly proportional to η
D) directly proportional to r^2
E) inversely proportional to r^2

Correct Answer : Option D

91. The heat required to convert 2 kg of ice at -10° C to water at 10° C at standard atmospheric pressure is (specific heat capacity of ice = 2100Jkg^{-1} K^{-1} specific heat capacity of water = 4200Jkg^{-1} K^{-1} Latent heat of fusion of ice = 3.35×10^{5} Jkg^{-1})

A) 210 kJ

B) 335 kJ

C) 398 kJ

D) 420 kJ

E) 796 kJ

Correct Answer : Option E

92. In a carnot engine , the ratio of the heat rejected to the sink to the heat absorbed from the source is 1 : 4. If this ratio is changed to 1: 2, the change in engine efficiency is

A) 75%

B) 50%

C) 25%

D) 20%

E) 80%

Correct Answer : Option C

93. One litre of an ideal gas at a pressure of 50 pascal is suddenly compressed to half its original volume. The final pressure of the gas in pascal is (γ = 1.5)

A) $50\sqrt{2}$

B) 75

C) 50

D) $100\sqrt{2}$

E) 100

Correct Answer : Option D

94. The average kinetic energy of a gas molecule is directly proportional to

A) its pressure

B) its volume

C) the square root of its absolute temperature

D) the square of its pressure

E) its absolute temperature

Correct Answer : Option E

95. The $\gamma \left(= \frac{C_p}{C_v} \right)$ values of a rigid diatomic gas molecule and a monoatomic gas molecule are in the ratio

A) 5 : 3

B) 21 : 25

C) 7 : 5

D) 25 : 21

E) 7 : 3

Correct Answer : Option B

96. Which of the following equations represents a simple harmonic motion? (*x* is displacement and *a* is acceleration)

A) $a=0.9x^2$

B) $a=-10x$

C) $a=100x^3$

D) $a=1.2x$

E) $a^2=12x$

Correct Answer : Option B

97. The speed of the transverse waves on a steel wire of length 50 *cm* and mass 5 *g* subjected to a tension of 64 N is

A) $\sqrt{6.4}ms^{-1}$

B) $8\sqrt{10}ms^{-1}$

C) $80ms^{-1}$

D) $6.4ms^{-1}$

E) $640ms^{-1}$

Correct Answer : Option C

98. Two point charges q_1=4μC and q_2=-4μC are located 40 cm apart in free space. The electric field at the mid point of the line joining q_1 and q_2 is

A) $9 \times 10^5 NC^{-1}$ towards q_1

B) $9 \times 10^5 NC^{-1}$ towards q_2

C) $18 \times 10^5 NC^{-1}$ towards q_1

D) $18 \times 10^5 NC^{-1}$ towards q_2

E) zero

Correct Answer : Option D

99. Two positive charges of +Q each are placed at the corners *A* and *B* of an equilateral triangle ABC of side *R*. The net electric potential at *C*, in terms of *K* is $(K =$

$\frac{Q}{4\pi \epsilon_0 R}$)

A) $\sqrt{2}K$

B) $\sqrt{3}K$

C) $2K$

D) K

E) $\sqrt{5}K$

Correct Answer : Option C

100. When a parallel combination of 2 capacitors of 100 pF each is connected across a series combination of 2 capacitors of 200 pF each, the effective capacitance is

A) 600 pF

B) $\frac{400}{9}pF$

C) 200 pF

D) 100 pF

E) 300 pF

Correct Answer : Option E

101. An electric dipole of dipole moment $12\mu\ C\ m$ is suspended in a uniform electric field of intensity $10^6 Vm^{-1}$ The work done in rotating it from 0^o to 60^o with respect to the field direction is

A) 3 J

B) 6 J

C) 1.5 J

D) 12 J

E) 2 J

Correct Answer : Option B

102. 5 equal resistors are combined suitably to get maximum and minimum effective resistances. Their ratio is

A) 5 : 1

B) 125 : 1

C) 1 : 5

D) 1 : 25

E) 25 : 1

Correct Answer : Option E

103. If the length of a linear conductor is doubled and its area of cross section halved, its resistance is

A) doubled

B) halved

C) tripled
D) quadrupled
E) unchanged

Correct Answer : Option D

104. The temperature coefficient of resistance of a coil of wire of resistance 4 Ω at 30^{o}C and 6 Ω at 70^{o}C (in per ^{o}C) is

