

**KEAM 2025**

Question Paper Code: 14/2025/OL

Exam:KEAM 2025 ENGG-5

Date of Test: 28-04-2025

- Let  $A = \{ x: x \text{ is a positive multiple of 2 less than 36} \}$ ,  
1.  $B = \{ x: x \text{ is a positive multiple of 3 greater than 16} \}$ , and  
 $C = \{ x: x \text{ is a positive multiple of 4 less than 42} \}$ . Then  $(A \cap B) \cap C =$
- A)  $\{12, 24, 36\}$
  - B)  $\{12, 24\}$
  - C)  $\{24\}$
  - D)  $\{24, 36\}$
  - E)  $\phi$

**Correct Answer :** Option C

2. If  $n(A) = 8$ , then the number of subsets of A which contain 2 or 6 elements is
- A) 24
  - B) 28
  - C) 48
  - D) 56
  - E) 216

**Correct Answer :** Option D

3. If  $f(x) = [2x]$ , where  $[x]$  denotes the greatest integer function in  $x$ , then the image of  $\{-2.3, 2.9\}$  is
- A)  $\{-5, 3\}$
  - B)  $\{-5, 5\}$
  - C)  $\{-4, 5\}$
  - D)  $\{-3, 2\}$
  - E)  $\{-4, 6\}$

**Correct Answer :** Option B

4. If  $f(x) = ax + bx^2$  then the co-efficient of  $x^3$  in  $f(f(x))$  is
- A) 0
  - B)  $ab$
  - C)  $a^3$
  - D)  $ab^2$
  - E)  $2ab^2$

**Correct Answer :** Option E

5. If  $z = 1 + i \tan \theta$ , where  $\pi < \theta < \frac{3\pi}{2}$ , then  $|z|$  is equal to

- A)  $1 + \tan \theta$
- B)  $2 \tan \theta$
- C)  $\sec \theta$
- D)  $-\sec \theta$
- E)  $\operatorname{cosec} \theta$

**Correct Answer :** Option D

6. If  $z = \frac{3+i}{2-i}$  then  $z^{-1}$  is equal to

- A)  $1 + i$
- B)  $\frac{1+i}{2}$
- C)  $\frac{1-i}{2}$
- D)  $2(1 - i)$
- E)  $1 - i$

**Correct Answer :** Option C

7. If  $z$  is a complex number, then the minimum value of  $|z - 2| + |z - 4|$  is

- A)  $\sqrt{20}$
- B) 4
- C) 6
- D)  $\sqrt{6}$
- E) 2

**Correct Answer :** Option E

8. The point  $z = \frac{1}{\sqrt{2}}(1 + i)$  in the complex plane is rotated about the origin through an angle  $\frac{\pi}{4}$  in the clockwise direction, then the new position of  $z$  is

- A) 2
- B) 1
- C)  $\frac{1}{\sqrt{2}}(1 - i)$
- D)  $\frac{1}{2}(1 - i)$
- E)  $1 - i$

**Correct Answer :** Option B

9. If the numbers  $x, 6, y, 54, 162$  are in geometric progression, then  $\frac{y}{x}$  is equal to

- A) 3
- B) 6
- C) 9
- D) 12
- E) 18

**Correct Answer :** Option C

**10.** If 1,  $a$ ,  $b$ ,  $c$ , 16 are in geometric progression, then  $\sqrt[3]{abc}$  is equal to

- A) 1
- B) 2
- C) 6
- D) 4
- E) 8

**Correct Answer :** Option D

**11.** The sum of the geometric series  $\sqrt{3} + \sqrt{12} + \sqrt{48} + \dots$  up to 10 terms is

- A)  $1023\sqrt{3}$
- B)  $1024\sqrt{3}$
- C)  $511\sqrt{3}$
- D)  $512\sqrt{3}$
- E)  $215\sqrt{3}$

**Correct Answer :** Option A

**12.** The sum and difference of the arithmetic mean and the geometric mean of two positive integers are respectively, 18 and 8. Then the values of the two numbers are

- A) 12 and 24
- B) 2 and 24
- C) 6 and 20
- D) 8 and 18
- E) 1 and 25

**Correct Answer :** Option E

**13.** The coefficient of  $x^5$  in the binomial expansion of  $\left(\sqrt{x} + \frac{1}{x}\right)^{10}$  is

- A) 55
- B) 10
- C) 45
- D) 135
- E) 1

**Correct Answer :** Option E

14. Four digit numbers are formed using 0, 3, 4, 5, 9, 8 without repetitions. Then the number of such 4 digits numbers is
- A) 270
  - B) 300
  - C) 320
  - D) 400
  - E) 450

**Correct Answer :** Option B

15. A bag contains 5 red balls, 4 black balls, and 3 white balls. Then the number of ways of selecting three balls at random that contains at least one white ball is
- A) 220
  - B) 210
  - C) 180
  - D) 136
  - E) 74

**Correct Answer :** Option D

16. Four fair dices are rolled. Then the number of ways in which the sum of upper faces of four dices can be six, is
- A) 4
  - B) 10
  - C) 15
  - D) 24
  - E) 36

**Correct Answer :** Option B

17.  $2 + {}^{15}C_1 + {}^{15}C_2 + \dots + {}^{15}C_{14} =$
- A)  $2^{14}$
  - B)  $2^{15}$
  - C)  $2^{16}$
  - D)  $2^{10}$
  - E)  $2^{18}$

**Correct Answer :** Option B

18. If  $\begin{vmatrix} a & 1 & 1 \\ 1 & b & 1 \\ 1 & 1 & c \end{vmatrix} = 2$ , where  $a, b$  and  $c$  are positive integers, then  $a+b+c$  is equal to
- A) 6
  - B) 8
  - C) 12

- D) 18
- E) 28

**Correct Answer :** Option A

19. Let  $\Delta = \begin{vmatrix} x & y & 1 \\ x+y & y+1 & x+1 \\ 1 & x & y \end{vmatrix}$ . If  $x+y=-1$ , then the value of  $\Delta$  is equal to

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

**Correct Answer :** Option D

20. If  $A = \begin{bmatrix} 1 & 1 & 1 \\ 0 & 2 & 1 \\ 0 & 0 & -2 \end{bmatrix}$  then  $|adj(adjA)|$  is equal to

- A) 16
- B) 256
- C) 128
- D) -256
- E) -16

**Correct Answer :** Option B

If the following system of linear equations

21.  $x - 2y + z = 5$   
 $2x - y + 2z = 7$   
 $x + 2y + \lambda z = 5$  has a unique solution, then  $\lambda \neq$

- A) 1
- B) -1
- C) 2
- D) -2
- E) 0

**Correct Answer :** Option A

22. If  $\frac{x+1}{x-1} < 2$ , then  $x$  lies in the interval

- A)  $(-\infty, -3) \cup (1, \infty)$
- B)  $(-\infty, -1) \cup (3, \infty)$
- C)  $(-\infty, 1) \cup (3, \infty)$
- D)  $(-3, -1)$

E) (1,3)

