# **FINAL ANSWER KEY**

# Question Paper Code: 13/2025/OL Exam:KEAM 2025 ENGG-4 Date of Test: 27-04-2025

The relation

- **1.**  $R = \{(4, 4)(4, 5), (5, 7), (4, 8), (5, 5), (7, 8), (7, 7), (7, 5), (8, 8), (8, 7), (8, 5), (9, 9)\}$ on the set  $A = \{4, 5, 7, 8, 9\}$  is
  - A) transitive
  - B) symmetric
  - c) reflexive
  - D) equivalence relation
  - E) a function

Correct Answer : Option C

Let  $A = \{1, 2, 3, 4\}$  and  $B = \{7, 8, 3, 4\}$  Then the number of elements common to both  $A \times B$  and  $B \times A$  is

- **A**) 8
- **B)** 6
- **C**) 12
- **D**) 4
- **E**) 2

Correct Answer : Option D

- **3.** The range of the function  $f(x) = log_e(4x^2 4x + 1)$ , where  $x \neq \frac{1}{2}$  is
- A)  $(-\infty, 0)$
- в) [0,∞)
- **c**) (0,∞)
- D)  $(-\infty,0)$
- E)  $(-\infty,\infty)$

Correct Answer : Option E

**4.** The domain of the function  $f(x) = \sqrt{x^2 + 2x - 15}$  is

- A)  $(-\infty, -5) \cup (3, \infty)$
- **B**)  $(-\infty, -5) \cup [3, \infty)$
- c)  $(-\infty, -5] \cup (3, \infty)$
- D)  $(-\infty, -5] \cup [3, \infty)$
- **E**) [−5,3]

**5.** All the points in 
$$A = \left\{\frac{\lambda + i}{\lambda - i}; \lambda \in \mathbb{R}\right\}$$
 lie on  
**A**) a circle with radius  $\sqrt{2}$ 

- a circle with radius 2 B)
- a circle with radius  $\frac{1}{2}$ C)
- a circle with radius 1 D)
- a straight line with slope 1 E)

Correct Answer : Option D

2025  $\sum_{n=1}^{\infty} i^n (1+i), i^2 = -1$  , is equal to 6. A) i + 1**в**) *i*-1 c) -i-1D) -i+1-iE)

Correct Answer : Option B

If  $x, y \in \mathbb{R}$  and  $x + iy = -(6+i)^3$ ,  $i^2 = -1$ , then x - y is equal to 7. A) 93 B) -93 91 C) -91 D)

-107 E)

Correct Answer : Option D

Let z = x + iy, where  $x, y \in \mathbb{R}$  and  $i^2 = -1$ . If |z - i| = |z - 1|, then y = |z - 1|. 8. A) -x*x* + 1 B) -x - 1C) x + 2D) E) х

Correct Answer : Option E

If *a*, *b*, *c* are real numbers such that  $(a - 2)^2 + (b - 2)^2 + (c - 2)^2 = 0$ 9.

a, b, c are in G.P. and a + b + c = 6A)

- **B**) a, b, c are in G.P. and a + b + c = 4
- **c**) *a, b, c* are not in G.P.
- **D**) a, b, c are in G.P. and a + b + c = 8
- E) a, b, c are not in G.P. and a + b + c = 16

10. Let  $a, \frac{3}{4}, ar^2, ar^3, \ldots$  be in G.P. where r > 0 If the product of first four terms of the G.P. is  $\frac{3^6}{4^5}$  then a is equal to A)  $\frac{3}{2}$ B)  $\frac{2}{3}$ C)  $\frac{1}{3}$ D)  $\frac{1}{2}$ E) 1

Correct Answer : Option D

- **11.** Let  $a_1, a_2, \ldots, a_n$  be positive non-zero real numbers. If  $a_1, a_2, \ldots, a_n = k$  then the minimum value of  $a_1 + a_2 + \ldots + a_n$  is
  - A)  $n(k)^{2/n}$
  - **B**)  $n(k)^{1/n}$
  - c)  $(k)^{1/n}$
  - D)  $(k)^{2/n}$
  - E)  $2n(k)^{2/n}$

## **Correct Answer:-Question Cancelled**

- 12. Let  $\lambda$  be the A.M. between  $\alpha$  and  $\beta$  and also G.M. between  $\alpha$  and  $\beta$ . Then  $\alpha^2 + \beta^2 =$ 
  - **A**) 3αβ
  - **B**)  $\frac{1}{2}\alpha\beta$
  - **C**) αβ
  - **D**) 4αβ
  - **Ε**) 2αβ

Correct Answer : Option E

- **13.** The number of integers greater than 7000 using 2,4,6,7,8 without repetition, is
- **A**) 168
- **B**) 336

- **C**) 196
- **D**) 256
- E) 512

- **14.** The coefficient of  $x^9$  in the expansion of  $\left(4 \frac{x^2}{4}\right)^{12}$  is
- A)  $-{}^{12}C_7(4)^7(3)^5$ B)  ${}^{12}C_7(4)^7(3)^5$ C)  ${}^{12}C_6(4)^6(3)^6$ D)  ${}^{12}C_5(4)^5(3)^7$ E) 0
- ,

#### Correct Answer : Option E

- **15.** Five digit number is formed using the digits 0,1,2,3,4 and 5 without repetitions. Number of five digit numbers which are divisible by 10 is
- **A**) 360
- **B**) 240
- **C**) 120
- **D**) 480
- E) 520

Correct Answer : Option C

**16.** The constant term in the expansion of  $\left(2x^2 - \frac{1}{x^2}\right)^6$  is

- **A**) -160
- **B**) 160
- **C**) -180
- **D**) 180
- **E)** 0

#### Correct Answer : Option A

**17.** If *n* is a positive integer and the coefficient of *x* in the expansion of  $\left(x^2 + \frac{1}{x^3}\right)^n$  is  ${}^nC_7$ , then *n* is equal to

- is equal
- **A**) 18
- **B**) 16
- **C**) 17
- **D**) 21
- **E**) 19

- **18.** Let  $A = (a_{ij})_{3\times 3}$ ,  $B = (b_{ij})_{3\times 2}$  and  $C = (c_{ij})_{3\times 1}$ . Which one of the following products, is not defined ?
- A)  $C^T A B$
- **B**)  $A^T A B$
- c)  $(AB)^T C$
- **D**) (*AB*)*C*
- E)  $B^T C$