A) 0.04
B) 0.06
C) 0.004
D) 0.006
E) 0.02

Correct Answer : Option E

105. A cyclotron accelerates a particle of mass m and charge q in a magnetic field B. The cyclotron frequency v is

A) $\frac{mq}{2\pi\ B}$
B) $\frac{qB}{2\pi\ m}$
C) $\frac{mqB}{2\pi}$
D) $2\pi\ mqB$
E) $\frac{2\pi\ m}{qB}$

Correct Answer : Option B

106. Two straight parallel conductors of 5 *m* length each and separated by a distance of 1 *cm* in free space carry currents of 2*A* and 3*A*, respectively, in the same direction. The force per unit length on either of the conductor is

A) an attractive force of $1.2 \times 10^{-4} Nm^{-1}$
B) a repulsive force of $1.2 \times 10^{-4} Nm^{-1}$
C) a repulsive force of $6 \times 10^{-4} Nm^{-1}$
D) an attractive force of $6 \times 10^{-4} Nm^{-1}$
E) a repulsive force of $4\pi \times 10^{-7} Nm^{-1}$

Correct Answer : Option A

107. A moving coil galvanometer of coil resistance 12 ohms shows full scale deflection for a current of 3 mA. It can be converted into a voltmeter of range 0-18 V by connecting

A) 0.01 ohms in series with the galvanometer
B) 5988 ohms in parallel with the galvanometer
C) 0.01 ohms in parallel with the galvanometer

D) 5988 ohms in series with the galvanometer

E) 6200 ohms in series with the galvanometer

Correct Answer : Option D

108. The magnetic susceptibility of a diamagnetic material is

A) positive and small

B) negative and small

C) positive and high

D) zero

E) negative and high

Correct Answer : Option B

109. The mutual inductance between a pair of coils is 3 *H*. If the current in one coil changes from 0 *A* to 2 *A* in 0.5 *s*, the induced *emf* produced in the other coil is

A) 5 *V*

B) 2 *V*

C) 6 *V*

D) 12 *V*

E) 3 *V*

Correct Answer : Option D

110. A pure inductor of self inductance 500 *mH* is connected to an alternating voltage supply of $100\sqrt{2}\pi$ sin $100\pi\ t$ volt. The current in the circuit in ampere is

A) $\sqrt{2}$

B) 5

C) $5\sqrt{2}$

D) $2\sqrt{2}$

E) 2

Correct Answer : Option E

111. A radio can tune in to any station in the 7.5 *MHz* to 12 *MHz* band. The corresponding wavelength band is

A) 75m-12m

B) 22.5m-36m

C) 40m-25m

D) 20m-45m

E) 15m-24m

Correct Answer : Option C

112. The refractive index of the material of a glass prism of refracting angle 60° and angle of minimum deviation 30° is

A) $\frac{1}{\sqrt{2}}$

B) $\sqrt{2}$

C) $\frac{1}{\sqrt{3}}$

D) $\sqrt{3}$

E) $\frac{\sqrt{3}}{2}$

Correct Answer : Option B

113. In Young's double slit experiment, the screen is placed 1*m* away from the coherent sources. If the wavelength of light used changes from 500 *nm* to 600 *nm* the fringe width increases by 0.25*mm*. The distance between the slits in *mm* is

A) 4

B) 2

C) 0.2

D) 0.4

E) 1

Correct Answer : Option D

114. Two convex lenses of different focal lengths are in contact with each other. If the focal length of each lens is doubled, the focal power of the combination

A) does not change

B) is doubled

C) is halved

D) is tripled

E) is quadrupled

Correct Answer : Option C

115. Two light rays of wavelength λ and $\frac{\lambda}{4}$ incident on the surface of a photo sensitive material emit electrons with max kinetic energy *E* and 6*E* respectively. The work function of the material is (*h* = Planck's constant, *c* = velocity of light in free space)