**Correct Answer :** Option C

**23.** The solution set of inequality  $|x + 2| < 3$  is

- A)  $-1 < x < 5$
- B)  $-5 < x < 1$
- C)  $-1 < x < 3$
- D)  $1 < x < 3$
- E)  $-1 < x < 1$

**Correct Answer :** Option B

**24.** If  $\tan(x - y) = \frac{4}{5}$ ,  $\tan(x + y) = \frac{6}{5}$  and  $0 < x, y < \frac{\pi}{4}$ , then  $\tan 2x$  is

- A) 62
- B) 60
- C) 54
- D) 50
- E) 55

**Correct Answer :** Option D

**25.** The value of  $\tan \frac{\pi}{12} + \tan \frac{\pi}{6} + (\tan \frac{\pi}{12} \tan \frac{\pi}{6})$  is equal to

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

**Correct Answer :** Option A

**26.** The period of the function  $f(x) = 2\sin 4x + 3\cos 2x$  is

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

**Correct Answer :** Option B

**27.**  $\frac{1 - \cos 2x}{1 + \cos 2x} - \sec^2 x =$

- A) 1

- B)  $\tan 2x$
- C)  $\sec 2x$
- D) 0
- E) -1

**Correct Answer :** Option E

**28.** If  $\theta \in \left[ \frac{\pi}{2}, \frac{3\pi}{2} \right]$ , then  $\sin^{-1}(\sin \theta)$  is equal to

- A)  $\theta$
- B)  $\theta - \pi$
- C)  $\theta - \frac{\pi}{2}$
- D)  $\pi - \theta$
- E)  $\theta + \frac{\pi}{2}$

**Correct Answer :** Option D

**29.** If  $\cos^{-1}x + \cos^{-1}y + \cos^{-1}z = 3\pi$ , then  $(x + y + z)$  is equal to

- A) 1
- B) 3
- C) 4
- D) -3
- E)  $\frac{1}{8}$

**Correct Answer :** Option D

**30.** If  $\sin^{-1}x + \sin^{-1}y = \frac{2\pi}{3}$ , then  $\cos^{-1}x + \cos^{-1}y$  is equal to

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

**Correct Answer :** Option E

**31.** If the line joining of two points (1, 0) and (4, 3) is rotated about the point (1, 0) in counter clockwise direction through an angle  $15^\circ$ , then the equation of the line in the new position is

- A)  $\sqrt{3}x - 2y - \sqrt{3} = 0$
- B)  $\sqrt{3}x - y - \sqrt{3} = 0$

- c)  $x + y - 1 = 0$
- d)  $x + \sqrt{3}y - 1 = 0$
- e)  $3x - y - 3 = 0$

**Correct Answer :** Option B

- 32.** The point with integral coordinates on the line  $x + y = 1$  , that lie at a distance 2 units from the line  $5x + 12y = 0$  , is
- A) (-7,8)
  - B) (-1,2)
  - C) (-12,13)
  - D) (-2,3)
  - E) (-3,4)

**Correct Answer :** Option D

- 33.** If the normal form of the equation of a straight line  $x + \sqrt{3}y = 2\sqrt{3}$  is  $x \cos \alpha + y \sin \alpha = p$  then the values of  $\alpha$  and  $p$  are respectively
- A)  $\frac{\pi}{6}$  and  $\sqrt{6}$
  - B)  $\frac{\pi}{3}$  and  $\sqrt{6}$
  - C)  $\frac{\pi}{3}$  and  $\sqrt{3}$
  - D)  $\frac{\pi}{6}$  and  $\sqrt{3}$
  - E)  $\frac{\pi}{4}$  and  $\sqrt{6}$

**Correct Answer :** Option C

- 34.** If the two circles  $(x - 2)^2 + (y - 3)^2 = 9$  and  $(x - 2)^2 + (y + 3)^2 = a^2$  intersect in two distinct points, then
- A)  $1 < a < 6$
  - B)  $1 < a < 7$
  - C)  $3 < a < 7$
  - D)  $3 < a < 4$
  - E)  $3 < a < 9$

**Correct Answer :** Option E

- 35.** If one end of the latus rectum of the parabola  $y^2 = 16x$  is (4,8), then the coordinates of the other end of the latus rectum, are
- A) (4,-16)
  - B) (4,10)
  - C) (4,-10)

- D) (4,16)
- E) (4,-8)

**Correct Answer :** Option E

**36.** If the length of the latus rectum of an ellipse is one-fourth of the major axis, then the eccentricity of the ellipse is

- A)  $\frac{\sqrt{3}}{2}$
- B)  $\frac{\sqrt{3}}{4}$
- C)  $\frac{\sqrt{5}}{4}$
- D)  $\frac{\sqrt{5}}{6}$
- E)  $\frac{2}{3}$

**Correct Answer :** Option A

**37.** The distance between the foci of the hyperbola  $x^2 - 4y^2 = 16$ , is

- A)  $2\sqrt{5}$
- B)  $4\sqrt{5}$
- C)  $4\sqrt{3}$
- D)  $5\sqrt{3}$
- E)  $5\sqrt{2}$

**Correct Answer :** Option B

**38.** The unit vector that bisects the angle between two vectors  $2i + j + 2k$  and  $i + 2j - 2k$  is

- A)  $\frac{i+j-k}{\sqrt{3}}$
- B)  $\frac{i-j}{\sqrt{2}}$
- C)  $\frac{i+j+k}{\sqrt{3}}$
- D)  $\frac{i-j+k}{\sqrt{3}}$
- E)  $\frac{i+j}{\sqrt{2}}$

**Correct Answer :** Option E

**39.** Let  $\vec{a}$  and  $\vec{b}$  be two unit vectors, and  $\theta$  be the angle between them. If  $\vec{a}-\vec{b}$  is a unit vector, then  $\theta$  is equal to

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

**Correct Answer :** Option A

40. If  $\vec{a} = i + 2j - 2k$  and  $\vec{b} = 2i + j + 2k$  then a unit vector perpendicular to  $\vec{a} + \vec{b}$  and  $\vec{a} - \vec{b}$  is
- A)  $\frac{2i - 2j + k}{3}$
  - B)  $\frac{2i - 2j - k}{3}$
  - C)  $\frac{i + j + k}{\sqrt{3}}$
  - D)  $\frac{i + 2j + 2k}{3}$
  - E)  $\frac{i + j - k}{\sqrt{3}}$

**Correct Answer :** Option B

41. Let  $\vec{a}$ ,  $\vec{b}$  and  $\vec{c}$  be the sides of a triangle ABC such that  $\vec{BC} = \vec{a}$ ,  $\vec{CA} = \vec{b}$  and  $\vec{AB} = \vec{c}$ . If  $BC = AC = 3$  and  $\vec{b} \cdot \vec{c} = -9$  then  $\vec{a} \cdot \vec{b}$  is equal to
- A) 27
  - B) 9
  - C)  $3\sqrt{3}$
  - D) 0
  - E)  $-3\sqrt{3}$