Correct Answer : Option D

- **19.** Let A be a square matrix of order 3 and |A| = 9 Then |adj(adjA)| =
  - **A**) 6561
  - **B**) 6564
  - **C**) 6569
  - **D**) 8187
  - **E**) 8164

Correct Answer : Option A

**20.** If  $\begin{vmatrix} 1 & 0 & 0 \\ x & x+2 & 0 \\ x^2 & x & x+3 \end{vmatrix} = 0$ , then value of x are **A**) 2,3 **B**) -2,3 **C**) -2,-3 **D**) 1,2,3

**E**) -1,2,-3

Correct Answer : Option C

**21.** Let  $A = \begin{pmatrix} 0 & 2 \\ 3 & 4 \end{pmatrix}$ ,  $I = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ . If  $(I + A) \begin{pmatrix} 4 & -3 \\ 2 & -1 \end{pmatrix} = \begin{pmatrix} 8 & -5 \\ 22 & x \end{pmatrix}$ , then the value of x is equal to **A**) 14 **B**) -14 **C**) 12 **D**) -12 **E**) 15

Correct Answer : Option B

**22.** The solution set for -12x > 38, where *x* is a natural number, is

- **A**) {1,2,3}
- в) {1,2}
- **C**) {1}
- D) empty set
- E) {-1,-2,-3}

Correct Answer : Option D

- **23.** Let x be a real number such that  $x + \frac{x}{4} + \frac{x}{3} < 13$ . Then the solution set is
- A)  $\left(-\infty, \frac{156}{19}\right)$ B)  $\left(\frac{156}{19}, \infty\right)$ C)  $\left(\frac{154}{19}, \infty\right)$
- (19)  $\left(-\infty, \frac{154}{17}\right)$
- **E**)  $\left(\frac{-156}{19}, \frac{156}{19}\right)$

Correct Answer : Option A

24.  $cos75^{\circ}cos45^{\circ}cos15^{\circ}=$ A)  $\frac{1}{3\sqrt{2}}$ B)  $\frac{1}{\sqrt{2}}$ C)  $\frac{1}{4\sqrt{2}}$ D)  $\frac{1}{2\sqrt{3}}$ E)  $\frac{2}{\sqrt{3}}$ 

Correct Answer : Option C

**25.** If  $\alpha + \beta + \nu = 2\pi$ , then  $\tan \frac{\alpha}{2} + \tan \frac{\beta}{2} + \tan \frac{\nu}{2} =$ 

- **A**)  $\tan\frac{\alpha}{2}\tan\frac{\beta}{2}\tan\frac{\nu}{2}$
- **B**)  $-\tan\frac{\alpha}{2}\tan\frac{\beta}{2}\tan\frac{\nu}{2}$
- **c**)  $2 \tan \frac{\alpha}{2} tan \frac{\beta}{2} tan \frac{\nu}{2}$
- **D**)  $3 \tan \frac{\alpha}{2} tan \frac{\beta}{2} tan \frac{\nu}{2}$

**E**) 4  $\tan \frac{\alpha}{2} tan \frac{\beta}{2} tan \frac{\nu}{2}$ 

Correct Answer : Option A

**26.** 
$$\tan (315^{\circ}) \cot (-405^{\circ}) =$$
  
**A**) -1  
**B**) 1  
**C**)  $\frac{1}{\sqrt{2}}$   
**D**)  $\frac{\sqrt{3}}{2}$   
**E**)  $\frac{1}{2}$ 

Correct Answer : Option B

27. 
$$\frac{\sin\frac{\pi}{7} + \sin\frac{2\pi}{7}}{1 + \cos\frac{\pi}{7} + \cos\frac{2\pi}{7}} =$$
A) 
$$\cot\frac{\pi}{7}$$
B) 
$$\cos\frac{\pi}{14}$$
c) 
$$1 + \sin\frac{\pi}{14}$$
D) 
$$1 + \cos\frac{\pi}{14}$$
E) 
$$\tan\frac{\pi}{7}$$

Correct Answer : Option E



Correct Answer : Option B



**31.** Let  $a \neq 1$  be non-zero real number. If the lines 2x + ay = 1 and x + 2y = 1 are perpendicular, then the value of a is equal to

- **A**) 1
- **B**) -2
- **c**) 2
- **D**) -1
- **E**)  $-\frac{1}{2}$

Correct Answer : Option D

**32.** Let P(1,2), Q(a,b), R(5,7) and S(2,3)

- ) be the vertices of a parallelogram PQRS . Then
- A) a = 4, b = 2
- в) *a* = 6, *b* = 2
- c) a = 6, b = 4
- **D**) a = 3, b = 2
- **E**) a = 4, b = 6

Correct Answer : Option E

**33.** Which one of the following lines, passes through the point of intersection of x + y = 5 and 2x + y = 7?

A) 
$$4x + 3y = -1$$

**B**) 3x + 2y = 7

- c) 4x 3y = -1
- 4x + 3y 2 = 0D)
- 4x + 3y + 3 = 0E)

The axis of a parabola is x = 0. If the vertex is at a distance 3 from the origin above the 34. x -axis. The vertex of the parabola is at

- (3,0) A)
- (-3,0)B)
- (3, -3)C)
- (3,3)D)
- (0,3)E)

Correct Answer : Option E

- **35.** Length of the Latus rectum of the ellipse  $\frac{x^2}{9} + \frac{y^2}{16} = 1$  is
  - 3 2 A)
  - 8 B)
  - 9 2 C)

  - 2 D)
  - 25 2 E)

Correct Answer : Option C

**36.** The centre of the ellipse  $4x^2 + 24x + 9y^2 - 18y + 9 = 0$  is

- (1,3)A)
- в) (1, -3)
- c) (3, -1)
- D) (-3,1)
- (3, -3)E)

Correct Answer : Option D

The line x - y + 4 = 0 touches the ellipse  $x^2 + 3y^2 = 12$  at 37.

