Royal Higher Secondary School-Dhoraji

Std - 12 E.M. Sci **GUJCET**

Date : 27-10-24
Time: 3:00 Hr.
Mark: 120

Sub : Physics

(1) Instantaneous current is given by I = 100 cos (200t + 45°)A, then the rms value of current is ..... A.

(A) 100 (B) $100\sqrt{2}$ (C) $50\sqrt{2}$ (D) 0

(2) A lamp is connected in series with a capacitor Predict your observations for DC and AC connections. What happens in each case if the capacitance of the capacitor is reduced?

(A) lamp will glow brighter in AC and less bright in DC

(B) lamp will glow less bright in AC and brighter in DC

(C) lamp will not glow in AC and brighter in DC

(D) lamp will not glow in DC and less bright in AC

(3) An alternating voltage is connected in series with R and an inductance L. If the potential drop across the resistance is 200 V and across the inductance is 150V, the applied voltage is

(A) 350 V (B) 250 V (C) 500 V (D) 300 V

(4) A 15 μF capacitor is connected to a 220 V - 50 Hz ac source. The capacitive reactance is .....Ω.

(A) 424 (B) 212 (C)106 (D) 21.2

(5) If an 8Ω resistance and 6Ω reactance are present in an ac series circuit then the impedance of the circuit will be .....

(A) 20Ω (B) 5Ω (C) 10Ω (D) $14\sqrt{2}$ Ω

(6) An alternating voltage given as V=$100\sqrt{2}$ sin 100t is applied to a capacitor of 1 μF The current reading of the ammeter will be equal to .....mA.

(A) 80 (B) 10 (C) 20 (D) 100

(7) The average power dissipated in a pure inductor is .....

(A) zero (B) less (C) more (D) maximum

(8) Power factor is maximum in an L-C-R circuit when .....

(A) $X_L = X_C$ (B) R = 0 (C) $X_L = 0$ (D) $X_C = 0$

(9) A power transmission line feeds input at 3300 V to a step down transformer with its primary windings having 2000 turns. Find the number of turns in the secondary to get the power input at 330 V.

(A) 200 (B) 33 (C) 400 (D) 40

(10) ..... quntity is increased in step down transformer.

(A) current (B) voltage (C) power (D) frequency

(11) A plane electromagnetic wave of frequency 25 MHz is travelling along the X-direction. The electric field at an arbitrary point at time is E = 6.3V m^{-1} .The magnetic field at that point at that time is .....T

(A) 4.7×10^{-9} (B) 3.9×10^{6} (C) 2.527×10^{-7} (D) 2.1×10^{-8}

(12) The amplitude of the magnetic field is B_0= 510 nT for electromagnetic wave propagating in vacuum. The amplitude of the electric field is ..... Vm^{-1}.

(A) 159 (B) 163 (C) 510 (D) 153

(13) The frequency of an electromagnetic wave is 30 Hz. It's wave length is .....

(A) 10^7 m (B) 10^{-7} m (C) 0.33 m (D)3.33 m

(14) ..... wave are used in remote sensing.

(A) microwave (B) infrared (C) visible (D) ultraviolet

(15) Which waves are used for LASIK surgery ?

(A) gamma (B) X-rays (C) Infrared (D) ultraviolet

(16) The frequency of FM radio band is .....

(A) 88 kHz to 108 kHz (B) 54 MHz to 890 MHz

(C) 88 MHz to 108 MHz (D) 54 kHz to 890 kHz

(17) At a certain point of an electromagnetic wave the maximum electric field intensity is ..... if magnetic field intensity at that point is 2.1×10^{-8} T.

(A) 6.3 V/m (B) 3.6 V/m (C) 2.1×10^{-8} V/m (D) 10^{-8} V/m

(18) The cut off voltage required to stop the emitted electrons by incident radiation of wavelength 2500 $\overset{o}{A}$ on a metal of work function 4.2 eV is ..... V.