**Correct Answer :** Option D

42. The equation of the straight line joining the points (1, 2, 3) and (3, 4, k) is  $\frac{x-3}{1} = \frac{y-4}{1} = \frac{z-k}{5}$ . Then the value of k is
- A) 4
  - B) 5
  - C) 7
  - D) 10

E) 13

**Correct Answer :** Option E

**43.** The projection of a line segment on the co-ordinate axes are 5, 6, 8 . Then the length of the line segment is

- A) 5
- B)  $5\sqrt{5}$
- C) 6
- D)  $6\sqrt{6}$
- E)  $6\sqrt{5}$

**Correct Answer :** Option B

**44.** The shortest distance between the point (2, 3, 4) and the line  $\frac{x-4}{-2} = \frac{y-4}{2} = \frac{z-6}{1}$  is

- A) 12
- B) 9
- C) 3
- D)  $\sqrt{5}$
- E)  $\sqrt{3}$

**Correct Answer :** Option C

**45.** If a point  $P$  with  $x$  -coordinate 7 lies on the line joining the points  $A$  (1, 2, 3) and  $B$  (4, 6, 8) then the coordinates of the point  $P$  are

- A) (7, 10, -13)
- B) (7, -10, 13)
- C) (7, 10, 12)
- D) (7, 10, 13)
- E) (7, 10, 15)

**Correct Answer :** Option D

**46.** If the point (3, 6, k) lie on the line  $\frac{x-1}{1} = \frac{y-2}{2} = \frac{z-3}{3}$ , then the value of k is

- A) 2
- B) 3
- C) 9
- D) -2
- E) -3

**Correct Answer :** Option C

**47.** The mean deviation from mean of the five numbers 2, 4, 6, 8, 10 is

- A) 2.4

- B) 3.6
- C) 4.8
- D) 6
- E) 0

**Correct Answer :** Option A

**48.** If the standard deviation of six numbers  $x_1, x_2, x_3, x_4, x_5, x_6$  is 4, then the variance of  $2x_1 + 3, 2x_2 + 3, 2x_3 + 3, 2x_4 + 3, 2x_5 + 3, 2x_6 + 3$  is

- A) 64
- B) 67
- C) 16
- D) 19
- E) 8

**Correct Answer :** Option A

**49.** A die is rolled once. If the die shows odd number, then the probability of getting other than 5 is

- A)  $\frac{1}{6}$
- B)  $\frac{5}{6}$
- C)  $\frac{1}{3}$
- D)  $\frac{2}{3}$
- E)  $\frac{1}{5}$

**Correct Answer :** Option D

**50.** If  $P(A) = 0.4$ , and  $P(B/A) = 0.9$ , then  $P(\overline{A \cap B})$  is equal to

- A) 0.36
- B) 0.6
- C) 0.64
- D) 0.44
- E) 0.24

**Correct Answer :** Option C

**51.** If  $f(x) + 3f(1 - x) = x + 4$ , then  $f(x) =$

- A)  $\frac{19 - 4x}{8}$
- B)  $\frac{11 - 4x}{8}$
- C)  $\frac{11 - 2x}{8}$

- D)  $\frac{11-2x}{9}$   
 E)  $\frac{11-4}{9}$

**Correct Answer :** Option B

**52.** If  $f(x) = \sqrt{10-x}$ , then  $\lim_{x \rightarrow 1} \frac{f(x)-f(1)}{x-1}$  is equal to

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

**Correct Answer :** Option D

**53.** The value of  $\lim_{x \rightarrow 0} \frac{(x - \sin 2x)(2x - \sin x)}{x^2}$  is equal to

- A) 0  
 B) -2  
 C) 2  
 D) -1  
 E)  $-\frac{3}{2}$

**Correct Answer :** Option D

**54.** The function  $f(x) = \begin{cases} \frac{3x^2-12}{x-2}, & x \neq 2 \\ \lambda, & x = 2 \end{cases}$  is continuous for  $x \in \mathbb{R}$ , then the value of  $\lambda$  is

- A) 0  
 B) 4  
 C) 6  
 D) 8  
 E) 12

**Correct Answer :** Option E

**55.** The set of all points where the function  $f(x) = \frac{x}{x^2-4}$ ,  $x \in \mathbb{R}$ , is discontinuous, is

- A) {0,2}  
 B) {0,4}  
 C) {0,-2,2}  
 D) {2,4}

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

**Correct Answer :** Option E

56. If  $(xe)^y - e^x = 0$ , then  $\frac{dy}{dx}$  at  $x = 1$  is

A) 0

B) 2

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

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

E) 4

**Correct Answer :** Option A

57. If  $y = \sin x \sin 2x$ , and  $t = \cos x$ , then  $\frac{dy}{dt}$  is

A)  $2(3t^2 - 1)$

B)  $1 - 3t^2$

C)  $\frac{1}{2}(1 - 3t^2)$

D)  $(3t^2 - 1)$

E)  $2(1 - 3t^2)$

**Correct Answer :** Option E

58. If  $y = \sin^{-1}(2x\sqrt{1-x^2})$ , then  $\frac{dy}{dx}$  at  $x=0$  is

A) 0

B) 1

C) 2

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

E) -1

**Correct Answer :** Option C

59. If  $(f(x))^n = f(nx)$ , then  $\frac{f'(nx)}{f'(x)}$  is

A)  $(f(x))^n$

B)  $nf(nx)$

C)  $\frac{f(nx)}{f(x)}$

D)  $\frac{f((n-1)x)}{f(x)}$

E)  $\frac{f(x)}{f(nx)}$

**Correct Answer :** Option C

**60.** If  $x^3 = \sin\theta, y^3 = \cos\theta$ , then  $x \frac{dy}{dx}$  is

A)  $\frac{y^5 - 1}{y^5}$

B)  $\frac{y^6 - 1}{y^5}$

C)  $\frac{y^6 - 1}{y^6}$

D)  $\frac{y^3 - 1}{y^3}$

E)  $\frac{y^2 - 1}{y^2}$

**Correct Answer :** Option B

**61.** If  $y = (5x - 2)e^x$ , then  $\frac{d^2y}{dx^2}$  is equal to

A)  $e^x(5x + 8)$

B)  $e^x(5x - 3)$

C)  $e^x(5x + 5)$

D)  $e^x(5x + 3)$

E)  $e^x(5x - 5)$

**Correct Answer :** Option A

**62.** If the function  $f(x) = ax^3 - 9x^2 + 6ax + 6$  attains maximum at  $x = 1$  and minimum at  $x = 2$ , then the value of  $a$  is