- (1,3)**A**)
- (3,1)B)
- (0,2)C)
- (0, -2)D)
- (-3,1)E)

Correct Answer : Option E

- **38.** Let  $\overrightarrow{OA} = 2\hat{\imath} + 3\hat{\jmath} 5\hat{k}$ ,  $\overrightarrow{OB} = 3\hat{\imath} + \hat{\jmath} 2\hat{k}$ ;  $\overrightarrow{OC} = 6\hat{\imath} 5\hat{\jmath} + 7\hat{k}$  be the position vectors of the points ,*A B* and *C*. Then
  - A)  $\overrightarrow{AC} = 3\overrightarrow{AB}$
  - **B**)  $\overrightarrow{AB} = 3\overrightarrow{BC}$
  - c)  $\overrightarrow{AC} = 2\overrightarrow{AB}$
  - **D**)  $\overrightarrow{AB} = 3\overrightarrow{BC}$
  - E)  $\overrightarrow{AC} = 4\overrightarrow{AB}$

**39.** Let  $\overrightarrow{AB} = 2\hat{i} + 10\hat{j} + 11\hat{k}$  and  $\overrightarrow{AC} = -\hat{i} + 2\hat{j} + 2\hat{k}$ . If  $\theta$  is the angle between  $\overrightarrow{AB}$  and  $\overrightarrow{AC}$  then  $\sin\theta =$  **A**)  $\frac{\sqrt{13}}{9}$  **B**)  $\frac{\sqrt{15}}{9}$  **c**)  $\frac{\sqrt{14}}{9}$  **b**)  $\frac{\sqrt{17}}{9}$ **c**)  $\frac{\sqrt{17}}{9}$ 

Correct Answer : Option D

40. Let  $\vec{a} \times (2\hat{i} + 3\hat{j} + 4\hat{k}) = (2\hat{i} + 3\hat{j} + 4\hat{k}) \times \vec{b}$ . If  $|\vec{a} + \vec{b}| = \sqrt{29}$ , then  $\vec{a} + \vec{b}$ = A)  $(2\hat{i} + 3\hat{j} - 4\hat{k})$ B)  $-(2\hat{i} + 3\hat{j} - 4\hat{k})$ c)  $\pm (2\hat{i} + 3\hat{j} + 4\hat{k})$ D)  $\pm (2\hat{i} - 3\hat{j} + 4\hat{k})$ E)  $\pm \sqrt{29}(2\hat{i} + 3\hat{j} + 4\hat{k})$ 

Correct Answer : Option C

**41.** Let  $\vec{a} = \hat{\imath} + 2\hat{\jmath} + 4\hat{k}$ ,  $\vec{b} = 2\hat{\imath} + 4\hat{\jmath} + 8\hat{k}$  and  $\vec{c} = 2\hat{\imath} + 4\hat{\jmath} + 3\hat{k}$ . Then  $(\vec{a} \times \vec{b})$ .  $\vec{c} =$  **A**) 4 **B**) 6 **C**) 8 **D**) 2 **E**) 0

Correct Answer : Option E

- **42.** The point of intersection of the lines  $\frac{x-1}{2} = \frac{y+1}{3} = \frac{z-11}{4}$  and  $\frac{x-3}{1} = \frac{y-\frac{9}{2}}{2} = \frac{z}{1}$  is
  - **A**)  $\left(-2,\frac{11}{2},5\right)$
  - **B**)  $\left(-2,\frac{11}{2},-5\right)$
  - **c**)  $\left(-2, \frac{-11}{2}, -5\right)$ **D**)  $\left(-2, \frac{11}{4}, -5\right)$
  - **E**)  $\left(-2, \frac{-11}{5}, \frac{-5}{2}\right)$

## **Correct Answer:-Question Cancelled**

- **43.** The equation of the line passing through (0, 0, 1) and (1,1,0) is
- A)  $\overrightarrow{r} = \widehat{k} + \lambda (\widehat{i} + \widehat{j} \widehat{k}), \lambda \in \mathbb{R}$ B)  $\overrightarrow{r} = \widehat{j} + \lambda (\widehat{i} - \widehat{j} + \widehat{k}), \lambda \in \mathbb{R}$ c)  $\overrightarrow{r} = \widehat{i} + \lambda (\widehat{i} + \widehat{j} + \widehat{k}), \lambda \in \mathbb{R}$ D)  $\overrightarrow{r} = \widehat{i} + \widehat{j} + \lambda (\widehat{i} - \widehat{j} - \widehat{k}), \lambda \in \mathbb{R}$ E)  $\overrightarrow{r} = \widehat{i} + \widehat{j} + \widehat{k} + \lambda (\widehat{i} + \widehat{j} - \widehat{k}), \lambda \in \mathbb{R}$

Correct Answer : Option A

44. Which one of the following is a vector parallel to the straight line  $\vec{r} = (\hat{\iota} - 11\hat{j} + 101\hat{k}) + \lambda (3\hat{\iota} - 5\hat{j} + 2\hat{k}), \lambda \in \mathbb{R}$ A)  $-3\hat{\iota} + 5\hat{j} - 2\hat{k}$ B)  $3\hat{\iota} + 5\hat{j} + 2\hat{k}$ c)  $\hat{\iota} - 11\hat{j} + 101\hat{k}$ D)  $-\hat{\iota} + 11\hat{\imath} + 101\hat{k}$ 

E)  $-4\hat{\iota} - 16\hat{j} + 103\hat{k}$ 

Correct Answer : Option A

**45.** A straight line through the point (1,-1,0) meets the line  $\frac{x-1}{1} = \frac{y+1}{1} = \frac{z-1}{-1}$  at right angle . It's equation is



The mean deviation about the mean for the following data

46.	x	:	2	4	6	10
	f	:	7	4	5	4
A)	2					
B)	2.5					
C)	4					
D)	6					
E)	5					

Correct Answer : Option B

**47.** If P(A) = 0.7, P(B) = 0.5 and  $P(A \cup B) = 0.9$ . Then P(A / B) is

- A) 0.3
- **B**) 0.4
- **C**) 0.5
- **D**) 0.6
- **E)** 0.7

Correct Answer : Option D

**48.** The variance of 240, 260, 270, 280 is

- **A**)  $\frac{475}{4}$  **B**)  $\frac{475}{2}$  **C**)  $\frac{475}{8}$ **D**)  $\frac{475}{16}$
- **E**)  $\frac{875}{4}$

Correct Answer : Option E

49.	Four unbiased coins are tossed simultaneously. Probability of getting atmost two heads, is
A)	<u>5</u> 8
B)	<u>9</u> 16
C)	$\frac{11}{16}$
D)	$\frac{13}{16}$
E)	<u>15</u> 16

**50.**  $\lim_{x \to 0} \frac{\sin(\pi \sin^2 x)}{x^2} =$  **A**)  $\frac{\pi}{2}$  **B**)  $\pi$  **c**)  $2\pi$  **D**)  $\pi^2$ **E**)  $\frac{\pi^2}{2}$ 