A) $\frac{hc}{\lambda}$

B) $\frac{hc}{2\lambda}$

C) $\frac{2hc}{5\lambda}$

D) $\frac{3hc}{5\lambda}$

E) $\frac{hc}{3\lambda}$

Correct Answer : Option C

116. For the same kinetic energy, the de Broglie wavelengths associated with particles of different masses are

A) directly proportional to their masses

B) directly proportional to the square root of their masses

C) inversely proportional to the square root of their masses

D) inversely proportional to their masses

E) directly proportional to the square of their masses

Correct Answer : Option C

117. In hydrogen spectral series, the wave numbers of the first Lyman line and the first Balmer line are in the ratio

A) 1 : 2

B) 2 : 1

C) 27 : 5

D) 5 : 27

E) 16 : 1

Correct Answer : Option C

118. 1600 atoms of a radioactive substance with a half life period T start decaying at t=0. The time during which 1550 atoms would have decayed is

A) $t = 3T$

B) $t = 6T$

C) $t = 2T$

D) $t = 5T$

E) $t = 4T$

Correct Answer : Option D

119. In the energy band diagram of solids, if the conduction band and the valance band overlap, the solid is

A) an elemental semiconductor

B) a metal

C) an insulator

D) an inorganic semiconductor

E) an organic semiconductor

Correct Answer : Option B

120. Choose the correct statement

A) An intrinsic semiconductor has trivalent or pentavalent impurities.

B) Pure Ge or Si is an extrinsic semiconductor.

C) The conductivity of a semiconductor can be increased by reducing its temperature.

D) A rectifier circuit does not use p-n junction diodes.

E) The potential barrier in a forward biased p-n junction gets reduced.

Correct Answer : Option E

121. 2.8 g of $N_{2(g)}$ and 0.8 g of $H_{2(g)}$are allowed to react completely. What is the mass of $NH_{3(g)}$formed? (molar mass of $N_{2(g)}$=28, $H_{2(g)}$=2 and $NH_{3(g)}$=17)

A) 3.6 g

B) 3.4 g

C) 3.2 g

D) 3.0 g

E) 3.8 g

Correct Answer : Option B

122. Consider the following statements about photoelectric effect:
(i)There is time lag between the striking of light beam and the ejection of electrons from the metal surface.
(ii)The number of electrons ejected is directly proportional to the intensity or brightness of light.
(iii)For each metal, there is a characteristic minimum frequency, known as threshold frequency (v_0) below which photoelectric effect is not observed.
(iv)At a frequency greater than v_0, the ejected electrons come out with certain kinetic energy. The kinetic energies of these electrons increase with the increase of the wavelength of the light used.
Which of the above statements are true?

A) (i), (ii) and (iii)

B) (i) and (iv)

C) (ii) and (iii)

D) (i) and (iii)

E) (i), (iii) and (iv)

Correct Answer : Option C

123. According to Bohr's theory the radius of the second stationary state of hydrogen atom is

A) 105.8 pm

B) 423.2 pm

C) 5.29 pm

D) 21.16 pm

E) 211.6 pm

Correct Answer : Option E

124. The correct decreasing order of the first ionization enthalpies among the elements C, N, O, F is

A) N > O > F > C

B) O > F > N > C

C) C > N > O > F

D) F > N > O > C

E) C > O > N > F

Correct Answer : Option D

125. List-I contains some group-I elements and List-II contains their electron gain enthalpy values (in kJ mol^{-1})

List-I	List-II
(i) H	(a) -48
(ii) Li	(b) -53
(iii) Na	(c) -73
(iv) K	(d) -60

Choose the correct match.

A) (i)-(a), (ii)-(c), (iii)-(d), (iv)-(b)
B) (i)-(c), (ii)-(d), (iii)-(b), (iv)-(a)
C) (i)-(d), (ii)-(b), (iii)-(c), (iv)-(a)
D) (i)-(a), (ii)-(b), (iii)-(c), (iv)-(d)
E) (i)-(b), (ii)-(a), (iii)-(d), (iv)-(c)

Correct Answer : Option B

126. The molecule with the highest dipolemoment among the following is

A) carbon dioxide
B) hydrogen fluoride
C) hydrogen iodide
D) hydrogen chloride
E) hydrogen bromide

Correct Answer : Option B

127. The covalent bond length is almost the same in which of the following pairs of bonds

A) C-H and O-H
B) C=C and C=N
C) C=O and N=O
D) C-C and C-N
E) C-O and N-O

Correct Answer : Option C

128. Which of the following substance has the standard molar enthalpy of formation zero?

A) $HCl_{(g)}$
B) $H2_{O(l)}$
C) $Br_{2(g)}$

D) $CH_{4(g)}$

E) C(graphite)