A) 6

B) 5

C) 4

D) 3

E) 2

**Correct Answer :** Option E

**63.** The function  $f(x) = \sin\theta + \cos\theta, 0 \leq x \leq 2\pi$  is decreasing in the interval

A)  $0 \leq x < \pi$

B)  $0 \leq x \leq \frac{\pi}{4}$

C)  $\frac{\pi}{4} \leq x \leq \frac{5\pi}{4}$

D)  $\frac{5\pi}{4} \leq x \leq 2\pi$

E)  $\frac{\pi}{2} \leq x \leq \frac{3\pi}{2}$

Correct Answer : Option C

64. If  $x + y = 50$ , then the maximum value of  $\sqrt{4xy}$  is

A) 25

B) 50

C) 100

D) 625

E) 2500

Correct Answer : Option B

65.  $\int \cot x(1 - \operatorname{cosec} x)e^x dx$  is

A)  $e^x \cot x + C$

B)  $-e^x \cot x + C$

C)  $e^x \operatorname{cosec} x + C$

D)  $-e^x \operatorname{cosec} x + C$

E)  $e^x \operatorname{cosec} x \cot x + C$

Correct Answer:-Question Cancelled

66.  $\int \frac{dx}{\cos^{2/3} x \sin^{4/3} x}$  is

A)  $3\tan^3 x + C$

B)  $3\tan^{1/3} x + C$

C)  $-3\tan^{1/3} x + C$

D)  $-3\tan^{-1/3} x + C$

E)  $3\tan^{-1/3} x + C$

Correct Answer : Option D

67.  $\int x(1-x)^{10} dx =$

A)  $\frac{(1-x)^{12}}{12} - \frac{(1-x)^{11}}{11} + C$

B)  $\frac{(1-x)^{12}}{12} + \frac{(1-x)^{11}}{11} + C$

C)  $\frac{(1-x)^{11}}{11} - \frac{(1-x)^{10}}{10} + C$

D)  $\frac{(1-x)^{12}}{12} + \frac{(1+x)^{11}}{11} + C$

E)  $\frac{(1-x)^{12}}{12} - \frac{(1+x)^{11}}{11} + C$

**Correct Answer :** Option A

68.  $\int \left( \frac{\sin 3x}{\sin x} - \frac{\cos 3x}{\cos x} \right) dx$  is equal to

- A)  $2\cos 2x + C$
- B)  $-2\cos 2x + C$
- C)  $2\sin 2x + C$
- D)  $2x + C$
- E)  $x + C$

**Correct Answer :** Option D

69.  $\int_0^1 \frac{\sin x}{\sin x + \sin(1-x)} dx$  is equal to

- A) 6
- B) 4
- C) 2
- D)  $\frac{1}{2}$
- E)  $\frac{1}{4}$

**Correct Answer :** Option D

70.  $\int_0^{\pi/2} \sin 2x e^{\sin x} dx$  is equal to

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

**Correct Answer :** Option C

71. The value of  $\int_1^3 [x-1] dx$ , where  $[x]$  denotes the greatest integer function in  $x$ , is equal to

- A) -2
- B) -1
- C) 0
- D) 1
- E) 2

**Correct Answer :** Option D

72. Area of the region bounded by the function  $f(x) = \begin{cases} x & x \leq 3 \\ -x+6 & x > 3 \end{cases}$  with the  $x$ -axis (in square units) in the first quadrant is
- A) 18  
 B) 9  
 C) 6  
 D) 3  
 E) 4.5

**Correct Answer :** Option B

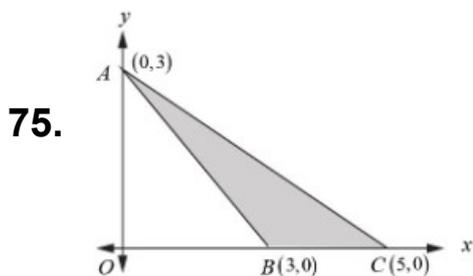
73. The general solution of the differential equation  $ydx - xdy = y^2(xdy + ydx)$  is
- A)  $\frac{y}{x} = xy + C$   
 B)  $\frac{x}{y^2} = xy + C$   
 C)  $\frac{y}{x^2} = xy + C$   
 D)  $x + y = xy + C$   
 E)  $\frac{x}{y} = xy + C$

**Correct Answer :** Option E

74. The solution of the linear differential equation  $\frac{dy}{dx} + y = e^{-x}$ , when  $x = 0, y = 1$ , is
- A)  $ye^{-x} = x - 1$   
 B)  $ye^{-x} = e^x - 1$   
 C)  $ye^x = x + 1$   
 D)  $ye^{-x} = e^x + 1$   
 E)  $ye^x = x - 1$

**Correct Answer :** Option C

The shaded region ABC shown in the diagram is given by the inequalities



- A)  $x + y \leq 3, 3x + 5y \geq 15, x \geq 0, y \geq 0.$   
 B)  $x + y \geq 3, 3x + 5y \leq 15, x \geq 0, y \geq 0.$   
 C)  $x + y \leq 3, 3x + 5y \leq 15, x \geq 0, y \geq 0.$   
 D)  $x + y \geq 3, 3x + 5y \geq 15, x \geq 0, y \geq 0.$   
 E)  $x + y \leq 3, 3x + 5y = 15, x \geq 0, y \geq 0.$

**Correct Answer :** Option B

- 76.** When a metallic sphere is heated, maximum percentage change will be observed in its
- A) volume
  - B) radius
  - C) diameter
  - D) surface area
  - E) mass

**Correct Answer :** Option A

- 77.** The dimensions of ratio of energy to Planck's constant are those of
- A) time
  - B) velocity
  - C) frequency
  - D) linear momentum
  - E) angular momentum

**Correct Answer :** Option C

- 78.** A garden roller of weight 100 kg is pulled with a force of 300 N acting at an angle of  $30^\circ$  with the ground. The effective pulling weight of the roller in (kg wt) is ( $g = 10 \text{ ms}^{-2}$ )
- A) 850
  - B) 725
  - C) 800
  - D) 820
  - E) 700

**Correct Answer :** Option A

- 79.** When a body starts from rest and moves with uniform acceleration, then its instantaneous displacement  $s$  is related to time  $t$  as
- A)  $s \propto t^{-1}$
  - B)  $s \propto t^{1/2}$
  - C)  $s \propto t$
  - D)  $s \propto t^2$
  - E)  $s \propto t^{-2}$

**Correct Answer :** Option D

- 80.** A particle moving in a circular path, covers equal distances in equal intervals of time. Then the quantity associated with the particle that remains constant with time is
- A) displacement
  - B) velocity
  - C) speed

- D) acceleration
- E) linear momentum

**Correct Answer :** Option C

**81.** A body of mass 2 kg is moving with a velocity of  $10 \text{ ms}^{-1}$ . If a force of 50 N is applied on it for 10 s along its motion, the velocity of the body (in  $\text{ms}^{-1}$ ) is

- A) 220
- B) 200
- C) 150
- D) 175
- E) 260

**Correct Answer :** Option E

**82.** A body of mass 5 kg collides with a wall with a speed of  $50 \text{ ms}^{-1}$  and rebounds with the same speed. If the time of contact of the body with the wall is  $\frac{1}{20}$  s the force exerted on the wall is

- A)  $0.5 \times 10^4 \text{ N}$
- B)  $2.5 \times 10^4 \text{ N}$
- C)  $2 \times 10^3 \text{ N}$
- D)  $1 \times 10^4 \text{ N}$
- E)  $4 \times 10^3 \text{ N}$