Correct Answer : Option B

**51.** If [x] is the greatest integer less than or equal to x, then  $\lim_{x \to 0^-} \frac{\sin[x]}{[x]}$  is equal to

- **A**) 1
- **B**) sin 1
- **C**) -1
- **D**) 0
- E) -sin 1

Correct Answer : Option B

52.	$\lim_{x \to 2} \frac{(x^3 - 8)\sin(x - 2)}{x^2 - 4x + 4}$ is equal to
A)	4
B)	8
C)	12
D)	-8
E)	-12
,	

Correct Answer : Option C

- **53.**  $\lim_{x \to 0} \frac{x \cos^2 x}{\sin x}$  is equal to
- **A**) 4
- **B**) 2
- **C**) -2
- **D**) 0
- E) 1

**54.** Let [a] be the greatest integer less than or equal to a, then  $\lim_{x \to 0^+} x \left\{ \begin{bmatrix} 1 \\ x \end{bmatrix} + \begin{bmatrix} 2 \\ x \end{bmatrix} \right\}$  is equal to

- **A**) 2
- **B)** 1
- **c**) 3
- **D**) 0
- E) 4

Correct Answer : Option C

**55.** If f(x) = sin(|x|) - |x|,  $x \in \mathbb{R}$ , then f is

- A) not differentiable at  $x = \frac{\pi}{6}$
- **B**) not differentiable at  $x = \frac{\pi}{2}$
- **c**) not differentiable at  $x = \frac{\pi}{4}$
- **D**) not differentiable at  $x = \pi$
- E) not differentiable at x = 0

# **Correct Answer:-Question Cancelled**

- **56.** The function  $f(x) = |x^2 3x + 2|$ ,  $x \in \mathbb{R}$  is not differentiable at
- A) x = 1 and x = 3
- **B**) x = 1 and x = 2
- c) x = 2 and x = 4
- **D**) x = 4 and x = 5
- **E**) x = -1 and x = -2

Correct Answer : Option B

**57.** If  $e^{y} + x^{2}y + xy^{2} = e^{2}$ , then  $\frac{dy}{dx}$  at (0,1) is equal to A)  $\frac{1}{e}$ B) eC) -eD)  $\frac{2}{e}$ 

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

58.	If $f(x) = x   x $ , then $f'(-10)=$
A)	-20
B)	-10
C)	-40
D)	20
E)	40

Correct Answer : Option D

59. If  $y = (\tan x)^x$ , then  $\frac{1}{y} \frac{dy}{dx} =$ A)  $log(\tan x) + 2x cosec(2x)$ B) log(tanx) + x cosec(2x)c)  $x log(\tan x) + 2xcosec(2x)$ D)  $xlog(\tan x) + x^2cosec(2x)$ 

E) 
$$log(tanx) + \frac{x}{2}cosec(2x)$$

Correct Answer : Option A

**60.** The minimum of f(x) = |x + 2|,  $x \in \mathbb{R}$  occurs at

- A) x = 0
- **в**) x = 2
- **c**) x = 1
- D) x = -2
- E) x = -1

Correct Answer : Option D

**61.** If 
$$g(x) = x^2 - x, x \in \mathbb{R}$$
, then  $g(x)$  is increasing in  
A)  $(-\infty, \infty)$   
B)  $(-\infty, 0)$   
C)  $(0, -\infty)$   
D)  $(-5,5)$   
E)  $\left[\frac{1}{2}, \infty\right]$ 

Correct Answer : Option E

**62.** The distance travelled by a moving particle is given by  $s = t^2 - 6t + 10$ , where *t* is the time in seconds. The particle is at rest when *t* =

- **A**) 1
- **B**) 4
- **C**) 6
- **D**) 3
- E) 8

Correct Answer : Option D

**63.** The maximum value of the function  $f(x) = x\sqrt{4x - x^2}$  is

- A)  $\sqrt{3}$
- **B**) 4√3
- c)  $5\sqrt{3}$
- D)  $3\sqrt{3}$
- E)  $6\sqrt{3}$

Correct Answer : Option D

$$64. \quad \int \frac{\sin 2x}{\sin x} \, dx =$$

- A) sinx + C
- **в**) 2*cosx* + *C*
- c) -cosx + C
- **D**) -sinx + C
- E) 2sinx + C

Correct Answer : Option E

**65.** 
$$\int \frac{\log(1+x)}{(1+x)} dx =$$
  
**A**)  $\frac{1}{2} \log(1+x) + C$   
**B**)  $\frac{1}{2} [\log(1+x)]^2 + C$   
**C**)  $[\log(1+x)]^2 + C$   
**D**)  $\log(1+x) + C$ 

**E**) x log(1 + x) + C

Correct Answer : Option B

**66.** 
$$\int \frac{\cos \theta}{2 - \sin^2 \theta} d\theta =$$
  
**A**) 
$$\frac{1}{2} \log \left| \frac{\sqrt{2} - \sin \theta}{\sqrt{2} + \sin \theta} \right| + C$$

**B**) 
$$\frac{1}{2}\log\left|\frac{\sqrt{2}+\sin\theta}{\sqrt{2}-\sin\theta}\right|+C$$

**C**) 
$$\log \left| \frac{\sqrt{2} + \sin \theta}{\sqrt{2} - \sin \theta} \right| + C$$

**D**) 
$$\frac{1}{\sqrt{2}} \log \left| \frac{\sqrt{2} + \sin \theta}{\sqrt{2} - \sin \theta} \right| + C$$

**E**) 
$$\frac{1}{2\sqrt{2}}\log\left|\frac{\sqrt{2}+\sin\theta}{\sqrt{2}-\sin\theta}\right|+C$$

67. 
$$\int (\sin^{-1}\sqrt{x} + \cos^{-1}\sqrt{x}) dx =$$
  
A)  $\frac{\pi}{2} + C$   
B)  $\frac{\pi x}{4} + C$   
c)  $\frac{\pi x}{3} + C$   
D)  $\frac{\pi x}{2} + C$   
E)  $\frac{-\pi x}{2} + C$ 

Correct Answer : Option D

68. 
$$\int e^{x} \left[ \frac{1}{1+x} - \frac{1}{(1+x)^{2}} \right] dx =$$
A) 
$$\frac{e^{x}}{1+x} + C$$
B) 
$$\frac{xe^{x}}{1+x} + C$$
C) 
$$e^{x} (1+x)^{2} + C$$
D) 
$$\frac{e^{x}}{(1+x)^{2}} + C$$
E) 
$$\frac{e^{x}}{1+x^{2}} + C$$