(A) 0.76 V (B) 3.6 V (C) 6.16 V (D) 1.36 V

(19) The number of photons emitted per unit time from a beam of 100 mW is .....

(The wavelength of the radiation is 4000 $\overset{o}{A}$)

(A) 3×10^{17} (B) 5×10^{18} (C) 2×10^{17} (D) 1×10^{18}

(20) If the intensity of radiation incident on a metal is doubled and its frequency is halved, the number of electrons emitted

(A) is doubled (B) quadrupled (C) one fourth (D) remain constant.

(21) If the kinetic energy of a given particle is doubled, its de-Broglie wavelength is...

(A) Doubled (B) Half (C) $\sqrt{2}$ times (D) $\frac{1}{\sqrt{2}}$ times

(22) de-Broglie wavelength of a plane of mass 2,20,000 kg moving at a speed of 100 m/s is .....

(A) 3×10^{-41} m (B) 6×10^{-20} m (C) 4.2×10^{-15} m (D) 7×10^{-36} m

(23) Which of the following formulas shows the relationship between wave and particle nature of matter ?

(A) $P = \frac{E}{t}$ (B) $\phi_0 = h\nu_0$ (C) $\lambda = \frac{h}{p}$ (D) $E=mc^2$

(24) ..... has a pair of isomers.

(A) ${}_6C^{12}, {}_6C^{13}$ (B) ${}_{36}Kr^{86}, {}_{37}Rb^{87}$ (C) ${}_{92}U^{235}$ (D) ${}_{35}Br^{80}$

(25) Calculate the Q value of the fusion reaction

${}_1H^2 + {}_1H^2 \rightarrow {}_2He^4 + Q$

$m({}_1H^2) = 2.0141$ u, $m({}_2He^4) = 4.0024$ u

(A) 12 MeV (B) 6 MeV (C) 24 MeV (D) 48 MeV

(26) Mass of 1 g equivalent to ..... J energy.

(A) 6×10^{11} (B) 6×10^{11} (C) 4×10^{12} (D) 7×10^{12}

(27) Nuclear force acts between .....

(A) only proton-proton (B) only neutron-proton

(C) only neutron-neutron (D) all the nucleons

(28) If R_1 and R_2 are the radii of atomic nuclei ${}^{27}_{13}Al$ and ${}^{64}_{30}Zn$, then $\frac{A_1}{A_2}$ = ...

(Where A= area)

(A) $\frac{27}{64}$ (B) $\frac{3}{4}$ (C) $\frac{9}{16}$ (D) $\frac{13}{30}$

(29) The radius of the nucleus of ${}^{27}_{13}Al$ is .....

(A) R_0 (B) $3R_0$ (C) $R_0^{\frac{1}{3}}$ (D) R_0^3

(30) The number of protons, neutrons and nucleons in ${}^{238}_{92}U$ respectively are .....

(A) 146,238,92 (B) 92,146,238 (C) 92,238,146 (D) 238,146,92

(31) For ${}^{16}_{8}O$, E_{bn} = ... MeV

Mass of ${}^{16}_{8}O$ = 15.9949 u,

m_p = 1.007825 u, m_n = 1.008665 u

(A) 0.79 (B) 7.973 (C) 79.73 (D) 797.3

(32) For an n-type semiconductor which of the following is true ?

(A) Electrons are the majority carriers and trivalent atoms are the dopants.

(B) Holes are the minority carriers and pentavalent atoms are the dopants.

(C) Electrons are the minority carriers and pentavalent atoms are the dopants.

(D) Holes are the majority carriers and trivalent atoms are the dopants.