**Correct Answer :** Option D

**83.** Power of an engine driving a vehicle of mass  $m$  with a speed  $v$  on a horizontal road is ( $\mu$  is the coefficient of friction between the road and the tyre)

- A)  $\frac{mg}{\mu v}$
- B)  $\mu mgv$
- C)  $\mu mgv^2$
- D)  $\frac{\mu mg}{v}$
- E)  $\frac{\mu mv}{g}$

**Correct Answer :** Option B

**84.** In a perfectly inelastic head on collision

- A) kinetic energy is conserved
- B) total energy is not conserved
- C) linear momentum is not conserved

- D) two bodies move as one body after collision
- E) two bodies move separately in different directions

**Correct Answer :** Option D

- 85.** A rotating fly wheel with an initial angular speed of  $4 \text{ rad s}^{-1}$  has an angular acceleration of  $2 \text{ rad s}^{-2}$ . The angle (in radian) it will turn in a time of 4s from the start is
- A) 32
  - B) 16
  - C) 8
  - D) 64
  - E) 24

**Correct Answer :** Option A

- 86.** Radius of gyration of a uniform circular disc of radius R about its diameter is
- A)  $\frac{R}{8}$
  - B) 2R
  - C) R
  - D)  $\frac{R}{4}$
  - E)  $\frac{R}{2}$

**Correct Answer :** Option E

- 87.** When two rigid bodies with moments of inertia  $I_1$  and  $I_2$  and angular velocities  $\omega_1$  and  $\omega_2$  respectively are coupled in such a way that their rotation axes coincide, the angular velocity of the combination is  $\omega$ . Then
- A)  $(I_1 \omega_1 + I_2 \omega_2) = (I_1 + I_2)\omega$
  - B)  $I_1 \omega_1 - I_2 \omega_2 = (I_1 + I_2)\omega$
  - C)  $I_1 I_2 \omega_1 \omega_2 = I_1 I_2 \omega$
  - D)  $(I_1 + I_2)(\omega_1 + \omega_2) = (I_1 + I_2)\omega$
  - E)  $\omega_1 + \omega_2 = \omega$

**Correct Answer :** Option A

- 88.** If K is the kinetic energy of a satellite at a height h from the surface of earth, then its total energy is
- A) -K
  - B) 2K
  - C)  $\sqrt{K}$
  - D)  $-\frac{K}{2}$

E)  $-\frac{K}{4}$

**Correct Answer :** Option A

**89.** The force between two identical solid spheres each of radius  $r$  kept in contact is  $F$ . If the distance of their centres is made  $4r$ , then the force between them is

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

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

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

D)  $\frac{F}{16}$

E)  $\frac{F}{24}$

**Correct Answer :** Option B

**90.** Global warming leads to

- A) falling of sea level
- B) lowering of the average temperature of earth
- C) static weather pattern
- D) melting of ice caps at slower rate
- E) expansion of desert

**Correct Answer :** Option E

**91.** The specific heat capacity at constant volume  $C_v$  of a mole of an ideal gas is related to the gas constant  $R$  and the ratio of the specific heats  $\gamma$  as

A)  $\frac{R}{\gamma - 1}$

B)  $\frac{R\gamma}{1 - \gamma}$

C)  $\frac{R(1 - \gamma)}{\gamma}$

D)  $\frac{R}{(1 - \gamma)}$

E)  $\frac{R}{(1 + \gamma)}$

**Correct Answer :** Option A

**92.** When a gas is compressed in an insulated vessel

- A) its internal energy decreases
- B) its temperature decreases
- C) both its pressure and volume increase
- D) both its temperature and volume increase

E) both its temperature and internal energy increase

**Correct Answer :** Option E

**93.** The statement, the total pressure of a mixture of ideal gases is the sum of partial pressures, is called as

- A) Boyle's law
- B) Charles' law
- C) Dalton's law
- D) Perfect gas law
- E) Law of equipartition

**Correct Answer :** Option C

**94.** If the temperature of a gas is changed to 9 times the initial value, then the *rms* velocity of the gaseous molecule increases by

- A) 9 times
- B) 3 times
- C)  $\sqrt{3}$  times
- D) 18 times
- E) 12 times

**Correct Answer :** Option B

**95.** For an ideal gas at temperature  $T$  having the total number of molecules  $N$ , the product of the pressure and volume,  $PV$  is equal to ( $k_B$  is the Boltzmann constant)

- A)  $2NT$
- B)  $K_B NT$
- C)  $K_B T \sqrt{N}$
- D)  $K_B N \sqrt{T}$
- E)  $NT$

**Correct Answer :** Option B

**96.** If the mean kinetic energy of one mole of helium gas at 400 K temperature is 5000 J, then that for one mole of neon gas at 800 K is

- A) 5000 J
- B) 50000 J
- C) 10000 J
- D) 2500 J
- E) 500 J

**Correct Answer :** Option C

**97.** If  $T$  and  $\rho$  represent the temperature and density of a gas, then the velocity of sound in the gas is directly proportional to

- A)  $\sqrt{T}$
- B)  $\sqrt{\rho}$
- C)  $T$
- D)  $\rho^2$
- E)  $T^2$

**Correct Answer :** Option A

- 98.** For smaller angular displacement, the period of a simple pendulum depends on
- A) its amplitude
  - B) its phase constant
  - C) its energy
  - D) the mass of the bob
  - E) its length

**Correct Answer :** Option E

- 99.** If the speed of transverse waves on a stretched wire of linear density  $7 \times 10^3 \text{ kg m}^{-1}$  is  $100 \text{ ms}^{-1}$ , then the tension in the wire is
- A) 60 N
  - B) 600 N
  - C) 700 N
  - D) 70 N
  - E) 80 N

**Correct Answer:-Question Cancelled**

- 100.** Force between two charges  $+8 \mu\text{C}$  and  $+2 \mu\text{C}$  is 16 N. If the charges are brought into contact and then separated by the same distance, the force between them is
- A) 25 N
  - B) 20 N
  - C) 30 N
  - D) 15 N
  - E) 12 N

**Correct Answer :** Option A

- 101.** If the work done in moving a charge of 3 C from A to B is 12 J, then the potential difference between A and B is
- A) 5 V
  - B) 4 V
  - C) 36 V
  - D) 26 V
  - E) 10 V

**Correct Answer :** Option B

**102.** The magnitude of the torque experienced by an electric dipole of dipole moment **P** placed at an angle of  $30^\circ$  in a uniform electric field **E** is

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

**Correct Answer :** Option C

**103.** The *rms* value of *a.c* with peak value of 200 V is

- A)  $100V$
- B)  $\frac{200}{\sqrt{2}} V$
- C)  $300V$
- D)  $200\sqrt{2}V$
- E)  $\frac{200}{\sqrt{3}} V$

**Correct Answer :** Option B

**104.** Mobility is the drift velocity per unit

- A) charge
- B) volume
- C) electric field
- D) current
- E) time

**Correct Answer :** Option C

The resistivity of a metallic wire is directly proportional to (T – temperature;  $\tau$  average time of collisions of free electrons;  $n$  – number of free electrons per unit volume;  $A$  – area of cross-section)