Correct Answer : Option A

**69.** 
$$\int_{3}^{5} \frac{1}{x(1+x)} dx =$$
  
**A**)  $\log(\frac{10}{9})$   
**B**)  $\log(5)$   
**c**)  $\log(2)$ 

D) 
$$\log\left(\frac{11}{9}\right)$$
  
E)  $\log\left(\frac{13}{9}\right)$ 

- **70.** If [x] is the greatest integer less than or equal to x, then  $\int_{-3}^{3} [x] dx =$ 
  - **A**) -3
  - в) -6
  - **c**) -4
  - **D**) -2
  - **E**) 0

Correct Answer : Option A



Correct Answer : Option E



Correct Answer : Option C

- **73.** The integrating factor of the differential equation  $\frac{dy}{dx} 2y = 2x 3$  is
- A)  $e^{2x}$

**B**) 
$$\frac{-1}{2}e^{-2x}$$

c)  $\frac{1}{2}e^{-2x}$ D)  $\frac{1}{2}e^{-2x}$ E)  $e^{-2x}$ 

Correct Answer : Option E

**74.** The elimination of arbitrary constants  $c_1, c_2, c_3, c_4$  from  $y = (c_1 + c_2)sin(2x + c_3) + c_4e^{5x}$  gives a differential equation of order

- **A**) 2
- **B**) 4
- **c**) 3
- **D**) 1
- **E)** 5

Correct Answer : Option C

Consider the linear programming problem.

- Minimize z = x + y
- **75.** Subject to the constraint  $2x + 3y \ge 6, x \ge 0, y \ge 0$ Then the solution of L.P.P. is
  - **A**) 0
  - в) 2
  - **c**) 3
  - **D**) 5
  - **E**) 6

Correct Answer : Option B

- **76.** The dimensions of  $\frac{mB}{kT}$  where m is the magnetic moment, B, the magnetic flux density, k, Boltzmann constant and T, the absolute temperature are:
  - **A**)  $ML^{-1}T^{-1}$
  - **B**)  $ML^2T^{-1}$
  - c)  $MLT^{-1}$
  - D)  $ML^{-2}T$
  - E)  $M^{0}L^{0}T^{0}$

Correct Answer : Option E

- 77. The SI unit of surface tension is
- A)  $Nm^{-1}$
- B)  $Nm^{-2}$

- c)  $Nm^2$
- **D**) Nm
- E) N

**78.** A car starting from rest moves such that its acceleration varies with time as  $a = 6t (ms^{-2})$ . Its velocity (in ms<sup>-1</sup>) and displacement (in m) after 4 seconds, respectively, are

- **A)** 48, 64
- **B**) 16, 24
- **c)** 16, 38
- **D)** 24, 32
- **E)** 32, 24

Correct Answer : Option A

For the graph shown below between time t and velocity v of the motion of a body, the correct statement is:



- A) The body comes to rest at infinite time
- **B**) At t = 0, acceleration is positive
- c) At t = 0, acceleration is negative
- **D**) At t = 0, the body has maximum velocity
- E) The displacement of the particle is zero.

Correct Answer : Option D

- 80. The coefficient of friction is defined as the ratio of
  - A) frictional force to applied force
  - B) frictional force to normal force
  - c) normal force to frictional force
  - D) weight of the object to frictional force
  - E) applied force to frictional force

Correct Answer : Option B

A tennis ball of mass 150 g is moving at 20 ms $^{-1}$  . A racket strikes it, reversing its

**81.** direction with a final speed of 30 ms<sup>-1</sup>. If the contact time is 0.02 s, then the magnitude of the force (in N) exerted by the racket is

- **A**) 1.5 N
- **B)** 3.75 N
- **c**) 15 N
- **D**) 150 N
- E) 375 N

- 82. A traffic light of mass  $10\sqrt{3}$  kg is suspended by two cables making  $30^{\circ}$  with the vertical. The tension in each cable is:
  - **A**) 10 N
  - **B**) 9.8 N
  - **C**) 98 N
  - D) 19.6 N
  - E) 20 N

Correct Answer : Option C

**83.** A car moves at a speed of 20 ms<sup>-1</sup> under a force of 500 N. The power output of the car is

- **A**) 9.8 kW
- **B**) 980 kW
- **c**) 98 kW
- **D**) 10 kW
- E) 100 kW

Correct Answer : Option D

- **84.** A spring is stretched twice its initial extension. Compared to its initial value, the potential energy
- A) becomes four times
- B) is doubled
- **c**) is halved
- D) remains the same
- E) becomes zero

Correct Answer : Option A

- **85.** If a spinning object contracts, its angular velocity
  - A) remains the same
  - B) becomes zero
  - c) becomes negative
  - D) increases
  - E) decreases

Correct Answer : Option D

A boy whirls a ball on a string along a horizontal circle of radius 98 cm. The angular

- velocity (in rad s<sup>-1</sup>) with which the ball has to be whirled so that its acceleration towards 86. the centre of the circle has the same magnitude as acceleration due to gravity is
  - $\sqrt{10}$ A)
  - B)
  - $\frac{1}{\sqrt{10}}$
  - 10 C)
  - 0.1 D)
  - 100 E)

Correct Answer : Option A

**87.** The centre of mass of a thin uniform rod of length L lies at a distance (from one end)

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

Correct Answer : Option C

**88.** The ratio of the escape velocity to the orbital velocity of the earth is

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

Correct Answer : Option B

- The gravitational potential energy of a body of mass m on the surface of earth of mass M 89. and radius R is (G - Gravitational constant)
- -GMm**A**) R GMm
- B) R
- mgR C)
- -mgR D)
- Zero E)

# **Correct Answer:-Question Cancelled**

90. In a liquid medium, if the depth increases, the pressure at that place

- A) decreases
- B) increases
- c) remains constant
- D) depends on the shape of the container
- E) is zero

- **91.** The angle of contact is the angle between
  - A) the normals to the liquid surface and the container wall
  - B) the liquid surface and the container wall
  - c) the tangent to the liquid surface and solid surface within the liquid at the point of contact
  - D) the liquid surface and solid surface outside the liquid
  - E) the line joining the centres of curvature of the liquid meniscus

## Correct Answer : Option C

Water flows at 3 ms<sup>-1</sup> in a horizontal pipe under a pressure of 2 × 10  $^{5}$ Nm<sup>-2</sup> The pipe