(33) The impurity atom needed to make a p-type semiconductor is .....
(A) antimony (B) phosphorus (C)arsenic (D) boron

(34) Cut-in voltage for germanium diode ..... V.
(A) 0.3 (B) 0.7 (C) 0.9 (D) 0.2

(35) In a p - type semiconductor, which of the following statements is true ?
(A) Electrons are majority carriers and trivalent atoms are dopants.
(B) Holes are majority carriers and trivalent atoms are dopants.
(C) Holes are majority carriers and pentavalent atoms are dopants.
(D) Electrons are majority carriers and pentavalent atoms are dopants.

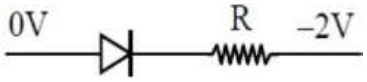
(36) Suppose a puer Si crystal has 5×10^{28} atoms m^{-3}. It is doped by 1 ppm concentration of pentavalent As, Calculate the number of electron and holes. ($n_i = 1.5\times10^{16}\ m^{-3}$).
(A) $2.56\times10^{32}\ m^{-3}$ (B) $4.5\times10^{9}\ m^{-3}$ (C) $5\times10^{22}\ m^{-3}$ (D) $4.5\times10^{28}\ m^{-3}$

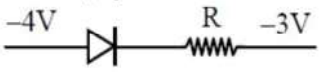
(37) Electrically, an isolated p-type semiconductor is .....
(A) positively charged (B) negatively charge (C) neutral (D) none

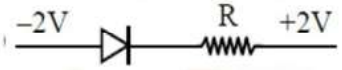
(38) When a forward biase is applied to p - n junction, it.....
(A) raises the potential barrier.
(B) reduces the majority carrier current to zero.
(C) lowers the potential barrier.
(D) none of the above.

(39) In half wave rectification, what is the output frequency if the input frequency is 50 Hz ?
(A) 0 (B) 50 Hz (C) 100 Hz (D) 25 Hz

(40) Which one of the following diode is in forward bias ?
(A) 

(B) 

(C) 

(D) 

Section A

● **Choose correct answer from the given options.**

41. Formality unit is used in which scientific field ?
(A) Pharmacy (B) Medical (C) Agriculture (D) (A) and (B) both

42. German silver is a alloy of …….. metal.
(A) Zn, Sn, Ni (B) Cu, Sn, Ni (C) Zn, Cu, Pb (D) Cu, Zn, Ni

43. ……. solution has highest freezing point.
(A) 1 m K_4 $[Fe(CN)_6]$ (B) 1 m NaCl (C) 1 m glucose (D) 1 m KCl

44. If 6.022×10^{20} molecules are present in 100 mL urea solution, then find out the concentration of urea solution.
(A) 0.01 M (B) 0.001 M (C) 0.2 M (D) 0.1 M

45. What will be the freezing point of aqueous 0.1 m KCl soln, if K_f for H_2O = 1.86 K kg mol ?
(A) –0.186 °C (B) 0.372 °C (C) –1.86 °C (D) –0.372 °C

46. What is the value of Van't Hoff factor (*i*) when there is an association of solute takes place ?
(A) More than one (B) Zero (C) More than two (D) Less than one

47. Molarity of 10% W/v NaOH is.... [2023]
(A) 2 M (B) 1.5 M (C) 2.5 M (D) 3 M

48. What is the percentage of nitrogen gas taken in the tanks used by scuba divers ?
(A) 11.7% (B) 56.2% (C) 32.1% (D) 16.2%

49. What is physical state of solvent in "camphor in nitrogen gas" solution ?
(A) Solid (B) Liquid (C) Gas (D) none

50. 25 mL $Ba(OH)_2$ solution is neutralized by 35 mL 0.1 M HCl, what will be molarity of $Ba(OH)_2$ solution ?
(A) 0.42 (B) 0.21 (C) 0.07 (D) 0.14

51. The mixture which shows positive deviation from Raoult's law is :
(A) Acetone + Chloroform (B) Chloroethane + Bromoethane
(C) Ethanol + Acetone (D) Benzene + Toluene

52. What is the SI unit of reaction rate ?
(A) mol sec^{-1} (B) mol m^{-3} sec^{-1} (C) mol dm sec^{-1} (D) mol lit^{-1}

53. Zero order reaction means .....
(A) Reaction occurring at zero Kelvin temperature.
(B) The value of reaction rate is zero.
(C) The reaction in which the reactants do not take part in chemical reaction.
(D) Reaction rate and rate constant are equal.

