

FINAL ANSWER KEY

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1. In the travelling plane wave equation given by $y = A \sin \omega \left(\frac{x}{v} - t \right)$, where ω is the angular velocity and v is the linear velocity. The dimension of ωt is
- A) $LM^{\circ}T^{-1}$
B) $L^{\circ}M^{\circ}T^{\circ}$
C) $L^{\circ}M^{\circ}T$
D) LMT
E) LMT^{-2}

Correct Answer : Option B

2. Add 2.7×10^{-5} to 4.5×10^{-4} with due regard to significant figures
- A) 4.8×10^{-4}
B) 4.7×10^{-5}
C) 4.8×10^{-5}
D) 4.7×10^{-4}
E) 5.0×10^{-4}

Correct Answer : Option A

3. The length of second's hand in a watch is 1 cm. The magnitude of the change in the velocity of its tip in 30 seconds (in cms^{-1}) is
- A) $\frac{\pi}{30}$
B) $\frac{\sqrt{2}\pi}{30}$
C) $\frac{\sqrt{2}\pi}{15}$
D) $\frac{\pi}{15}$
E) $\frac{\pi}{30\sqrt{2}}$

Correct Answer : Option D

- A) constant but not zero
- B) zero
- C) constant and is in the direction of velocity
- D) not a constant.
- E) constant and is opposite to the direction of velocity

Correct Answer : Option B

A projectile is projected with a velocity of 20 ms^{-1} at an angle 45° to the horizontal. After

5. sometime its velocity vector makes an angle of 30° to the horizontal. Its speed at this instant (in ms^{-1}) is

A) $10\sqrt{\frac{2}{3}}$

B) $\frac{20}{\sqrt{3}}$

C) $20\sqrt{\frac{2}{3}}$

D) $10\sqrt{2}$

E) $10\sqrt{3}$

Correct Answer : Option C

6. A boy sitting in a bus moving at a constant velocity throws a ball vertically up into air. The ball will fall

- A) in the bus in front of the boy
- B) in the bus on the side of the boy
- C) outside the bus
- D) in the hands of the boy
- E) in the bus behind the boy

Correct Answer : Option D

A machine gun fires a bullet of mass 25 g with a velocity of 1000 ms^{-1} . If the man holding the gun can exert a maximum force of 100 N on the gun, the maximum number of bullets that he can fire per second is

- A) 4
- B) 12
- C) 8
- D) 6
- E) 3

Correct Answer : Option A

8. When a vehicle moving with kinetic energy K is stopped in a distance d by applying a stopping force F given by

A) $F = \frac{K}{d}$

B) $F = Kd$

C) $F = \frac{1}{Kd}$

D) $F = \frac{d}{K}$

E) $F = \frac{d}{K^2}$

Correct Answer : Option A

9. In moving a body of mass m down a smooth incline of inclination θ with velocity v , the power required is (g = acceleration due to gravity)

A) $mg v$

B) $(mg \cos \theta)v$

C) $(mg \sin \theta)v$

D) $\frac{mg \sin \theta}{v}$

E) $\frac{mg \cos \theta}{v}$

Correct Answer : Option C

10. The torque required to increase the angular speed of a uniform solid disc of mass 10 kg and diameter 0.5 m from zero to 120 rotations per minute in 5 sec. is

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

B) $\pi \text{ Nm}$

C) $\frac{\pi}{2} \text{ Nm}$

D) $\frac{\pi}{3} \text{ Nm}$

E) $\frac{3\pi}{4} \text{ Nm}$

Correct Answer : Option A

11. Radius of gyration K of a hollow cylinder of mass M and radius R about its long axis of symmetry is

A) $2R$

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

- c) R
- d) $\frac{R}{4}$
- e) $\frac{3R}{4}$

Correct Answer : Option C

12. The value of escape velocity v_e for a planet depends on

- A) the mass of the body thrown from the planet
- B) the direction of projection of the body
- C) the angle of projection
- D) only on the mass of the planet
- E) its mass M , density ρ and radius of the planet

Correct Answer : Option E

13. The slope of the graph plotted between square of time period of a planet T^2 and the cube of its mean distance from the sun r^3 is
(G = Gravitational constant, M = Mass of the planet)

- A) $\frac{4\pi^2}{GM}$
- B) $4\pi GM$
- C) $\frac{4\pi G}{M}$
- D) $\frac{4\pi^2 M}{G}$
- E) Zero

Correct Answer : Option A

14. If n small identical liquid drops, each having terminal velocity v merge together, then the terminal velocity of the bigger drop is

- A) $n^2 v$
- B) $n^{1/3} v$
- C) $\frac{v}{n}$
- D) nv
- E) $n^{2/3} v$

Correct Answer : Option E

15. A fluid has stream line flow through a horizontal pipe of variable cross-sectional area. Then
- A) its velocity is minimum at the narrowest part of the tube and the pressure is minimum at the widest point
 - B) its velocity and pressure both are maximum at the widest point
 - C) its velocity and pressure both are minimum at the narrowest point
 - D) its velocity is maximum at the narrowest point and the pressure is maximum at the widest part
 - E) its velocity is maximum and pressure is minimum at the narrowest point

Correct Answer:-Question Cancelled

16. A metal rod of length 1 m at 20°C is made up of a material of coefficient of linear expansion $2 \times 10^{-5} /^{\circ}\text{C}$. The temperature at which its length is increased by 1 mm is
- A) 45°C
 - B) 70°C
 - C) 65°C
 - D) 60°C
 - E) 50°C

Correct Answer : Option B

- The ends of a metallic rod are at temperatures T_1 and T_2 and the rate of flow of heat through it is $Q \text{ Js}^{-1}$. If all the dimensions of the rod are halved keeping the end temperatures constant, the new rate of flow of heat will be
- 17.
- A) $2Q$
 - B) $\frac{Q}{8}$
 - C) $\frac{Q}{4}$
 - D) $\frac{Q}{2}$
 - E) Q

Correct Answer : Option D

- The rate of emission of a perfectly black body at temperature 27°C is E_1 . If the temperature of the body is raised to 627°C , its rate of emission becomes E_2 . The ratio of $\frac{E_1}{E_2}$ is
- 18.
- A) $\frac{1}{81}$
 - B) $\frac{1}{16}$
 - C) $\frac{1}{25}$
 - D) $\frac{1}{36}$