- **92.** narrows to half its original diameter at one end. The speed of water (in ms  $^{-1}$ ) in this narrow section is
  - **A**) 3
  - в) 4
  - **C**) 6
  - **D**) 12
  - **E**) 24

Correct Answer : Option D

A Carnot engine is working between 127 °C and 27 °C. Keeping the sink temperature**93.** unaltered, the temperature at which the source has to be kept so as to double its efficiency is

- **A**) 400°C
- в) 273 °С
- **c**) 327°C
- **D**) 525 °C
- **E**) 600°C

## Correct Answer : Option C

- **94.** The ratio of specific heat capacities of a diatomic gas at constant pressure and constant volume is
  - **A**) 1.4
  - **B**) 1.6
  - **C**) 1.7
  - **D**) 1.8
  - **E)** 1.5

- **95.** The translational kinetic energy of an ideal gas containing N molecules at temperature T is (k Boltzmann constant)
- A)  $\frac{5}{2}NkT$
- B)  $\frac{1}{2}NkT$
- c)  $\frac{3}{2}NkT$
- D)  $\frac{7}{2}NkT$
- E)  $\frac{9}{2}NkT$

**96.** For an ideal gas of molar mass *M*, the slope of the plot between the rms velocity ( $v_{rms}$  along the y-axis) and the square root of absolute temperature ( $\sqrt{T}$  along the x-axis) is



Correct Answer : Option B

- **97.** In a simple harmonic motion,
  - A) the velocity is constant
  - B) the motion is periodic
  - c) the acceleration is directly proportional to velocity
  - **D**) the acceleration is along the direction of displacement
  - E) the motion must be along a straight line

# Correct Answer : Option B

- 98. The principle of superposition in wave motion states that
  - A) the net displacement is the vector sum of individual displacements
  - B) waves interfere with each other and lose energy
  - c) waves cannot occupy the same space at the same time
  - **D**) it is applicable to sound waves only

E) it is applicable to standing waves only

Correct Answer : Option A

- **99.** The number of nodes and antinodes in a guitar string vibrating in the third harmonic is:
  - A) 5 nodes, 4 antinodes
  - B) 4 nodes, 3 antinodes
  - c) 3 nodes, 2 antinodes
  - D) 2 nodes, 3 antinodes
  - E) 1 node, 2 antinodes

Correct Answer : Option B

**100.** The electric field inside a uniformly charged spherical shell of radius R is:

- A) directly proportional to the charge within the shell
- **B**) inversely proportional to  $R^2$
- c) same as that outside the shell
- D) zero
- E) maximum at the centre

Correct Answer : Option D

**101.** The torque on an electric dipole consisting of charges q and -q of dipole moment P in a uniform electric field E is

- A) qE
- в) -qE
- **c**) Zero
- D) **P.E**
- E) P×E

Correct Answer : Option E

**102.** The direction of the electric field due to a positive charge is:

- A) circular around the charge
- B) radially inwards towards the charge
- c) radially outwards away from the charge
- D) along a fixed straight line away from the charge
- E) along a fixed straight line towards the charge

Correct Answer : Option C

103. A Wheatstone bridge is used to measure

- A) unknown resistances
- B) direct current
- c) alternating current
- D) electric power

#### voltage E)

Correct Answer : Option A

The current carrying rail of a subway track is made of steel and has a cross-sectional **104.** area of about 20  $cm^2$ . The resistance of 2 km of the track is (in ohm) as a multiple of the specific resistance of steel, p is:

- 10<sup>2</sup> ρ A)
- 10<sup>3</sup> ρ B)
- 10<sup>4</sup> ρ C)
- 10<sup>5</sup> ρ D)
- 10<sup>6</sup> ρ E)

Correct Answer : Option E

- If n identical cells each of emf E and internal resistance r are connected in parallel, the 105. total EMF and total internal resistance of the combination, respectively, are
  - nE, nr A)
  - E, nr B)
  - $E, \frac{r}{n}$ C)
  - nE, 2nr D)
  - $nE, \frac{r}{n}$ E)

Correct Answer : Option C

**106.** The line integral of the magnetic field around a closed loop is directly proportional to the:

- current enclosed A)
- charge enclosed B)
- C) voltage across the loop
- length of the loop D)
- electric field around the loop E)

Correct Answer : Option A

- **107.** The magnetic dipole moment of a current loop carrying current *I* and of area *A* with n turns is
  - IA A) п

  - $\frac{IA}{n^2}$ B)
  - *IA* 2
  - C)
  - nIA D)
  - IA E)

**108.** A galvanometer is converted into a voltmeter by connecting

- A) a high resistance in series
- B) a low resistance in series
- c) a high resistance in parallel
- **D**) a low resistance in parallel
- E) an inductance in series

Correct Answer : Option A

**109.** The resistance of a semiconductor

- A) increases with increase in temperature
- B) decreases with increase in temperature
- c) is independent of temperature
- D) becomes infinite at high temperature
- E) becomes zero at high temperature

## Correct Answer : Option B

**110.** A metal rod of length 0.5 *m* moves with its length perpendicular to a uniform magnetic field of 0.2 *T* with a velocity of  $3 \text{ ms}^{-1}$ . The induced emf in the rod is

- **A)** 0.1 V
- **B**) 0.2 V
- **c**) 0.3 V
- **D**) 0.4 V
- E) 0.6 V

Correct Answer : Option C

- **111.** The speed of electromagnetic waves in a medium depends on the
  - A) intensity of the wave
  - B) initial phase of the wave
  - c) permittivity and permeability of the medium
  - D) energy it carries
  - E) reflectivity of the medium

## Correct Answer : Option C

**112.** When a beam of white light enters into an optical prism, the most deviated colour is

- A) green
- B) violet
- c) yellow
- D) red
- E) blue

- 113. The phenomenon of diffraction is most significant when the slit width is
  - A) much larger than the wavelength
  - B) much smaller than the wavelength
  - c) comparable to the wavelength
  - D) equal to the screen distance
  - E) independent of the wavelength

Correct Answer : Option C

**114.** In Huygens construction, the secondary wavelets move

- A) in all directions
- B) only radially outward
- c) only radially inward
- D) only in the backward direction of the incident light
- E) in a direction perpendicular to the direction of the incident light

Correct Answer : Option A

- **115.** The plot of maximum kinetic energy of photo-electrons to the energy of the incident photon above its threshold frequency on a photo-sensitive material of work function  $\varphi$  is
- A) an oblique straight line with a positive slope.
- **B**) an oblique straight line with a negative slope.
- c) an oblique straight line passing through the origin.
- **D**) an exponential curve.
- E) a polynomial curve of order 2.