54. How many time is required to complete reaction when initial concentration of reactant is $[R]_0$. For zero order reaction ?
(A) $\frac{[R]_0}{K}$ (B) $\frac{2[R]_0}{K}$ (C) $\frac{[R]_0^2}{K}$ (D) $\frac{1}{2}\frac{[R]_0}{K}$

55. Use / application of catalyst….

(A) For Gibb's energy reaction.
(B) For reaction enthalpy.
(C) For increase / decrease of activation energy of reaction.
(D) It is equilibrium constant.

56. What is the formula to find half life of zero order reaction ?

(A) $\frac{0.693}{K}$ (B) $\frac{[R]_0}{2K}$ (C) $\frac{2K}{[R]_0}$ (D) $\frac{K}{[R]_0}$

57. Total order of reaction X + Y → XY is 3. The order of reaction with respect to X is 2. State the differential rate equation for the reaction.

(A) $-\frac{d[X]}{dt} = K[X]^3[Y]^0$ (B) $-\frac{d[X]}{dt} = K[X]^0[Y]^3$ (C) $-\frac{d[X]}{dt} = K[X]^2[Y]$ (D) $-\frac{d[X]}{dt} = K[X][Y]^2$

58. What is the unit for rate constant for pseudo first order reaction ?

(A) L mol^{-1} sec^{-1} (B) sec^{-1} (C) mol lt^{-1} sec^{-1} (D) L^2 mol^{-2} sec^{-1}

59. Which of the following relation is correct for zero order reaction ?

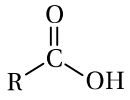
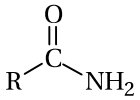
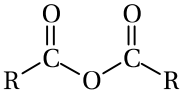
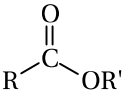
(A) $t_{\frac{1}{2}} \propto \frac{1}{[R]_0}$ (B) $t_{\frac{1}{2}} \propto [R]_0$

(C) $t_{\frac{1}{2}} \propto \frac{1}{[R]_0^2}$ (D) $t_{\frac{1}{2}}$ is independent of $[R]_0$

60. A first order reaction is found to have a rate constant, $K = 5.5 \times 10^{-14}\ s^{-1}$. The half life of reaction is ..... .

(A) 1.26×10^{14} s (B) 6.93×10^{14} s (C) 1.26×10^{13} s (D) 12.6×10^{15} s

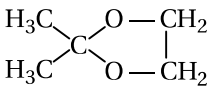
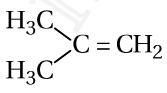
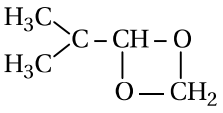
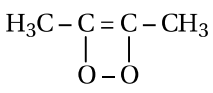
61. ..... is a common formula of anhydride.

(A)  (B)  (C)  (D) 

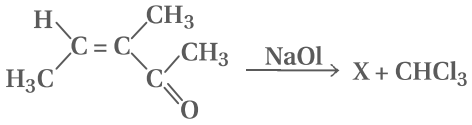
62. Which of the following has less water solubility ?

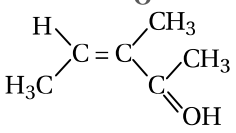
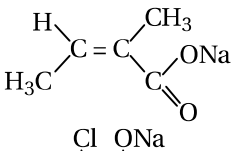
(A) Methanal (B) Ethanal (C) Butanal (D) Propanal

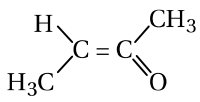
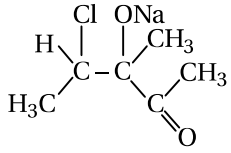
63. Which of the following product can be obtained on reaction of acetone and ethylene glycol in presence of dry HCl gas ?