- A)  $n$
- B)  $\tau$
- C)  $A$
- D)  $\frac{1}{n}$
- E)  $\frac{1}{T}$

**Correct Answer :** Option D

**106.** Gyromagnetic ratio of an electron is the ratio between

- A) charge and angular momentum
- B) magnetic moment and angular acceleration
- C) magnetic moment and angular momentum
- D) charge and angular momentum
- E) magnetic moment and angular velocity

**Correct Answer :** Option C

**107.** For a circular coil carrying current, the thumb in the right hand thumb rule gives the direction of

- A) magnetic field
- B) Current
- C) induced emf
- D) electric field
- E) electric force

**Correct Answer :** Option A

**108.** In synchrotron, the required high magnetic fields are generated by

- A) solenoid only
- B) electromagnet only
- C) toroid only
- D) solenoid and electromagnet
- E) solenoid and toroid

**Correct Answer :** Option E

**109.** The power required to push the arm of a rectangular conductor with a constant speed  $v$  in a motor is directly proportional to

- A)  $v$
- B)  $v^2$
- C)  $\sqrt{v}$
- D)  $\sqrt[3]{v}$
- E)  $v^3$

**Correct Answer :** Option B

**110.** A 1 kW bulb radiates light uniformly in all directions. The intensity at a point on the surface of the surrounding sphere of area  $200 \text{ m}^2$  is (in  $\text{Wm}^{-2}$ )

- A) 2
- B) 4
- C) 5

- D) 6
- E) 8

**Correct Answer :** Option C

**111.** The transverse nature of electromagnetic waves is confirmed by the phenomenon of

- A) diffraction
- B) polarization
- C) photoelectric effect
- D) interference
- E) total internal reflection

**Correct Answer :** Option B

**112.** If two waves of equal amplitude  $A$  and opposite phase interfere, the amplitude of the resultant wave is

- A)  $A$
- B)  $2A$
- C)  $A/2$
- D)  $0$
- E)  $A^2$

**Correct Answer :** Option D

**113.** At the lowest point of the plot of angle of deviation versus the angle of incidence of a triangular prism, the angle of incidence is equal to

- A) the angle of refraction at the first face
- B) the angle of refraction at the second face
- C) the angle of emergence
- D) the angle of prism
- E) half of the angle of prism

**Correct Answer :** Option C

**114.** Plane polarized light can be produced by the phenomenon of

- A) reflection
- B) dispersion
- C) diffraction
- D) scattering
- E) interference

**Correct Answer :** Option A

**115.** Above the threshold frequency, if the intensity of incident light falling on a photo sensitive material is increased, then the correct statement is:

- A) The number of emitted electrons increases
- B) The maximum kinetic energy of electrons increases

- C) The stopping potential increases
- D) The number of electrons emitted decreases
- E) The stopping potential decreases

**Correct Answer :** Option A

- 116.** The ratio between the wavelengths of the air column vibrating in the first two modes in an open organ pipe is
- A) 2 : 1
  - B) 1 : 2
  - C) 1 : 1
  - D) 1 : 3
  - E) 6 : 1

**Correct Answer :** Option A

- 117.** Light of wavelength  $\frac{36}{5R} m$  is emitted by a hydrogen atom during the transition of electrons from the state
- A)  $n = 3$  to  $n = 2$
  - B)  $n = 4$  to  $n = 1$
  - C)  $n = 4$  to  $n = 2$
  - D)  $n = 4$  to  $n = 3$
  - E)  $n = 3$  to  $n = 1$

**Correct Answer :** Option A

- 118.** 75% of  $^{234}_{90}\text{Th}$  decays in  $t$  years. Its half-life is (in years):
- A)  $t$
  - B)  $\frac{t}{2}$
  - C)  $2t$
  - D)  $4t$
  - E)  $\frac{t}{4}$

**Correct Answer :** Option B

- 119.** The I-V characteristic of a semiconductor diode in forward bias is a/an:
- A) straight line
  - B) parabolic curve
  - C) exponentially decreasing curve
  - D) exponentially increasing curve
  - E) sinusoidal curve

**Correct Answer :** Option D

**120.** The *pn* junction diode acts as a rectifier because:

- A) it conducts in both directions
- B) it blocks current in reverse bias
- C) it allows ac to pass
- D) it amplifies the signal
- E) it offers a phase difference between voltage and current

**Correct Answer :** Option B

**121.** Which of the following has the highest molar mass?  
(Atomic mass: N=14, O=16, Ag=108, Pb=208, Na=23, H=1, K=39)

- A) Silver nitrate
- B) Lead nitrate
- C) Ammonium nitrate
- D) Sodium nitrate
- E) Potassium nitrate

**Correct Answer :** Option B

**122.** When the uncertainty in momentum is zero then the uncertainty in the position of a particle is

- A)  $h/4\pi$
- B) 1
- C) 2
- D)  $\frac{1}{2}$
- E) infinity

**Correct Answer :** Option E

**123.** Which of the following statement is NOT true with Bohr's model of atom?

- A) It accounts the stability and line spectra of  $\text{He}^+$
- B) It fails to account for the finer details of the hydrogen atom spectrum by using sophisticated spectroscopic techniques.
- C) It is unable to explain the spectrum of atom/ion which possess only two electrons.
- D) It only explains about the splitting of spectral lines in the presence of electric field.
- E) It is unable to explain the ability of atoms to form molecules by chemical bonds.

**Correct Answer :** Option D

**124.** Which of the following statement is INCORRECT with p-block elements?

- A) p-Block elements comprise of Group 13 to Group 18.
- B) The outer electronic configuration of p-block elements is  $ns^2 p^{1-6}$ .
- C) Halogens belongs to Group 16.
- D) Gallium and Bromine are liquids.
- E) The zero group elements having general formula  $ns^2 p^6$  are inert, because their energy levels are completely filled.