Correct Answer : Option E

129. The molar entropy of which of the following reaction is negative?

A) $C(gr) + O_2(g) \rightarrow CO_2(g)$

B) $C_6H_6(l) + 7½O_2(g) \rightarrow 6CO_2(g) + 3H_2O(l)$

C) $CaCO_3(s) \rightarrow CaO(s) + CO_2(g)$

D) $PCl_5(g) \rightarrow PCl_3(g) + Cl_2(g)$

E) $NH_4NO_3(s) \rightarrow N_2O(g) + 2H_2O(l)$

Correct Answer : Option B

130. A certain amount of $H_2(g)$ and $I_2(g)$ are sealed in a 4L container and kept at 600K to attain equilibrium. K_C for the reaction, $H_{2(g)} + I2_{(g)} \leftrightharpoons 2HI_{(g)}$at 600K is 64. If the equilibrium concentration of HI(g) is 0.08M, what are the equilibrium concentrations of $H_2(g)$ and $I_2(g)$ at the same temperature?

A) 0.02 M

B) 0.01M

C) 0.03 M

D) 0.04 M

E) 0.002 M

Correct Answer : Option B

131. Consider the following equilibrium $A(g) + B(g) \leftrightharpoons C(g) + D(g)$. The equilibrium constant will be altered when

A) reactant ‘A’ is added to the system at constant temperature

B) product ‘D’ is added to the system at constant temperature

C) total pressure is changed at constant temperature

D) both ‘A’ and ‘D’ are added to the system at constant temperature

E) temperature is changed

Correct Answer : Option E

132. The oxidation of ferrous oxalate by $KMnO_4$ in acidic medium is given by the following equation,

$3MnO_4^- + 5FeC_2O_4 + 24H^+ \rightarrow 3Mn^{2+} + 5Fe^{3+} + 10CO_2 + 12H_2O$

What is the volume of 0.01 mol dm^{-3} $KMnO_4$ required to oxidise 15 cm^3 of an acidified solution of 0.01 moldm^{-3} ferrous oxalate?

A) 18 cm^3

B) 9 cm^3

C) 15 cm^3

D) 18 cm^3

E) 3 cm^3

Correct Answer : Option B

133. What volume of $O_2(g)$ is produced when 2F current is passed through a very dilute aqueous solution of H_2SO_4 at STP?

A) 36 dm^3

B) 48.6 dm^3

C) 22.4 dm^3

D) 11.2 dm^3

E) 6 dm^3

Correct Answer : Option D

134. A binary solution containing two volatile solutes A and B shows positive deviation from Raoult's law. Which of the following statement is true?

A) The molecular interactions between A-B are greater than those of A-A or B-B.

B) The molecular interactions between A-B are weaker than those of A-A or B-B.

C) There are equal molecular interactions between A-A or B-B.

D) There are no molecular interactions between A-B compared to those of A-A and B-B.

E) The molecular interactions between one of the components is stronger than those of the other component.

Correct Answer : Option B

135. In a first order reaction the initial concentration of the reactant was 0.1M at 298K. It is decreased to 0.01M in 8 minutes and 20 seconds. Calculate the rate constant of the reaction at 298K.

A) 2.303 $x10^{-3}$ s^{-1}

B) 2.303 x 10^{-4} s^{-1}

C) 4.606 x 10^{-4} s^{-1}

D) 2.303 x 10^{-5} min^{-1}

E) 4.606 x 10^{-3} s^{-1}

Correct Answer : Option E

136. The first order reaction $N_2O_5 \rightarrow 2NO_2 + 1/2\ O_2$, is carried out in a closed container and there were no products initially. When it is heated at constant volume the final pressure of the system on 75% completion of the reaction is

A) 2.5 times initial pressure

B) 3.5 times initial pressure

C) 3 times initial pressure

D) 2 times initial pressure

E) 4 times initial pressure

Correct Answer : Option D

137. Which of the following 3d transition metal has the positive standard electrode potential (E^0)?

A) Ni
B) Cu
C) V
D) Mn
E) Cr

Correct Answer : Option B

138. The correct IUPAC name of the complex $[Ag(NH_3)_2][Ag(CN)_2]$ is named as

A) diamminesilver(II) dicyanoargentate(II)
B) diamminesilver(II) dicyanoargentate(I)
C) diamminesilver(I)dicyanidoargentate(I)
D) diaminesilver(I)dicyanoargentate(I)
E) diamminesilver(I)dicyanidoargentate(II)