(A)  (B)  (C)  (D) 

64. What is X in following reaction ?



(A)  (B) 

(C)  (D) 

65. On reaction of ethyl magnesium bromide with ethanal followed by hydrolysis gives ..... as a main product.

(A) Propan-1-ol (B) Propan-2-ol (C) Propanone (D) All of above

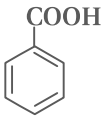
66. ..... does not give Cannizzaro reaction.

(A) Methanal (B) Ethanal

(C) Benzaldehyde (D) Trimethyl acetaldehyde

67. $CH_3(CH_2)_8CH_2OH \xrightarrow[\text{reagent}]{\text{Jones}} CH_3(CH_2)_8COOH$

(A) Alkaline $KMnO_4$ (B) Acidic $KMnO_4$ (C) $CrO_3 - H_2SO_4$ (D) $K_2Cr_2O_7 - NaOH$

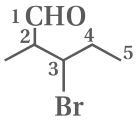
68. $X \xrightarrow[KOH]{KMnO_4} Y \xrightarrow{H_3O^+}$ 

which of the following are not X and Y ?

(A) $C_6H_5CH_3$ and C_6H_5COOK (B) $C_6H_5COCH_3$ and C_6H_5COOK

(C) $C_6H_5CH = CH_2$ and C_6H_5COOK (D) $C_6H_5COCH_3$ and C_6H_5CHO

69. What is the IUPAC name of compounds ?



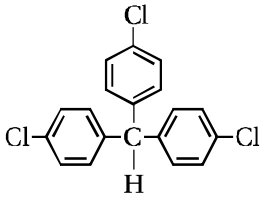
(A) 2-methyl-3-bromo hexanal

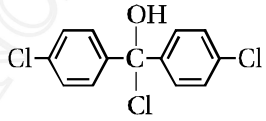
(B) 3-bromo-2-methyl butanal

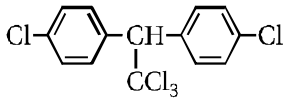
(C) 2-methyl-3-bromo butanal

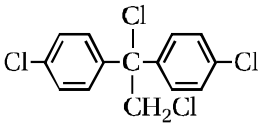
(D) 3-bromo-2-methyl pentanal

70. Which product is obtained when $CCl_3 \cdot CHO$ is treated with chlorobenzene in present of HCl ?

(A) 

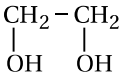
(B) 

(C) 

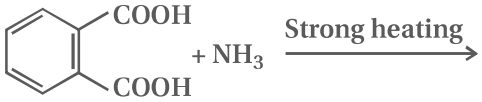
(D) 

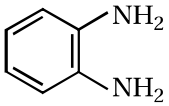
71. Which product will obtain in below reaction ?

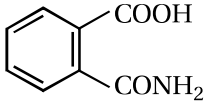
$CH \equiv CH \xrightarrow[H_2SO_4]{H_2O/HgSO_4}$

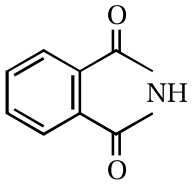
(A) $CH_3 - CH_2 - OH$ (B) $CH_3 - CHO$ (C) $CH_3 - COOH$ (D) 

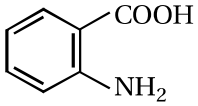
72. The major product of the following reaction is :



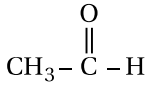
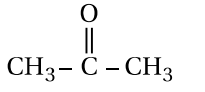
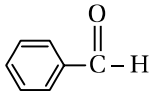
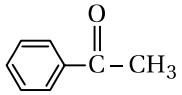
(A) 

(B) 

(C) 

(D) 

73. Which of the following compounds is most reactive towards nucleophilic addition reactions ?

(A)  (B)  (C)  (D) 