E) $\frac{1}{49}$

Correct Answer : Option A

A monoatomic ideal gas of ' n ' moles heated from temperature T_1 to T_2 under two different

19. conditions (i) at constant pressure (ii) at constant volume. The change in the internal energy of the gas is

- A) more in process (ii)
 B) more in process (i)
 C) same in both the processes
 D) zero
 E) proportional to $\frac{T_1 + T_2}{2}$

Correct Answer : Option C

20. The ratio between the root mean square velocities of O_2 and O_3 molecules at the same temperature is

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

Correct Answer : Option D

21. A particle is executing linear simple harmonic oscillation with an amplitude of A . If the total energy of oscillation is E , then its kinetic energy at a distance of $0.707 A$ from the mean position is

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

Correct Answer : Option A

The equation of a stationary wave is given by

22. $y = 5 \sin \frac{\pi x}{2} \cos 10\pi t \text{ cm}$

The distance between two consecutive nodes (in cm) is

- A) 5
- B) 2
- C) 8
- D) 1
- E) 6

Correct Answer : Option B

- 23.** A thin spherical shell of radius 12 cm is charged such that the potential on its surface is 60 V. Then the potential at the centre of the sphere is
- A) 5 V
 - B) Zero
 - C) 30 V
 - D) 120 V
 - E) 60 V

Correct Answer : Option E

- 24.** A stationary body of mass 5 g carries a charge of $5 \mu\text{C}$. The potential difference with which it should be accelerated to acquire a speed of 10 ms^{-1} is
- A) 4 kV
 - B) 25 kV
 - C) 50 kV
 - D) 40 kV
 - E) 2 kV

Correct Answer : Option C

- 25.** An electric dipole of dipole moment p is kept in a uniform electric field E such that it is aligned parallel to the field. The energy required to rotate it by 45° is
- A) pE
 - B) $pE \frac{(\sqrt{2} + 1)}{\sqrt{2}}$
 - C) $pE \frac{(\sqrt{2} - 1)}{\sqrt{2}}$
 - D) $\frac{pE}{\sqrt{2}}$
 - E) $\sqrt{2} pE$

Correct Answer : Option C

- 26.** A steady current of 2A is flowing through a conducting wire. The number of electrons flowing per second in it is
- A) 1.25×10^7
 - B) 1.25×10^{19}

- c) 2.50×10^{10}
- D) 0.125×10^{25}
- E) 2.5×10^{17}

Correct Answer : Option B

27. If the voltage across a bulb rated 220V – 60 W drops by 1.5% of its rated value, the percentage drop in the rated value of the power is

- A) 0.75%
- B) 1.5%
- C) 4.5%
- D) 3%
- E) 2.5%

Correct Answer : Option D

28. The terminal potential difference of a cell in the open circuit is 2 V. When the cell is connected to a 10Ω resistor, the terminal potential difference falls to 1.5 V. The internal resistance of the cell is

- A) $\frac{10}{3}\Omega$
- B) $\frac{10}{9}\Omega$
- C) $\frac{20}{7}\Omega$
- D) $\frac{15}{6}\Omega$
- E) $\frac{13}{2}\Omega$

Correct Answer : Option A

29. For a linear material, the relation between the relative magnetic permeability μ_r and magnetic susceptibility χ is (μ = magnetic permeability)

- A) $\chi = \mu_r + 1$
- B) $\chi = \mu_r - 1$
- C) $\chi = \mu\mu_r$
- D) $\mu - 1$
- E) $\chi = \mu + 1$

Correct Answer : Option B

30. The magnetic field at the centre of a circular coil having single turn of the wire carrying current I is B . The magnetic field at the centre of the same coil with 4 turns carrying the same current is
- A) $16B$
 - B) $8B$
 - C) $4B$
 - D) $\frac{B}{2}$
 - E) $\frac{B}{4}$

Correct Answer : Option A

31. A current carrying square loop is suspended in a uniform magnetic field acting in the plane of the loop. If $\vec{F}$ is the force acting on one arm of the loop, then the net force acting on the remaining three arms of the loop is
- A) $-3\vec{F}$
 - B) $3\vec{F}$
 - C) $\vec{F}$
 - D) $-\vec{F}$
 - E) $-\frac{1}{2}\vec{F}$

Correct Answer : Option D

32. If the magnetic field energy stored in an inductor changes from maximum to minimum value in 5 ms, when connected to an a.c. source, the frequency of the a.c. source is
- A) 200 Hz
 - B) 500 Hz
 - C) 50 Hz
 - D) 20 Hz
 - E) 100 Hz

Correct Answer : Option C

33. In an LCR circuit, at resonance, the value of the power factor is
- A) 1
 - B) 0
 - C) 0.5
 - D) 0.75
 - E) infinity

Correct Answer : Option A

34. An electromagnetic wave is propagating in a medium with velocity $\vec{v} = v\hat{i}$. The instantaneous oscillating magnetic field of this electromagnetic wave is along positive z direction. Then the direction of oscillating electric field is in the
- A) positive x direction

- B) negative x direction
- C) positive y direction
- D) negative y direction
- E) negative z direction

Correct Answer : Option C

- 35.** When light is reflected from an optically rarer medium
- A) its phase remains unchanged but its frequency increases
 - B) both its phase and frequency remain unchanged
 - C) its phase changes by π but the frequency remains unchanged
 - D) its phase remains the same but the frequency decreases
 - E) its phase changes by $\pi/2$ but the frequency remains unchanged

Correct Answer : Option B

- Focal length of a convex lens of refractive index 1.5 is 3 cm. When the lens is immersed in
- 36.** water of refractive index $\frac{4}{3}$, its focal length will be
- A) 3 cm
 - B) 10 cm
 - C) 12 cm
 - D) 1.5 cm
 - E) 6 cm

Correct Answer : Option C

- A narrow single slit of width d is illuminated by white light. If the first minimum for violet
- 37.** light ($\lambda = 4500 \text{ \AA}$) falls at $\theta = 30^\circ$, the width of the slit d in microns is (1 micron = 10^{-6} m)
- A) 0.4
 - B) 0.5
 - C) 0.3
 - D) 0.7
 - E) 0.9