Correct Answer : Option A

**116.** The ratio of the respective de Broglie wavelengths of two particles with kinetic energy of 0.02 eV and 2 eV, respectively, is

- **A**) 1:1
- **B**) 10:1
- **c**) 1:10
- D) 1: $\sqrt{10}$
- E)  $\sqrt{10}$  : 1

Correct Answer : Option B

In the following nuclear reaction, Z is a/an

117.

$$^{197}_{80}X \rightarrow ^{197}_{79}Y + Z + v$$

- A) α particle
- **B**)  $\beta^+$  particle

- **c**)  $\beta^-$  particle
- **D**) proton
- E) neutron

**118.** If a radioactive element disintegrates for a period of time equal to its mean life, then the fraction of the original amount remaining undisintegrated is

- A) *e*-
- в) 1-е
- **C**)  $1 \frac{1}{e}$
- 1
- D)  $\frac{1}{e}$
- **E**) 2*e*

Correct Answer : Option D

**119.** In a Germanium crystal containing N atoms, the total number of outer electrons in the crystal is

- **A**) N
- **B**) 2 N
- **c**) 3 N
- D) 6N
- E) 4 N

Correct Answer : Option E

120. The donor level in an *n*-type semiconductor lies

- A) just below the conduction band
- B) exactly at the middle of the band gap
- c) just below the valence band
- D) just above the conduction band
- E) on the valence band

Correct Answer : Option A

Ten grams of calcium carbonate which is only 90% pure is treated with excess

**121.** hydrochloric acid. What is the mass of *CO*<sub>2</sub> gas liberated? (Atomic mass: Ca=40, C=12 & O=16)

- **A**) 4.4g
- **B**) 3.96g
- **c**) 2.2g
- **D**) 0.44g
- **E)** 0.22g

**122.** For any sub-shell defined by l' value how many values of magnetic quantum number (*m* l) are possible?

- A) (2l)
- в) (2l-1)
- c) (2l+1)
- D) (*l*+1)
- E) (*l*-1)

Correct Answer : Option C

**123.** What is the total number of orbitals associated with the principal quantum number n=3?

- **A**) 3
- **B**) 6
- **C**) 9
- **D**) 10
- E) 14

Correct Answer : Option C

**124.** The alkali metal with the highest first enthalpy of ionization is

- A) Cs
- B) Rb
- **c**) K
- D) Na
- E) Li

Correct Answer : Option E

**125.** Which one of the following molecules contains two 'sigma' bonds and two 'pi' bonds?

- **A**) O<sub>2</sub>
- в) N<sub>2</sub>
- c)  $C_2H_2$
- **D**) CO<sub>2</sub>
- E) CO

Correct Answer : Option D

12g of pure graphite is burnt completely in a bomb calorimeter in excess of oxygen at 298 K at 1 atm. pressure. During combustion, the temperature rises from 298 K to 308 K. The

**126.** heat capacity of the bomb calorimeter is 20.7 kJ  $K^{-1}$ . What is the enthalpy change for combustion of 1 mole of graphite

(in kJ mol<sup>-1</sup>) at 298 K and 1 atm. pressure? (R=8.3 JK<sup>-1</sup> mol<sup>-1</sup>)

- **A**) -2070
- в) -207
- **c**) +2070
- **D**) +207
- E) +2.07

If water vapour is assumed to be a perfect gas, molar enthalpy change for vapourisation
 of 1 mol of water at 1bar and 100°C is 41kJ mol<sup>-1</sup>. Calculate the internal energy change (in kJ mol<sup>-1</sup>) when 1 mole of water is vaporized at 100°C at 1 bar assuming water vapour as an ideal gas. (R=8.3 JK<sup>-1</sup>mol<sup>-1</sup>)

- **A**) 43.1
- **B**) 37.9
- **c**) -43.1
- **D**) -37.9
- **E**) 41.0

## Correct Answer : Option B

**128.** If "S" is the solubility of  $X_3Y_2$  in pure water, assuming that neither kind of ion reacts with water, then, the solubility product,  $K_{sp}$  is

- **A)** 27 S<sup>4</sup>
- **B**) 108 S<sup>5</sup>
- **c**)  $108 \text{ S}^2$
- **D**) 27 S<sup>6</sup>
- **E)**  $27 \text{ S}^2$

Correct Answer : Option B

**129.** In which of the following equilibrium  $K_P = K_C$ ?

- A)  $CaCO_{3(s)} \rightleftharpoons CaO_{(s)} + CO_{2(g)}$
- **B**)  $2SO_{2(g)} + O_{2(g)} = 2SO_{3(g)}$
- c)  $PCI_{5(g)} = PCI_{3(g)} + CI_{2(g)}$
- **D**)  $H_{2(g)} + I_{2(g)} = 2HI_{(g)}$
- **E**)  $N2O_{4(g)} \approx 2NO_{2(g)}$

Correct Answer : Option D

In the following cell reaction,

**130.** 
$${}^{Zn}(S) + {}^{Cu^{2}+}(0.1 \text{ M}) = {}^{Zn^{2}+}(0.001 \text{ M}) + {}^{Cu}(S)$$
, at 298 K,  
Calculate the E<sub>cell</sub> at 298 K if E<sup>0</sup><sub>cell</sub> at this temperature is 1.1V. (2.303 RT/F = 0.059 V at 298 K)

- **A**) 1.218 V
- **B)** 1.118 V
- **c**) 1.159 V
- **D**) 1.041 V
- **E)** 0.982 V

**131.** For which of the following electrode reactions the standard electrode potential is the highest at 298 K? The ions are present in aqueous solution.