74. The correct order of increasing acidic strength is....

(A) Phenol < Ethanol < Chloroacetic acid < Acetic acid

(B) Ethanol < Phenol < Chloroacetic acid < Acetic acid

(C) Ethanol < Phenol < Acetic acid < Chloroacetic acid

(D) Chloroacetic acid < Acetic acid < Phenol < Ethanol

75. For second order reaction which of the following relationship is correct ?

(A) $t_{\frac{1}{2}} \alpha [R_0]^2$ (B) $t_{\frac{1}{2}} \alpha [R_0]^{-2}$ (C) $t_{\frac{1}{2}} \alpha [R_0]^{-1}$ (D) $t_{\frac{1}{2}} \alpha [R_0]^{\frac{-1}{2}}$

76. In the equation for collision theory,

rate = $P \cdot Z_{AB} e^{-\frac{E_a}{RT}}$, What does P indicate ?

(A) Pressure (B) Collison frequency (C) Arrhenius factor (D) Probability factor

77. If M is the molarity of H_3PO_3 solution, then what will be its normality ?

(A) 2 M (B) M (C) 3 M (D) M/2

78. Soda water is of which type solution ?

(A) Solid solution (B) Liquid solution (C) Gaseous solution (D) None of these

79. An ideal solution is formed when its components...

(A) have no volume change on mixing. (B) have no enthalpy change on mixing.

(C) have both the above (A) & (B) characteristics. (D) have high solubility.

80. If temperature increases the value of Henry's law constant……

(A) remains constant. (B) increases. (C) decreases. (D) none of the above

Maths Ch :- 2,3,7,9,11 Paper Set :- 01

(81) $\tan^{-1} 2+\tan^{-1} 3 =$..... .

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

(82) Value of $\sec\left[\tan^{-1}\left(\frac{b+a}{b-a}\right)-\tan^{-1}\left(\frac{a}{b}\right)\right]$.....

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

(83) If $\cos\left(2\sin^{-1} x\right)=\frac{1}{9}$, then x .....

(A) $\frac{3}{2}$ (B) $\frac{2}{3}$ (C) $\frac{1}{2}$ (D) 1

(84) If $\cos^{-1}\left(\frac{x}{5}\right)+\operatorname{cosec}^{-1}\left(\frac{5}{4}\right)=\frac{\pi}{2}$, then x .....

(A) 1 (B) 3 (C) 5 (D) 4

(85) If $x=\frac{1}{3}$, then $\cos\left(2\cos^{-1} x+\sin^{-1} x\right)$ .....

(A) $-\sqrt{\frac{8}{9}}$ (B) $-\sqrt{\frac{1}{3}}$ (C) $\frac{\sqrt{3}}{2}$ (D) $\frac{1}{2}$

(86) $\sin^{-1}\left(\cos\left(\sin^{-1} x\right)\right)+\cos^{-1}\left(\sin\left(\cos^{-1} x\right)\right)=$.....

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

(87) If $A=\begin{bmatrix}1 & 1\\ 1 & 1\end{bmatrix}$ then A^{10}=..... .

(A) 512 A (B) 1024 A (C) 10 A (D) 2^{99}A

(88) If $A=\begin{bmatrix}2 & 3\\ -1 & 2\end{bmatrix}$ then $A^2-4A=$.....