Correct Answer : Option E

- Threshold frequency for photoelectric effect from a metallic surface corresponds to a
- 38.** wavelength of $6000 \text{ \AA}$. The photoelectric work function for the metal is ($h = 6.6 \times 10^{-34} \text{ Js}$)
- A) $1.5 \times 10^{-19} \text{ J}$
 - B) $2.7 \times 10^{-18} \text{ J}$
 - C) $5.4 \times 10^{-18} \text{ J}$
 - D) $4.5 \times 10^{-19} \text{ J}$
 - E) $3.3 \times 10^{-19} \text{ J}$

Correct Answer : Option E

A proton and a photon have the same energy. Then the de-Broglie wavelength of proton λ_p

39. and wavelength of photon λ_0 are related by

A) $\lambda_0 \propto \frac{1}{\sqrt{\lambda_p}}$

B) $\lambda_0 \propto \sqrt{\lambda_p}$

C) $\lambda_0 \propto \lambda_p$

D) $\lambda_0 \propto \lambda_p^2$

E) $\lambda_0 \propto \frac{1}{\lambda_p}$

Correct Answer : Option D

40. Bohr atom model is invalid for

- A) Hydrogen atom
- B) doubly ionized helium atom
- C) deuteron atom
- D) singly ionized helium atom
- E) doubly ionized lithium atom

Correct Answer : Option B

41. The energy equivalent of 1 g of a substance in joules is

- A) 9×10^{13}
- B) 4.5×10^{13}
- C) 1×10^{13}
- D) 0.5×10^{13}
- E) 2.25×10^{13}

Correct Answer : Option A

42. Mass numbers of two nuclei are in the ratio 2:3. The ratio of the nuclear densities would be

- A) $2:3^{1/3}$
- B) $3^{1/3}:2$
- C) 2:3
- D) 3:2
- E) 1:1

Correct Answer : Option E

43. Four hydrogen atoms combine to form an ${}^4_2\text{He}$ atom with a release of 26.7 MeV of energy. This is
- A) fission reaction
 - B) β^+ emission
 - C) β^- emission
 - D) γ emission
 - E) fusion reaction

Correct Answer : Option E

In the circuit given below, the current is

44. 
- A) 0.10 A
 - B) 10^{-3} A
 - C) 0.5 A
 - D) 1 A
 - E) 0A

Correct Answer : Option E

45. Electric conduction in a semiconductor is due to
- A) holes only
 - B) electrons only
 - C) neither holes nor electrons
 - D) both electrons and holes
 - E) recombination of electrons and holes

Correct Answer:-Question Cancelled

46. 260 g of an aqueous solution contains 60 g of urea (Molar mass = 60 g mol^{-1}). The molality of the solution is
- A) 2m
 - B) 3m
 - C) 4m
 - D) 5m
 - E) 6m

Correct Answer : Option D

47. Which of the following pair exhibits diagonal relationship?
- A) Li and Mg
 - B) Li and Na
 - C) Mg and Al
 - D) B and P
 - E) C and Cl

Correct Answer : Option A

48. The molecule which has see saw in structure is

- A) NH_3
- B) SF_4
- C) CCl_4
- D) SiCl_4
- E) BrF_5

Correct Answer : Option B

49. The quantum number which determines the shape of the subshell is

- A) Principal quantum number
- B) Magnetic quantum number
- C) Azimuthal quantum number
- D) Spin quantum number
- E) Principal and magnetic quantum number

Correct Answer : Option C

The total enthalpy change when 1 mol of water at 100°C and 1 bar pressure is converted to ice at 0°C is -----.

50. (Enthalpy of fusion of ice = 6.00 kJ mol^{-1} , heat capacity of water = $4.2 \text{ J K}^{-1} \text{ g}^{-1}$, molar mass of H_2O = 18 g mol^{-1})

- A) $-7.56 \text{ kJ mol}^{-1}$
- B) $-6.00 \text{ kJ mol}^{-1}$
- C) $-13.56 \text{ kJ mol}^{-1}$
- D) -756 kJ mol^{-1}
- E) $-1.356 \text{ kJ mol}^{-1}$

Correct Answer : Option C

51. The balanced ionic equation for the reaction of $\text{K}_2\text{Cr}_2\text{O}_7$ with Na_2SO_3 in an acid solution is

- A) $\text{Cr}_2\text{O}_7^{2-}(\text{aq}) + \text{SO}_3^{2-}(\text{aq}) + 8\text{H}^+(\text{aq}) \rightarrow 2\text{Cr}^{3+}(\text{aq}) + \text{SO}_4^{2-}(\text{aq}) + 4\text{H}_2\text{O}(\text{l})$
- B) $\text{Cr}_2\text{O}_7^{2-}(\text{aq}) + 3\text{SO}_3^{2-}(\text{aq}) + 2\text{H}^+(\text{aq}) \rightarrow 2\text{Cr}^{3+}(\text{aq}) + 3\text{SO}_4^{2-}(\text{aq}) + \text{H}_2\text{O}(\text{l})$
- C) $3\text{Cr}_2\text{O}_7^{2-}(\text{aq}) + 3\text{SO}_3^{2-}(\text{aq}) + 8\text{H}^+(\text{aq}) \rightarrow 6\text{Cr}^{3+}(\text{aq}) + 3\text{SO}_4^{2-}(\text{aq}) + \text{H}_2\text{O}(\text{l})$
- D) $3\text{Cr}_2\text{O}_7^{2-}(\text{aq}) + 3\text{SO}_3^{2-}(\text{aq}) + 2\text{H}^+(\text{aq}) \rightarrow 3\text{Cr}^{3+}(\text{aq}) + 3\text{SO}_4^{2-}(\text{aq}) + \text{H}_2\text{O}(\text{l})$
- E) $\text{Cr}_2\text{O}_7^{2-}(\text{aq}) + 3\text{SO}_3^{2-}(\text{aq}) + 8\text{H}^+(\text{aq}) \rightarrow 2\text{Cr}^{3+}(\text{aq}) + 3\text{SO}_4^{2-}(\text{aq}) + 4\text{H}_2\text{O}(\text{l})$

Correct Answer : Option E

52. The limiting molar conductances of NaCl , HCl and CH_3COONa at 300 K are 126.4, 425.9 and $91.0 \text{ S cm}^2 \text{ mol}^{-1}$ respectively. The limiting molar conductance of acetic acid at 300 K is

- A) $266 \text{ S cm}^2 \text{ mol}^{-1}$
- B) $390.5 \text{ S cm}^2 \text{ mol}^{-1}$