A) 
$$Co^{3+} + e^- \rightarrow Co^{2+}$$

- **B**)  $\operatorname{Cl}_{2(g)}$  + 2e<sup>-</sup>  $\rightarrow$  2Cl<sup>-</sup>
- c)  $MnO_{2(s)} + 4H^{+} + 2e^{-} \rightarrow Mn^{2+} + 2H_2O$
- D)  $F_{2(q)} + 2e^- \rightarrow 2F^-$

$$\mathsf{E}) \quad \mathsf{AgCl}_{(s)} + \mathsf{e}^- \to \mathsf{Ag}_{(s)} + \mathsf{Cl}^-$$

## Correct Answer : Option D

The vapour pressure of pure benzene (molar mass=78 g mol<sup>-1</sup>) at a certain

- **132.** temperature is 0.85 bar. When 0.5 g of a non-volatile, non-electrolyte is added to 39 g of benzene, the vapour pressure was found to be 0.845 bar at the same temperature. What is the molar mass of the substance?
  - **A**) 85 g mol<sup>-1</sup>
  - **B**) 127.5 g mol<sup>-1</sup>
  - **c**)  $170 \text{ g mol}^{-1}$
  - **D**)  $210 \text{ g mol}^{-1}$
  - **E**) 145 g mol<sup>-1</sup>

Correct Answer : Option C

- **133.** A first order reaction is 75% completed in 6000 s at 300 K. What is its half life period at the same temperature? (log 2 = 0.3010)
  - **A**) 15 min
  - **B**) 25 min
  - **c**) 75 min
  - **D**) 50 min
  - E) 60 min

Correct Answer : Option D

**134.** Ammonium ion  $(NH_4^+)$  reacts with nitrite ion  $(NO_2^-)$  according to the following equation:

 $NH_4^+ + NO_2^- \rightarrow N_{2(g)} + 2H_2O(I)$ 

The following initial rates of reaction have been measured for the given reactant

•

Experiment	[NH4 <sup>+</sup> ]0,M	[NO <sub>2</sub> <sup>-</sup> ]0,M	Initial rate, M/hour
Ι	0.010	0.020	0.020
П	0.015	0.020	0.030
III	0.010	0.010	0.005

Which of the following is the rate law (rate equation) for this reaction?

A) Rate = 
$$k[NH_4^+]^{1/2}[NO_2^-]$$

**B**) Rate = 
$$k[NH_4^+][NO_2^-]$$

- **c**) Rate =  $k[NH_4^+]^0 [NO_2^-]$
- D) Rate =  $k[NH_4^+][NO_2^-]^{1/2}$
- **E**) Rate =  $k[NH_4^+][NO_2^-]^2$

# Correct Answer : Option E

135. Acidified potassium dichromate cannot oxidize

- A) lodides to iodine
- B) Iron (II) salt to iron (III) salt
- c) Tin (II) salt to tin (IV) salt
- **D**)  $H_2$  S to sulphur
- E) Fluoride to fluorine

Correct Answer : Option E

# **136.** Which of the following is a basic oxide?

- A) CrO
- B) CrO<sub>3</sub>
- **c**) Mn<sub>2</sub>O<sub>7</sub>
- $\mathbf{D}$ )  $Cr_2O_3$
- E)  $V_2O_5$

Correct Answer : Option A

137. The transistion metal ion with the highest magnetic moment is

- A)  $Fe^{2+}$
- B) Mn<sup>2+</sup>
- **c**) Ni<sup>2+</sup>
- D)  $Co^{2+}$
- E)  $Cr^{2+}$

Correct Answer : Option B

**138.** The transition metal with the highest melting point is

- A) Mo
- B) Mn
- C) W
- D) Cr
- E) Au

Correct Answer : Option C

139. Which of the following complex has the least conductivity?

- A)  $[Co(NH_3)_5 CI]CI_2$
- B) Cis-[Co(NH<sub>3</sub>)<sub>4</sub> Cl<sub>2</sub>]Cl
- c)  $[Co(NH_3)_6]Cl_3$
- **D**) [Co(NH<sub>3</sub>)<sub>3</sub>Cl<sub>3</sub>]
- E) trans-[Co(NH<sub>3</sub>)<sub>4</sub>Cl<sub>2</sub>]Cl

Correct Answer : Option D

140. Which one of the following is an ambidentate ligand?

- A) Oxalate
- B) Carbon monoxide
- c) Ethylene diamine
- **D**) Ammonia
- E) Nitrite

Correct Answer : Option E

**141.** The empirical formula of an organic compound is  $CH_2$ . The molar mass of the compound is 56g mol<sup>-1</sup>. The organic compound is

- A) n-Butane
- B) Propene
- c) Propane
- D) 2-Methylpropane
- E) Cyclobutane

Correct Answer : Option E

Which of the following finely divided metals can be used as catalyst in the hydrogenation **142.** of alkenes and alkynes?

- (i) Pt (ii) Fe (iii) Ni (iv) Pd
- **A**) (i), (ii) & (iii)
- **B**) (ii), (iii) & (iv)
- **c**) (i), (iii) & (iv)
- **D**) (ii) & (iii)
- E) (i), (ii), (iii) & (iv)

143. The solvent used in Wurtz reaction is

- A) Water
- B) Methanol
- c) Ethanol
- **D**) Dry ether
- E) Aqueous ethanol

# Correct Answer : Option D

When chlorobenzene is treated with  $Cl_2$  in the presence of anhydrous  $FeCl_3$  catalyst

- **144.** gives a mixture of 1,2-dichlorobenzene and 1,4-dichlorobenzene. This reaction is an example of
- A) Nucleophilic substitution reaction
- B) Electrophilic substitution reaction
- c) Free radical substitution reaction
- D) Nucleophilic addition reaction
- E) Electrophilic addition reaction

Correct Answer : Option B

- **145.** Which of the following compound contains two primary alcoholic and one secondary alcoholic groups?
  - A) Ethylene glycol
  - B) Isopropyl alcohol
  - c) 3° Butyl alcohol
  - D) Glycerol
  - E) 2° Butyl alcohol

Correct Answer : Option D

146. Propene on hydroboration-oxidation gives

- A) 1-propanol
- B) 2-propanol
- c) propanal
- D) propanone
- E) etanoic acid

Correct Answer : Option A

- **147.** When propanone is treated with Zn/Hg and Con.HCl propane is formed. This reaction is known as
  - A) Wolf-Kishner reaction
  - B) Clemmensen reaction
  - c) Hoffman reaction

- D) Kolbe's reaction
- E) Cannizzaro reaction

- 148. Benzoyl chloride can be converted to benzaldehyde by
  - A) Rosenmund reduction
  - B) Etard reaction
  - c) Stephen reaction
  - D) Gatterman reaction
  - E) Gatterman-Koch reaction

Correct Answer : Option A

**149.** The amine with the highest  $pK_b$  value is

- A) Methanamine
- B) N-methylmethanamine
- c) Benzeneamine
- D) N-Methylaniline
- E) Ethanamine

Correct Answer : Option C

150. The base that is not present in DNA is

- A) uracil
- B) adenine
- c) guanine
- **D**) thymine
- E) cytosine

Correct Answer : Option A