(A) A^{-1} (B) adj A (C) $7I_2$ (D) $-7I_2$

(89) If $A=\begin{bmatrix}\cos\theta & -\sin\theta\\ \sin\theta & \cos\theta\end{bmatrix}$ and $A^T+A=I_2$ તો $\theta=\{.....|\,k\in Z\}$

(A) $2k\pi+\frac{\pi}{6}$ (B) $(2k+1)\frac{\pi}{2}$ (C) $k\pi$ (D) $2k\pi\pm\frac{\pi}{3}$

(90) If $a_{ij}=\frac{(i+2j)^2}{3}$ then $\left[a_{ij}\right]_{2\times2}=.....$

(A) $\begin{bmatrix}\frac{25}{3} & 12\\ 3 & \frac{16}{3}\end{bmatrix}$ (B) $\begin{bmatrix}\frac{25}{3} & 3\\ \frac{16}{3} & 12\end{bmatrix}$ (C) $\begin{bmatrix}\frac{25}{3} & 3\\ 12 & \frac{16}{3}\end{bmatrix}$ (D) $\begin{bmatrix}3 & \frac{25}{3}\\ \frac{16}{3} & 12\end{bmatrix}$

(91) If $2\begin{bmatrix}5 & x\\ 3 & 4\end{bmatrix}+\begin{bmatrix}0 & 1\\ 1 & y\end{bmatrix}=\begin{bmatrix}10 & 5\\ 7 & 0\end{bmatrix}$ then x=.....and y=.....

(A) $-2,-8$ (B) $-2,8$ (C) $2,8$ (D) $2,-8$

(92) For 3×4 matrix A if A^TB and BA^T is defined then order of B .....

(A) 3×4 (B) 4×4 (C) 4×3 (D) 3×3

(93) If $A=\begin{bmatrix}a & b\\ b & a\end{bmatrix}$ and $A^2=\begin{bmatrix}x & y\\ y & x\end{bmatrix}$ then x=..... and y=..... .

(A) $x=a^2+b^2,\ y=2ab$ (B) $x=2ab,\ y=a^2+b^2$

(C) $x=a^2+b^2,\ y=ab$ (D) $x=a^2+b^2,\ y=a^2-b^2$

(94) If $2X+\begin{bmatrix}1 & 2\\ 3 & 4\end{bmatrix}=\begin{bmatrix}3 & 8\\ 7 & 2\end{bmatrix}$, then X=..... .

(A) $\begin{bmatrix}1 & 3\\ 2 & -1\end{bmatrix}$ (B) $\begin{bmatrix}1 & -3\\ 2 & -1\end{bmatrix}$ (C) $\begin{bmatrix}2 & 6\\ 4 & -2\end{bmatrix}$ (D) $\begin{bmatrix}2 & -6\\ 4 & -2\end{bmatrix}$

(95) $\int\frac{x^4+x^2+1}{x^2+1}\,dx=.....+c.$

(A) $\tan^{-1}x+\frac{x^4}{4}$ (B) $\frac{x^3}{3}+\tan^{-1}x$ (C) $\log\left(x^2+1\right)$ (D) $\frac{x^3}{3}+\frac{1}{2}\log\left|\frac{x+1}{x-1}\right|$

(96) $\int \frac{\left(\tan^{-1} x\right)^3}{1+x^2}\, dx = ...$

(A) $3\left(\tan^{-1} x\right)^2 + c$ (B) $\frac{\left(\tan^{-1} x\right)^4}{4} + c$

(C) $\left(\tan^{-1} x\right)^4 + c$ (D) none of these

(97) $\int \frac{\cos x - \sin x}{\cos x + \sin x}\left(2 + 2\sin 2x\right) dx = ...$

(A) sin 2x+c (B) cos 2x+c (C) tan 2x+c (D) none of these

(98) $\int \frac{x^3}{x-1}\, dx + \int \frac{1}{1-x}\, dx = ... + c.$

(A) $\frac{x}{6}\left(2x^2 - 3x + 6\right)$ (B) $\frac{x}{6}\left(2x^2 + 3x + 6\right)$

(C) $\frac{x}{3}\left(2x^2 - 3x + 6\right)$ (D) $\frac{x}{3}\left(2x^2 + 3x + 6\right)$

(99) $\int \frac{10x^9 + a10^{x-1}}{x^{10} + 10^x}\, dx = \log\left|x^{10} + 10^x\right| + c$ तो a=..... .