**Correct Answer :** Option C

**125.** Which of the following molecule has zero dipole moment?

- A)  $\text{BF}_3$
- B)  $\text{CH}_2\text{Cl}_2$
- C)  $\text{NH}_3$
- D)  $\text{SO}_2$
- E)  $\text{NF}_3$

**Correct Answer :** Option A

Types of system and their definitions are given below:

| System                   | Definition  |
|--------------------------|---|
| (a) Closed system        | (i) A system which can exchange both energy and matter with surrounding |
| (b) Open system          | (ii) A system which cannot exchange matter or energy with surrounding   |
| (c) Isolated system      | (iii) A system consisting of single phase                               |
| (d) Homogeneous system   | (iv) A system consisting of many phases                                 |
| (e) Heterogeneous system | (v) A system which can exchange only energy with surrounding            |

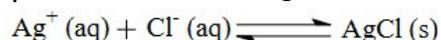
**126.**

Choose the correct match from the following codes:

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

**Correct Answer :** Option D

The  $\Delta_r H^\circ$  for the following reaction at  $25^\circ\text{C}$  is



**127.** (Given:  $\Delta_f H^\circ(\text{Ag}^+, \text{aq}) = 105.6 \text{ kJ mol}^{-1}$ ,

$\Delta_f H^\circ(\text{Cl}^-, \text{aq}) = -167.2 \text{ kJ mol}^{-1}$  and

$\Delta_f H^\circ(\text{AgCl}, \text{s}) = -127.1 \text{ kJ mol}^{-1}$ )

- A)  $6.0 \text{ kJ mol}^{-1}$
- B)  $65.5 \text{ kJ mol}^{-1}$
- C)  $-65.5 \text{ kJ mol}^{-1}$
- D)  $-6.0 \text{ kJ mol}^{-1}$
- E)  $100 \text{ kJ mol}^{-1}$

**Correct Answer:-Question Cancelled**

**128.** The pH of a solution is 4 then its  $\text{OH}^-$  ion concentration (in  $\text{mol dm}^{-3}$ ) is

- A)  $10^{-4}$
- B)  $10^{-10}$
- C)  $10^{-2}$
- D)  $10^{-12}$
- E)  $10^{-6}$

**Correct Answer :** Option B

4 g of NaOH were dissolved in 1 litre of a solution containing 1 mole of  $\text{CH}_3\text{COOH}$  and 1

**129.** mole of  $\text{CH}_3\text{COONa}$ . The  $[\text{H}^+]$  in the resultant solution is

(Given:  $K_a(\text{CH}_3\text{COOH}) = 1.1 \times 10^{-5}$ )

- A)  $1.47 \times 10^{-5} \text{M}$
- B)  $2 \times 10^{-5} \text{M}$
- C)  $2.5 \times 10^{-5} \text{M}$
- D)  $1.5 \times 10^{-5} \text{M}$
- E)  $0.9 \times 10^{-5} \text{M}$

**Correct Answer :** Option E

**130.** Which of the following statement is INCORRECT for the concept of oxidation?

- A) Addition of oxygen
- B) Removal of hydrogen
- C) Decreases in number of positive charges
- D) Decreases in number of negative charges
- E) Removal of an electron

**Correct Answer :** Option C

**131.** Which of the following statement is true for the electrochemical, Daniel cell?

- A) Electrons flow from copper electrode to zinc electrode.
- B) Current flows from zinc electrode to copper electrode.
- C) Cation moves toward copper electrode.
- D) Cation moves toward zinc electrode
- E) Reduction occurs at cathode.

**Correct Answer:-Question Cancelled**

**132.** The osmotic pressure of 0.01 M aqueous solution of urea at 300 K is  
( $R = 0.082 \text{ lit atm mol}^{-1}$ )

- A) 0.0082 atm
- B) 0.082 atm
- C) 2.46 atm
- D) 24.6 atm

E) 0.246 atm

**Correct Answer :** Option E

**133.** The first order rate constant for the decomposition of  $\text{N}_2\text{O}_5$  is  $6.93 \times 10^{-4} \text{ sec}^{-1}$ . Its half-life period is

- A) 1000 s
- B) 100 s
- C) 10 s
- D) 1 s
- E) 10000 s

**Correct Answer :** Option A

**134.** Which of the following is a zero order reaction?

- A) Decomposition of  $\text{H}_2\text{O}_2$  catalysed by iodide in alkaline medium.
- B) Artificial radioactive decay of unstable nuclei.
- C) Decomposition of  $\text{N}_2\text{O}_5$
- D) Decomposition of  $\text{N}_2\text{O}$
- E) Decomposition of gaseous ammonia on a hot platinum surface.

**Correct Answer :** Option E

**135.** Which of the following outermost electronic configuration of the element shows the highest oxidation state?

- A)  $3d^3 4s^2$
- B)  $3d^5 4s^1$
- C)  $3d^5 4s^2$
- D)  $3d^6 4s^2$
- E)  $3d^2 4s^2$

**Correct Answer :** Option C

**136.**  $\text{CrO}_3$  is a/an

- A) acidic oxide
- B) basic oxide
- C) neutral oxide
- D) amphoteric oxide
- E) reducing agent

**Correct Answer :** Option A

**137.** Which of the following statement is INCORRECT?

- A) Transition metals and many of their compounds show paramagnetic behaviour.

- B) The enthalpies of atomisation of the transition metals are high.
- C) The transition metals generally form coloured compounds.
- D) Transition metals and their many compounds act as good catalyst.
- E) Zn, Cd and Hg are very hard and have very low volatility.

**Correct Answer :** Option E

**138.** The correct order of ionic radii of Ce, La, Pm and Yb in +3 oxidation state is

- A)  $\text{La}^{3+} < \text{Pm}^{3+} < \text{Ce}^{3+} < \text{Yb}^{3+}$
- B)  $\text{La}^{3+} < \text{Ce}^{3+} < \text{Pm}^{3+} < \text{Yb}^{3+}$
- C)  $\text{Yb}^{3+} < \text{Ce}^{3+} < \text{Pm}^{3+} < \text{La}^{3+}$
- D)  $\text{Yb}^{3+} < \text{Pm}^{3+} < \text{Ce}^{3+} < \text{La}^{3+}$
- E)  $\text{La}^{3+} > \text{Pm}^{3+} > \text{Ce}^{3+} > \text{Yb}^{3+}$

**Correct Answer :** Option D

**139.** The IUPAC name of  $[\text{Fe}(\text{CO})_5]$  is

- A) Pentacarbonylferrate(0)
- B) Pentacarbonylferrate(III)
- C) Pentacarbonyliron(0)
- D) Pentacarbonyl iron(II)
- E) Pentacarbonylferrate(II)

**Correct Answer :** Option C

**140.** The isomerism exhibited by the octahedral complex  $[\text{Co}(\text{NH}_3)_4\text{Br}_2]\text{Cl}$  is

- A) Geometrical
- B) Optical
- C) Linkage
- D) Coordination
- E) Ionisation

**Correct Answer:-Question Cancelled**

**141.** Which of the following is not an electron withdrawing group?

- A) -CN
- B) -NO<sub>2</sub>
- C) -COOH
- D) -COOR
- E) -OCH<sub>3</sub>

**Correct Answer :** Option E

**142.** Which of the following statements is INCORRECT with Kolbe's electrolytic process?

- A) Ethane can be prepared by this method.
- B) Presence of alkyl groups in  $\alpha$ -position decrease the yield of alkanes.

- C) The reaction proceeds via methyl free radical.
- D) At anode alkane and CO<sub>2</sub> gas is formed.
- E) An alkane obtained at anode contains odd number of carbon atoms.