- C) $461.3 \text{ S cm}^2 \text{ mol}^{-1}$
- D) $208 \text{ S cm}^2 \text{ mol}^{-1}$
- E) $108 \text{ S cm}^2 \text{ mol}^{-1}$

Correct Answer : Option B

53. Which of the following liquid pair shows negative deviation from Raoult's law?

- A) Phenol – Aniline
- B) Acetone - Carbon disulphide
- C) Benzene – Toluene
- D) n-hexane – n-heptane
- E) Bromoethane – Chloroethane

Correct Answer : Option A

54. The half-life period of a first order reaction is 1000 seconds. Its rate constant is

- A) 0.693 sec^{-1}
- B) $6.93 \times 10^{-2} \text{ sec}^{-1}$
- C) $6.93 \times 10^{-3} \text{ sec}^{-1}$
- D) $6.93 \times 10^{-4} \text{ sec}^{-1}$
- E) $6.93 \times 10^{-1} \text{ sec}^{-1}$

Correct Answer : Option D

55. Which of the following material acts as a semiconductor at 298 K?

- A) Iron
- B) Copper oxide
- C) Sodium
- D) Graphite
- E) Glass

Correct Answer : Option B

56. The resistance of a conductivity cell filled with 0.02 M KCl solution is 520 ohm at 298 K. The conductivity of the solution at 298 K is (Cell constant = 130 cm^{-1})

- A) 0.50 S cm^{-1}
- B) 1.25 S cm^{-1}
- C) 0.025 S cm^{-1}
- D) 0.25 S cm^{-1}
- E) 0.75 S cm^{-1}

Correct Answer : Option D

57. For the equilibrium at 500 K, $\text{N}_2 (\text{g}) + 3\text{H}_2 (\text{g}) \rightleftharpoons 2\text{NH}_3 (\text{g})$, the equilibrium concentrations of $\text{N}_2 (\text{g})$, $\text{H}_2 (\text{g})$ and $\text{NH}_3 (\text{g})$ are respectively 4.0 M, 2.0 M and 2.0 M. The K_c for the formation of NH_3 at 500 K is

- A) $1/16 \text{ mol}^{-2} \text{ dm}^6$
- B) $1/32 \text{ mol}^{-2} \text{ dm}^6$
- C) $1/8 \text{ mol}^{-2} \text{ dm}^6$
- D) $1/4 \text{ mol}^{-2} \text{ dm}^6$
- E) $1/2 \text{ mol}^{-2} \text{ dm}^6$

Correct Answer : Option C

58. The molarity of a solution containing 8 g of NaOH (Molar mass = 40 g mol^{-1}) in 250 mL solution is

- A) 0.8M
- B) 0.4M
- C) 0.2M
- D) 0.5M
- E) 0.6M

Correct Answer : Option A

59. Which of the following are the conditions for a reaction spontaneous at all temperatures?

- A) $\Delta_r H > 0$; $\Delta_r S > 0$
- B) $\Delta_r H < 0$; $\Delta_r S > 0$
- C) $\Delta_r H < 0$; $\Delta_r S < 0$
- D) $\Delta_r H = 0$; $\Delta_r S < 0$
- E) $\Delta_r H = 0$; $\Delta_r S = 0$

Correct Answer : Option B

60. Transition elements act as catalyst because

- A) their melting points are high
- B) their ionization potential values are high
- C) they have high density
- D) they show variable oxidation state
- E) they have high electronegativity

Correct Answer : Option D

61. Lanthanides (Ln) burn in O_2 to give

- A) LnO
- B) Ln(OH)_3
- C) Ln_2O_3
- D) LnO_2
- E) LnO_3

Correct Answer : Option C

62. The IUPAC name of the coordination compound $\text{Hg}[\text{Co}(\text{SCN})_4]$ is

- A) Mercury (I) tetrathiocyanato-S-cobaltate (III)
- B) Mercury (II) tetrathiocyanato-S-cobaltate(II)
- C) Mercury (I) tetrathiocyanato-S-cobaltate (IV)
- D) Mercury (II) tetraisocyanato-S-cobaltate (III)
- E) Mercury (I) tetraisocyanato-N-cobaltate (III)

Correct Answer : Option B

63. In a combustion reaction, heat change during the formation of 40 g of carbon dioxide from carbon and dioxygen gas is (Enthalpy of combustion of carbon = -396 kJ mol^{-1})

- A) 320 kJ
- B) -320 kJ

- c) -360 kJ
- d) 360 kJ
- e) 240 kJ

Correct Answer : Option C

64. Which of the following statement is incorrect?

- A) Hyperconjugation is a permanent effect.
- B) Tertiary carbocation is relatively more stable than a secondary carbocation.
- C) F has stronger -I effect than Cl.
- D) Inductive effect decreases with increasing distance.
- E) When inductive and electromeric effects operate in opposite directions, the inductive effect predominates.

Correct Answer : Option E

65. Which of the following statement is incorrect with regard to ozonolysis?

- A) It involves addition of ozone on alkene.
- B) An unsymmetrical alkene gives two different carbonyl compounds.
- C) It is used to identify the number of double bonds in starting material.
- D) It cannot be used to detect the position of the double bonds.
- E) Ozonide will undergo cleavage by $\text{Zn-H}_2\text{O}$.

Correct Answer : Option D

66. Which of the following statement is true?

- A) Dehydration of alcohol takes place in presence of HCl/ZnCl_2 .
- B) Formation of ethene from ethyl iodide occurs on heating with aqueous KOH.
- C) Hydrogenation of an unsymmetrical alkyne in presence of Pd/C gives *cis*- alkene.
- D) Hydrogenation of an unsymmetrical alkyne in presence of Na/liq.NH_3 gives *cis*-alkene.
- E) The order of reactivity of hydrogen halides towards alkenes is $\text{HI} < \text{HBr} < \text{HCl}$.

Correct Answer : Option C

67. An organic compound X ($\text{C}_6\text{H}_6\text{O}$) on reaction with zinc dust gives 'Y'. The product 'Y' reacts CH_3COCl in presence of anhydrous AlCl_3 to give 'Z' ($\text{C}_8\text{H}_8\text{O}$). The compounds X, Y and Z are respectively

- A) benzaldehyde, benzene, methyl phenyl ketone
- B) phenol, benzene, acetophenone
- C) phenol, naphthalene, acetophenone
- D) benzene, phenol, diphenyl ketone
- E) cyclohexanol, cyclohexane, benzophenone

Correct Answer : Option B

68. The percentage amylose in starch is about

- A) 40-50 %
- B) 80-85 %
- C) 60-80 %
- D) 50-60 %
- E) 15 – 20 %

Correct Answer : Option E

69. Which of the following statement is correct?

- A) Bromination of phenol in CS_2 at low temperature give 2,4,6-tribromophenol.