Correct Answer : Option C

139. Which of the following complex ion absorbs yellow colour in the visible region?

A) $[Co(NH_3)_6]^{+3}$
B) $[Co(CN)_6]^{3-}$
C) $[Cu(H_2O)_4]^{+2}$
D) $[Co(NH_3)_5(H_2O)]^{+3}$
E) $[CoCl(NH_3)_5]^{+2}$

Correct Answer : Option E

140. Tropone is an example of

A) alicyclic compound
B) acyclic compound
C) heterocyclic compound
D) benzenoid aromatic compound
E) non-benzenoid aromatic compound

Correct Answer : Option E

The general combustion equation for any alkane is given by the following equation:

141. $C_nH_{2n+2} + X\ O_2 \rightarrow nCO_2 + (n+1)\ H_2O$

What is the value of 'X' in the above equation?

A) (n+1)/2

B) (2n+1)/2

C) (2n+2)/2

D) (3n+1)/2

E) (4n+1)/2

Correct Answer : Option D

142. Consider the reaction $CH_3Cl + NaI \rightarrow CH_3I + NaCl$. The name of the reaction and the solvent used to remove NaCl from the reaction mixture are respectively

A) Wurtz reaction, H_2O

B) Swarts reaction, H_2O

C) Finklestein reaction, dry acetone

D) Williamson reaction, H_2O

E) Fittigreaction, dry acetone

Correct Answer : Option C

143. Chloroethane is prepared by the action of PCl_3 on ethanol. What is the inorganic product formed in the reaction?

A) $POCl_3$

B) HPO_3

C) H_3PO_3

D) H_2PO_2

E) H_3PO_4

Correct Answer : Option C

144. Which of the following oxidising agent is used to convert ethanol to ethanal?

A) Acidified $KMnO_4$

B) Alkaline $KMnO_4$

C) Acidified $K_2Cr_2O_7$

D) H_2O_2 in anhydrous medium

E) CrO_3 in anhydrous medium

Correct Answer : Option E

145. List I contains organic compounds while list II contains boiling points.

List I	List II
(i)n-Butanol	(a) 350 K
(ii)1-Chlorobutane	(b) 309.1 K

(iii)n-Butane	(c) 307.6 K
(iv)Ethoxyethane	(d) 390 K

Which of the following is correct matching?

A) (i)-(d), (ii)-(a),(iii)-(c), (iv)-(b)

B) (i)-(d), (ii)-(a),(iii)-(b), (iv)-(c)

C) (i)-(b), (ii)-(a),(iii)-(c), (iv)-(d)

D) (i)-(b), (ii)-(a),(iii)-(d), (iv)-(c)

E) (i)-(a), (ii)-(c),(iii)-(d), (iv)-(b)

Correct Answer : Option B

146. Clemmensen reduction involves the formation of an alkane from a ketone on treatment with

A) H_2 in the presence of Ni catalyst

B) Zn amalgam and concentrated HCl

C) $LiAlH_4$

D) N_2H_4 followed by heating with KOH in glycol

E) H_2 in the presence of Pd/BaSO4

Correct Answer : Option B

147. The carboxylic acid that is used in rubber, textile, dyeing, leather and electroplating industries is

A) methanoic acid

B) ethanoic acid

C) lactic acid

D) benzoic acid

E) hexanoic acid

Correct Answer : Option A

148. Which of the following answers positively in carbylamine test?

A) N-ethylmethanamine

B) N,N-dimethylethanamine

C) benzenamine

D) N-methylbenzenamine

E) N,N-dimethylbenzeneamine

Correct Answer : Option C

149. Which of the following amine has the highest pK_b value in aqueous phase?

A) Methanamine

B) N-methylmethanamine
C) Ethanamine
D) N-Methylbenzenamine
E) Benzenamine

Correct Answer : Option E

150. Which of the following is not an essential amino acid?

A) Methionine
B) Leucine
C) Histidine
D) Glutamine
E) Tryptophan

Correct Answer : Option D