**Correct Answer :** Option E

**143.** Which of the following hydrocarbon pair have the highest boiling point and highest melting point respectively?

- A) Eicosane and Methane
- B) Eicosane and Decane
- C) Eicosane and 2,2-Dimethylpropane
- D) Eicosane and 2-Methylbutane
- E) 2,2-Dimethylpropane and Eicosane

**Correct Answer :** Option C

**144.** The order of reactivity towards S<sub>N</sub>2 reaction among the following is (a)CH<sub>3</sub>Cl (b)CH<sub>3</sub>CH(Cl)CH<sub>3</sub> (c) (CH<sub>3</sub>)<sub>3</sub>CCl (d) CH<sub>3</sub>CH<sub>2</sub>Cl

- A) a > d > b > c
- B) a > b > c > d
- C) a > c > d > b
- D) b > a > c > d
- E) c > b > d > a

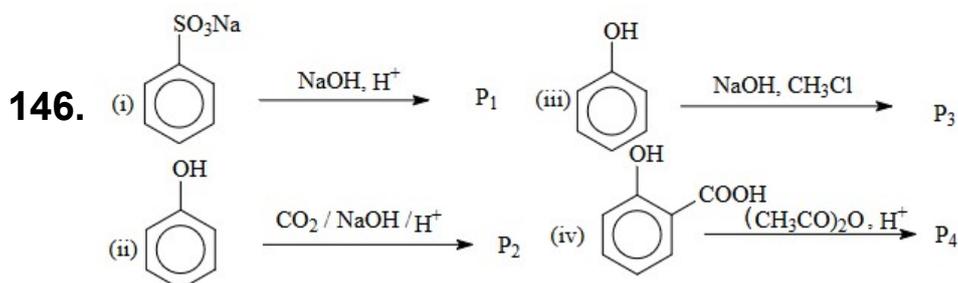
**Correct Answer :** Option A

**145.** The correct decreasing order of acidic strength is

- A) C<sub>6</sub>H<sub>5</sub>OH > *p*-CH<sub>3</sub>-C<sub>6</sub>H<sub>4</sub>OH > *m*-CH<sub>3</sub>-C<sub>6</sub>H<sub>4</sub>OH > C<sub>2</sub>H<sub>5</sub>OH
- B) C<sub>2</sub>H<sub>5</sub>OH > *m*-CH<sub>3</sub>-C<sub>6</sub>H<sub>4</sub>OH > *p*-CH<sub>3</sub>-C<sub>6</sub>H<sub>4</sub>OH > C<sub>6</sub>H<sub>5</sub>OH
- C) *m*-CH<sub>3</sub>-C<sub>6</sub>H<sub>4</sub>OH > C<sub>6</sub>H<sub>5</sub>OH > *p*-CH<sub>3</sub>-C<sub>6</sub>H<sub>4</sub>OH > C<sub>2</sub>H<sub>5</sub>OH
- D) C<sub>6</sub>H<sub>5</sub>OH > *m*-CH<sub>3</sub>-C<sub>6</sub>H<sub>4</sub>OH > *p*-CH<sub>3</sub>-C<sub>6</sub>H<sub>4</sub>OH > C<sub>2</sub>H<sub>5</sub>OH
- E) C<sub>6</sub>H<sub>5</sub>OH > *m*-CH<sub>3</sub>-C<sub>6</sub>H<sub>4</sub>OH > C<sub>2</sub>H<sub>5</sub>OH > *p*-CH<sub>3</sub>-C<sub>6</sub>H<sub>4</sub>OH

**Correct Answer :** Option D

The products P<sub>1</sub>, P<sub>2</sub>, P<sub>3</sub> and P<sub>4</sub> of the following reactions are



- A) P<sub>1</sub> = Phenol, P<sub>2</sub> = Salicylaldehyde, P<sub>3</sub> = Cyclohexanol, P<sub>4</sub> = Phenyl acetate,

- B)  $P_1 = \text{Benzene}$ ,  $P_2 = \text{Salicylic acid}$ ,  $P_3 = \text{Cyclohexanol}$ ,  $P_4 = \text{Phenyl acetate}$ ,  
 C)  $P_1 = \text{Phenol}$ ,  $P_2 = \text{Salicylic acid}$ ,  $P_3 = \text{Anisole}$ ,  $P_4 = \text{Aspirin}$ ,  
 D)  $P_1 = \text{Phenol}$ ,  $P_2 = \text{Salicylic acid}$ ,  $P_3 = \text{Anisole}$ ,  $P_4 = \text{Phenyl acetate}$ ,  
 E)  $P_1 = \text{Cyclohexanol}$ ,  $P_2 = \text{Salicylic acid}$ ,  $P_3 = \text{Phenol}$ ,  $P_4 = \text{Aspirin}$ ,

**Correct Answer** : Option C

**147.** Which one of the following compounds undergoes HVZ reaction?

- A)  $\text{C}_6\text{H}_5\text{COOH}$   
 B)  $\text{CH}_3\text{CH}_2\text{COOH}$   
 C)  $\text{Cl}_3\text{C-COOH}$   
 D)  $\text{CH}_3\text{CH}_2\text{CHO}$   
 E)  $\text{HCOOH}$

**Correct Answer** : Option B

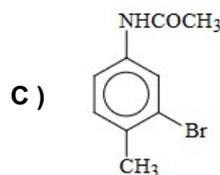
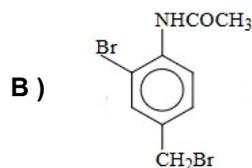
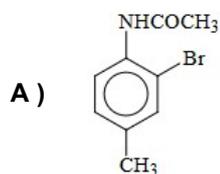
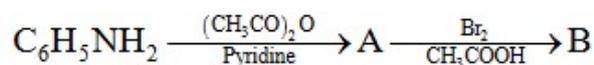
**148.** Which of the following does not undergo Cannizarro reaction?

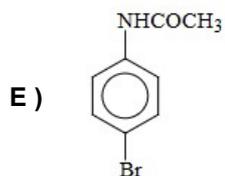
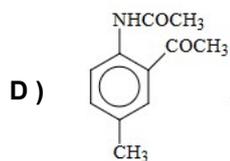
- A)  $(\text{CH}_3)_3\text{CCHO}$   
 B)  $\text{C}_6\text{H}_5\text{CHO}$   
 C)  $\text{C}_6\text{H}_5\text{COC}_6\text{H}_5$   
 D)  $\text{CH}_3\text{CHO}$   
 E)  $\text{HCHO}$

**Correct Answer** : Option D

In the following reaction, the final product B is

**149.**





**Correct Answer :** Option E

Match Column I with column II.

- 150.**
- | Column I (Vitamins)        | Column II (Sources)  |
|----------------------------|----------------------|
| (a) Vitamin A              | (i) Sunflower oil    |
| (b) Vitamin B <sub>1</sub> | (ii) Amla            |
| (c) Vitamin C              | (iii) Fish liver oil |
| (d) Vitamin E              | (iv) Yeast           |
- A) (a)-(iii), (b)-(i), (c)-(ii), (d)-(iv)  
 B) (a)-(iii), (b)-(ii), (c)-(i), (d)-(iv)  
 C) (a)-(iii), (b)-(ii), (c)-(iv), (d)-(i)  
 D) (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii)  
 E) (a)-(iii), (b)-(iv), (c)-(ii), (d)-(i)

**Correct Answer :** Option E