- B) Oxidation of phenol with chromic acid gives benzene.
- C) Conversion of phenol into tribromophenol by bromine water is a nucleophilic substitution reaction.
- D) p-Nitrophenol is steam volatile due to intermolecular hydrogen bonding.
- E) The intermediate in Riemer-Tiemann reaction is substituted benzal chloride.

Correct Answer : Option E

- 70.** On heating an aldehyde with Fehling's reagent, a reddish-brown precipitate is obtained due to the formation of
- A) cupric oxide
 - B) cuprous oxide
 - C) carboxylic acid
 - D) silver
 - E) copper acetate

Correct Answer : Option B

- 71.** The decreasing order of basic strength of amines in aqueous medium is
- A) $\text{CH}_3\text{NH}_2 > (\text{CH}_3)_2\text{NH} > (\text{CH}_3)_3\text{N} > \text{NH}_3$
 - B) $(\text{CH}_3)_2\text{NH} > \text{CH}_3\text{NH}_2 > (\text{CH}_3)_3\text{N} > \text{NH}_3$
 - C) $(\text{CH}_3)_2\text{NH} > (\text{CH}_3)_3\text{N} > \text{CH}_3\text{NH}_2 > \text{NH}_3$
 - D) $(\text{CH}_3)_2\text{NH} > \text{NH}_3 > (\text{CH}_3)_3\text{N} > \text{CH}_3\text{NH}_2$
 - E) $\text{NH}_3 > \text{CH}_3\text{NH}_2 > (\text{CH}_3)_3\text{N} > (\text{CH}_3)_2\text{NH}$

Correct Answer : Option B

- 72.** Which of the following statement is correct?
- A) Sucrose is laevorotatory.
 - B) Fructose is a disaccharide.
 - C) Sucrose on hydrolysis gives D(+)-glucose only.
 - D) Sucrose is made up of a glycosidic linkage between C1 of α -D-glucose and C2 of β -D-Fructose.
 - E) Sucrose is a reducing sugar.

Correct Answer : Option D

- 73.** The structure of MnO_4^- ion is
- A) square planar
 - B) octahedral
 - C) trigonal pyramid
 - D) pyramid
 - E) tetrahedral

Correct Answer : Option E

- 74.** When benzene diazonium fluoroborate is heated with aqueous sodium nitrite solution in the presence of copper, the product formed is
- A) fluorobenzene
 - B) benzene
 - C) aniline
 - D) nitrobenzene
 - E) phenol

Correct Answer : Option D

75. A fibrous protein present in muscles is

- A) keratin
- B) albumin
- C) riboflavin
- D) insulin
- E) myosin

Correct Answer : Option E

76. Let P and Q be two finite sets having 3 elements each. The total number of mappings from P to Q is

- A) 32
- B) 516
- C) 6
- D) 9
- E) 27

Correct Answer : Option E

77. If $f(x) = [x]$, where $[x]$ denotes the greatest integer function, and if the domain of f is $\{-3.01, 2.99\}$, then the range of f is

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

Correct Answer : Option D

78. The domain of the function $f(x) = \sqrt{7 - 8x + x^2}$ is

- A) $(-\infty, 1] \cup (7, \infty)$
- B) $(-\infty, 1] \cup [7, \infty)$
- C) $(-\infty, 1) \cup [7, \infty)$
- D) $(-\infty, -1] \cup [7, \infty)$
- E) $(-\infty, -7] \cup [1, \infty)$

Correct Answer : Option B

79. The period of the function $\sin\left(\frac{\pi x}{4}\right)$ is

- A) 4
- B) 4π

- D) 8
- E) 2π

Correct Answer : Option D

80. If $f(x) = x + 8$, and $g(x) = 2x^2$, then $(g \circ f)(x)$ is equal to

- A) $(2x + 8)^2$
- B) $2(x + 8)^2$
- C) $2x^2 + 8$
- D) $2x^2 + 64$
- E) $2x^3 + 8x$

Correct Answer : Option B

81. If $f(x) = \frac{x}{1-x}$, $x \neq 1$, then the inverse of f is

- A) $\frac{1-x}{1+x}, x \neq -1$
- B) $\frac{1}{1+x}, x \neq -1$
- C) $\frac{1-x}{x}, x \neq 0$
- D) $\frac{x}{1+x}, x \neq -1$
- E) $\frac{1+x}{1-x}, x \neq 1$

Correct Answer : Option D

82. If the complex numbers $(2 + i)x + (1 - i)y + 2i - 3$ and $x + (-1 + 2i)y + 1 + i$ are equal, then (x, y) is

- A) (1, -2)
- B) (-1, 2)
- C) (2, -1)
- D) (2, -2)
- E) (2, 1)

Correct Answer : Option E

83. If $x + iy = \frac{3 + 4i}{5 - 12i}$, then $x + y$ is equal to

- A) $\frac{23}{169}$
- B) $\frac{56}{169}$

- C) $-\frac{15}{169}$
- D) $\frac{15}{169}$
- E) $\frac{71}{169}$

Correct Answer : Option A

84. If $z = 1 + i$, then the maximum value of $|z + 12 + 9i|$ is

- A) 225
- B) 265
- C) 269
- D) 200
- E) $\sqrt{265}$

Correct Answer:-Question Cancelled

85. If $\left| \frac{z - 5i}{z + 5i} \right| = 1$, then

- A) $\operatorname{Re}(z) = 0$
- B) $|z| = 10$
- C) $|z| = 25$
- D) $|z| = 5$
- E) $\operatorname{Im}(z) = 0$

Correct Answer : Option E

86. The coefficient of x^7 in the expansion of $\left(\frac{1}{x} + x^2 \right)^8$ is

- A) 70
- B) 28
- C) 42
- D) 56
- E) 8

Correct Answer : Option D

87. If $a_1 = 3$ and $a_n = na_{n-1}$, for $n \geq 2$, then a_6 is equal to

- A) 72
- B) 144
- C) 720
- D) 2160
- E) 4320

Correct Answer : Option D

88. If $\frac{1}{\log_2 x} + \frac{1}{\log_3 x} + \frac{1}{\log_4 x} + \frac{1}{\log_5 x} + \frac{1}{\log_6 x} = 1$, then the value of x is equal to
- A) 18
B) 36
C) 120
D) 360
E) 720

Correct Answer : Option E

89. The common ratio of a G.P. is 10. Then the ratio between its 11th term and its 6th term is
- A) $10^6 : 1$
B) $10^5 : 1$
C) $10^4 : 1$
D) $10^{11} : 1$
E) $10^3 : 1$

Correct Answer : Option B

90. Let a, b, c be positive numbers. If $a + b + c \geq K[(a+b)(b+c)(c+a)]^{1/3}$, then the maximum value of K is
- A) $\frac{3}{2}$
B) $\frac{1}{2}$
C) $\frac{1}{4}$
D) $\frac{1}{8}$
E) 1

Correct Answer : Option A

91. If $A = \begin{bmatrix} 4 & -1 \\ 12 & x \end{bmatrix}$ and $A^2 = A$, then the value of x is
- A) -8
B) -3
C) 0
D) 3
E) 8

Correct Answer : Option B

92. If $A = \begin{bmatrix} 3 & 7 \\ 2 & 5 \end{bmatrix}$, then $A^2 (\text{adj} A)$ is
- A) I

- B) $4I$
- C) $2A$
- D) $3A$
- E) A

Correct Answer : Option E

93. If $|x - 2| \leq 4$, then x lies in the interval

- A) $(-\infty, -2)$
- B) $(-\infty, 0)$
- C) $[-2, 6]$
- D) $[-2, \infty)$
- E) $(-2, 4)$

Correct Answer : Option C

94. If $\tan\left(\frac{\pi}{12} + 2x\right) = \cot 3x$, where $0 < x < \frac{\pi}{2}$, then the value of x is

- A) $\frac{\pi}{12}$
- B) $\frac{\pi}{3}$
- C) $\frac{\pi}{4}$
- D) $\frac{\pi}{6}$
- E) $\frac{\pi}{24}$

Correct Answer : Option A

95. If $\cos \theta + \sin \theta = \sqrt{2}$, then $\cos \theta - \sin \theta$ is equal to.

- A) 0
- B) $-1/2$
- C) $1/2$
- D) $1/4$
- E) 1

Correct Answer : Option A

96. The value of $\cos 26^\circ + \cos 54^\circ + \cos 126^\circ + \cos 206^\circ + \cos 240^\circ$ is.

- A) 0
- B) 1

- D) $\frac{1}{2}$
E) -1

Correct Answer : Option C

97. If $\cos x - \sin x = 0$, $0 \leq x \leq \pi$, then the value(s) of x is/are

- A) $\frac{\pi}{4}, \frac{3\pi}{4}$
B) $\frac{\pi}{4}, \frac{5\pi}{4}$
C) $\frac{\pi}{4}$
D) $\frac{5\pi}{4}$
E) $\frac{3\pi}{4}$

Correct Answer : Option C

98. If $2 \sin\left(\frac{\pi}{3} - 2x\right) - 1 = 0$, $0 < x < \frac{\pi}{2}$, then the value of x is

- A) $\frac{\pi}{4}$
B) $\frac{\pi}{3}$
C) $\frac{5\pi}{12}$
D) $\frac{\pi}{12}$
E) $\frac{\pi}{6}$

Correct Answer : Option D

99. Domain of the function $\sin^{-1}(2x-1)$ is

- A) $[0,1]$
B) $[0,\infty]$
C) $[-\infty,1]$
D) $[1,\infty]$
E) $[-1,1]$

Correct Answer : Option A

100. If $3 \tan^{-1} x + \cot^{-1} x = \pi$ then $\sin^{-1} x$ is

- A) $\frac{\pi}{12}$
- B) $\frac{\pi}{3}$
- C) $\frac{\pi}{4}$
- D) $\frac{\pi}{6}$
- E) $\frac{\pi}{2}$

Correct Answer : Option E

101. $\tan^{-1} 2 - \tan^{-1} \left(\frac{1}{3} \right)$ is equal to

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

Correct Answer : Option C

102. $\sin^{-1} \left(\sin \left(\frac{5\pi}{6} \right) \right)$ is equal to

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

Correct Answer : Option B

103. If $\sin x = \frac{3}{5}$, then the value of $\sec x + \tan x$ is equal to

- A) -2
- B) 3
- C) 0

- D) 2
- E) -3

Correct Answer : Option D

104. If $P(-3, 4)$ and $Q(3, 1)$ are points on a straight line, then the slope of the straight line perpendicular to PQ is

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

Correct Answer : Option C

105. The length of perpendicular from the origin to the line $\frac{x}{5} - \frac{y}{12} = 1$, is

- A) $\frac{60}{13}$
- B) $\frac{5}{12}$
- C) $\frac{12}{5}$
- D) $\frac{13}{12}$
- E) $\frac{13}{60}$

Correct Answer : Option A

106. The equation of the straight line passing through the point $(1, 1)$ and perpendicular to the line $x + y = 5$, is

- A) $x - y = 2$
- B) $x - y = 0$
- C) $x - y = -2$
- D) $x + y = 2$
- E) $x + y = 0$

Correct Answer : Option B

107. The area of the triangle formed by the coordinate axes and a line whose perpendicular from the origin makes an angle 45° with the x -axis is 50 square units. Then the equation of the line is

- A) $x + y = 10$
- B) $x + 2y = 10$

- C) $2x + y = 5$
- D) $x + y = 25$
- E) $x + y = 5$

Correct Answer : Option A

108. The equation of the straight line, intersecting the coordinate axes x and y are respectively 1 and 2, is

- A) $x + y = 3$
- B) $x - 2y = -3$
- C) $2x - y = 0$
- D) $2x + y = 2$
- E) $x - y = -1$

Correct Answer : Option D

109. If the sum of distances of a point from the origin and the line $x = 3$ is 8, then its locus is

- A) $y^2 - 10x + 25 = 0$
- B) $y^2 + 10x + 25 = 0$
- C) $y^2 - 10x - 25 = 0$
- D) $y^2 - 25x + 10 = 0$
- E) $y^2 + 25x - 10 = 0$

Correct Answer : Option C

110. If the point $(2, k)$ lies on the circle $(x - 2)^2 + (y + 1)^2 = 4$, then the value of k is

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

Correct Answer : Option E

111. The radius of the circle $x^2 + y^2 - 2x - 4y - 4 = 0$ is

- A) 2
- B) 3
- C) 4
- D) 5
- E) 6

Correct Answer : Option B

112. The eccentricity of an ellipse is $\frac{1}{3}$ and its centre is at the origin. If one of the directrices is $x = 9$, then the equation of the ellipse is

- A) $8x^2 + 9y^2 = 32$

- B) $8x^2 + 9y^2 = 36$
- C) $9x^2 + 8y^2 = 36$
- D) $9x^2 + 8y^2 = 32$
- E) $8x^2 + 9y^2 = 72$

Correct Answer : Option E

113. If the parametric form of the circle is $x = 3 \cos \theta + 3$ and $y = 3 \sin \theta$, then the Cartesian form of the equation of the circle is

- A) $x^2 + y^2 + 6x = 0$
- B) $x^2 + y^2 - 6x = 9$
- C) $x^2 + y^2 + 6x = 9$
- D) $x^2 + y^2 - 6x = 0$
- E) $x^2 + y^2 - 6x - 2y - 9 = 0$

Correct Answer : Option D

114. A line makes angle α, β, γ with x, y and z -axis respectively. Then the value of $\sin^2 \alpha + \sin^2 \beta - \cos^2 \gamma$ is

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

Correct Answer : Option C

115. The direction ratios of the line joining the points $(2, 3, 4)$ and $(-1, 4, -3)$ is

- A) $\pm(3, -1, 7)$
- B) $\pm(-3, -1, 7)$
- C) $\pm(3, 1, 7)$
- D) $\pm(3, -1, -7)$
- E) $\pm(-3, 1, 7)$

Correct Answer : Option A

116. Equation of the line parallel to the line $\frac{x-2}{2} = \frac{y-2}{3} = \frac{z-1}{-2}$ and passing through the point $(3, 2, -1)$ is

- A) $\frac{x-3}{2} = \frac{y-2}{3} = \frac{z+1}{2}$

- B) $\frac{x+3}{2} = \frac{y+2}{3} = \frac{z-1}{-2}$
- C) $\frac{x-3}{2} = \frac{y-2}{3} = \frac{z-1}{-2}$
- D) $\frac{x-3}{2} = \frac{y-2}{3} = \frac{z+1}{-2}$
- E) $\frac{x+3}{2} = \frac{y+2}{3} = \frac{z+1}{-2}$

Correct Answer : Option D

117. If the lines $\frac{x-1}{2} = \frac{y-2}{2} = \frac{z-3}{\alpha}$ and $\frac{x-1}{2} = \frac{y-2}{1} = \frac{z-3}{-2}$ are perpendicular, then the value of α is

- A) 6
- B) 4
- C) 3
- D) -3
- E) -2

Correct Answer : Option C

118. If $\vec{a} = 2\vec{i} + 4\vec{j} + 7\vec{k}$ and $\vec{b} = 4\vec{i} + 7\vec{j} + 2\vec{k}$, then the angle between $\vec{a} + \vec{b}$ and $\vec{a} - \vec{b}$ is equal to

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

Correct Answer : Option C

119. A vector of magnitude 6 and perpendicular to $\vec{a} = 2\vec{i} + 2\vec{j} + \vec{k}$ and $\vec{b} = \vec{i} - 2\vec{j} + 2\vec{k}$, is

- A) $\pm(2\vec{i} - \vec{j} - 2\vec{k})$
- B) $\pm 2(2\vec{i} - \vec{j} + 2\vec{k})$
- C) $\pm 3(2\vec{i} - \vec{j} - 2\vec{k})$
- D) $\pm 2(2\vec{i} + \vec{j} - 2\vec{k})$
- E) $\pm 2(2\vec{i} - \vec{j} - 2\vec{k})$

120. If $\vec{a}$ and $\vec{b}$ are non collinear unit vectors and $|\vec{a} + \vec{b}|^2 = 3$, then $(3\vec{a} + 2\vec{b}) \cdot (3\vec{a} - \vec{b})$ is equal to
- A) $\frac{32}{3}$
- B) $\frac{17}{2}$
- C) 15
- D) 7
- E) $\frac{17}{4}$

Correct Answer : Option B

121. If $x_i, i = 1, 2, 3, \dots, n$ are n observations such that $\sum_{i=1}^n x_i^2 = 550$, mean $\bar{x} = 5$ and variance is zero, then the number of observations is equal to
- A) 30
- B) 25
- C) 22
- D) 16
- E) 4

Correct Answer : Option C

122. If the mean of five observations $x, 2x + 5, 13, 2x - 7$, and 9 is 22, then the value of x is
- A) 20
- B) 15
- C) 10
- D) 12
- E) 18

Correct Answer : Option E

123. If A and B are two independent events such that $P(A) = 0.4$ and $P(A \cup B) = 0.7$, then $P(B)$ is equal to
- A) 0.3
- B) 0.4
- C) 0.5
- D) 0.6
- E) 0.7

Correct Answer : Option C

124. The probability that at least one of A or B occurs is 0.6. If A and B occur simultaneously with probability 0.2, then $P(A') + P(B')$ is
- A) 0.7
- B) 1.5
- C) 1.1

- D) 1.2
- E) 0.3

Correct Answer : Option D

125. $\lim_{x \rightarrow 0} \left(\frac{\sin 5x}{\sin 3x} \right)$ is equal to

- A) $\frac{3}{5}$
- B) $\frac{5}{3}$
- C) 1
- D) 0
- E) 5

Correct Answer : Option B

126. The value of $\lim_{x \rightarrow 1} \frac{x^2 + 2x - 3}{x - 1}$ is equal to

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

Correct Answer : Option B

127. If $f(x) = \frac{1}{2-x}$, $g(x) = \frac{1}{1-x}$, then the point(s) of discontinuity of the function $g(f(x))$ is (are)

- A) $x = 2$
- B) $x = 3$
- C) $x = 2, x = 3$
- D) $x = 2, x = 1$
- E) $x = 1, x = -2$

Correct Answer : Option D

128. Let $f(x) = \cos^{-1} \left(\frac{1 - \tan^2 x}{1 + \tan^2 x} \right)$. Then $f' \left(\frac{\pi}{2} \right)$ is equal to

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

Correct Answer : Option B

129. If $x = r \cos \theta$, $y = r \sin \theta$, then $\frac{dy}{dx}$ at $\theta = \frac{\pi}{4}$, where r is a constant and θ is a parameter, is equal to
- A) 0
B) 1
C) -1
D) $\sqrt{2}$
E) $\frac{1}{\sqrt{2}}$

Correct Answer : Option C

130. If $f(x) = \int_0^{x^3} (t+4)^2 dt$, then is $f'(2)$ is equal to
- A) 288
B) 432
C) 144
D) 216
E) 24

Correct Answer:-Question Cancelled

131. $\lim_{x \rightarrow 0} \left(\frac{3 \sin^2 2x}{x^2} \right)$ is equal to
- A) 3
B) 2
C) 6
D) $\frac{3}{2}$
E) 12

Correct Answer : Option E

132. The function $f(x) = (x-4)^2 (1+x)^3$ attains a local extremum at the point
- A) $x = 2$
B) $x = -1$
C) $x = 0$
D) $x = 1$
E) $x = -2$

Correct Answer : Option A

133. The derivative of $t^2 + t$ with respect to $t-1$ at $t = -2$, is equal to
- A) -4
B) 2
C) -1
D) -3
E) $-\frac{1}{2}$

Correct Answer : Option D

134. If a continuous function f is defined as $f(x) = \begin{cases} ax+1, & x < 2 \\ x^2+7, & x \geq 2 \end{cases}$, then the value of a is

- A) 7
- B) 6
- C) 5
- D) 3
- E) 2

Correct Answer : Option C

135. If $f(x) = x|x|$, then $f'(-1) + f'(1)$ is equal to

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

Correct Answer : Option E

136. $\int \frac{1+x^2+x^4}{(1-x^3)(1+x^3)} dx$ is equal to

- A) $\tan^{-1} x + C$
- B) $\tan^{-1}(1+x^2) + C$
- C) $\frac{1}{2} \log \frac{1+x}{1-x} + c$
- D) $\log(1+x^3) + C$
- E) $\log(1+x^2) + C$

Correct Answer : Option C

A train starts from X towards Y at 3pm (time $t = 0$) with velocity $v(t) = 10t + 25$ kilometre

137. per hour, where t is measured in hours. Then the distance covered by the train at 5pm (in km)

- A) 70
- B) 140
- C) 35
- D) 60
- E) 55

Correct Answer : Option A

138. $\int \sqrt{1+\sin 2x} dx =$

- A) $\sin x - \cos x + C$
- B) $\sin x - \operatorname{cosec} x + C$
- C) $\tan x - \cot x + C$
- D) $\cos x - \sec x + C$
- E) $\tan x - \sec x + C$

Correct Answer : Option A

139. $\int x e^x dx$

- A) $x e^x + e^x + C$
- B) $e^x - x e^x + C$
- C) $x + e^x + C$
- D) $x e^x - e^x + C$
- E) $x e^x - x^2 e^x + C$

Correct Answer : Option D

140. $\int e^x \sec x (1 + \tan x) dx$

- A) $e^x \sec x + C$
- B) $e^x \tan x + C$
- C) $e^x (\sec x + \tan x) + C$
- D) $e^x \sec x \tan x + C$
- E) $e^x \sec x + \tan x + C$

Correct Answer : Option A

141. $\int_0^1 x(1-x)^{10} dx$ is equal to

- A) $\frac{1}{110}$
- B) $\frac{1}{132}$
- C) $\frac{1}{156}$
- D) $\frac{1}{90}$
- E) $\frac{5}{156}$

Correct Answer : Option B

142. $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \frac{\tan x + \sin x}{1 + \cos^2 x} dx$ is equal to

- A) 0
- B) 2
- C) $\sqrt{2}$
- D) $2\sqrt{2}$
- E) $-2\sqrt{2}$

Correct Answer : Option A

143. $\int_5^{10} [x] dx$ is equal to (where $[x]$ denotes the greatest integer function)

- A) 55
- B) 45
- C) 35
- D) 26
- E) 5

Correct Answer : Option C

144. $\int_{-2}^4 x^2 |x| dx$ is equal to

- A) 72
- B) 68
- C) 64
- D) 48
- E) 37

Correct Answer : Option B

145. $\int_{-1}^1 x^2 \sin x dx$

- A) $2\sin 1$
- B) 2
- C) 4
- D) $-2\sin 1$
- E) 0

Correct Answer : Option E

146. The area of the region bounded by the curve $y = 3x^2$ and the x -axis, between $x = -1$ and $x = 1$, is

- A) 2 sq. units.
- B) 4 sq. units.

- c) $\frac{55}{27}$ sq. units.
- d) $\frac{55}{23}$ sq. units.
- e) $\frac{1}{2}$ sq. units.

Correct Answer : Option A

147. The order and degree of the following differential equation $\frac{d^2y}{dx^2} - 2x = \sqrt{y + \frac{dy}{dx}}$ respectively, are

- A) 2,2
- B) 2,1
- C) 1,2
- D) 4,2
- E) 1,1

Correct Answer : Option A

148. The solution of the differential equation $x + y \frac{dy}{dx} = 0$, given that at $x = 0, y = 5$ is

- A) $x^2 + y^2 = 5y$
- B) $x^2 + 5y^2 = 125$
- C) $x^2 + y = 5$
- D) $x^2 + y^2 = 25$
- E) $2x^2 + y^2 = 25$

Correct Answer : Option D

149. The general solution of the differential equation $(x + y)^2 \frac{dy}{dx} = 1$ is

- A) $y = \frac{1}{2} \tan^{-1}(x + y) + c$
- B) $y = -(x + y)^{-1} + c$
- C) $y = \frac{1}{3}(x + y)^3 + c$
- D) $y = \sin^{-1}(x + y) + c$
- E) $y = \tan^{-1}(x + y) + c$

Correct Answer : Option E

150. The equation of the curve passing through (1, 0) and which has slope $\left(1 + \frac{y}{x}\right)$ at (x, y), is

- A) $y = xe^x$
- B) $y = x + \log x$
- C) $y = x - \log x$
- D) $y = x + 2\log x$
- E) $y = x\log x$

Correct Answer : Option E