(A) log 10^{10} (B) log 10^2 (C) log 10^5 (D) log 10

(100) $\int \frac{2^x + 3^x}{4^x}\, dx = ... + c.$

(A) $\log_e \frac{1}{2}.\left(\frac{1}{2}\right)^x - \log_e \frac{3}{4}.\left(\frac{3}{4}\right)^x$ (B) $\frac{2^x}{\log_e \frac{1}{2}} + \frac{3^x}{\log_e \frac{3}{4}}$

(C) $\log_e \frac{1}{2}.\left(\frac{1}{2}\right)^x + \log_e \frac{3}{4}.\left(\frac{3}{4}\right)^x$ (D) $\frac{\left(\frac{1}{2}\right)^x}{\log_e \frac{1}{2}} + \frac{\left(\frac{3}{4}\right)^x}{\log_e \frac{3}{4}}$

(101) $\int e^{2x}\left(\log x + \log 2 + \frac{1}{2x}\right) dx = ... + c.$

(A) $\frac{e^{2x}}{2}\log 2x$ (B) $e^{2x}\log 2x$ (C) $\frac{e^x}{2}\log x$ (D) $\frac{e^{2x}}{2}\log x$

(102) $\int x\cos 2x\ dx = \ldots\ldots + c.$

(A) $\frac{x\sin 2x}{2} + \frac{\cos 2x}{4}$ (B) $x\cos 2x - \frac{1}{2}\cos 2x$

(C) $\frac{x\sin 2x}{2} - \frac{\cos 2x}{4}$ (D) $\frac{x^2\cos 2x}{2} + \frac{\sin 2x}{2}$

(103) $\int x^2\sqrt{x^6-1}\ dx = \ldots + c.$

(A) $\frac{1}{6}\left(x^3\sqrt{x^6-1} + \cos^{-1}x^3\right)$ (B) $\frac{1}{6}\left(x^3\sqrt{x^6-1} + \sin^{-1}x^3\right)$

(C) $\frac{1}{6}\left(x^3\sqrt{x^6-1} + \log\left|x+\sqrt{x^6-1}\right|\right)$ (D) $\frac{1}{6}\left(x^3\sqrt{x^6-1} - \log\left|x^3+\sqrt{x^6-1}\right|\right)$

(104) $\int_{-a}^{a} \frac{x}{2+x^8}\ dx = \ldots\ldots$

(A) $\frac{\pi a}{4}$ (B) $\frac{\pi a^2}{2}$ (C) $\frac{\pi a}{2}$ (D) 0

(105) $\int_0^{\frac{\pi}{2}} \frac{\sin^n x}{\sin^n x + \cos^n x}\ dx = \ldots\ldots,$ where $n \in N$

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

(106) If $\int_0^k \frac{dx}{2+8x^2} = \frac{\pi}{16}$ then k=..... .

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

(107) Differential equaiton corresponding to y=a cos 10x+b sin 10 x is .....

(A) $\frac{d^2y}{dx^2} = -100y$ (B) $\frac{d^2y}{dx^2} = 10y$ (C) $\frac{d^2y}{dx^2} = 25y$ (D) $\frac{d^2y}{dx^2} = -25y$

(108) For Differential equaiton $x\log x\frac{dy}{dx} + y = \frac{2}{x}\log xe^x; x > 0$ integreting factor is .....

(A) $\log_e(\log_e x)$ (B) $\log_e x$ (C) x (D) $\log(\log_e(\log_e x))$

(109) The degree of $x^{\frac{dy}{dx}} = y$ is ..... (y>0, x>0)

(A) 1 (B) undefind (C) 2 (D) 3

(110) For Differential equaiton $y = x\frac{dy}{dx} + 3\sqrt{1+\left(\frac{dy}{dx}\right)^2}$ order ..... and degree .....

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

(111) Differential equaiton corresponding to $ax + by + c = 0, \left(a^2 + b^2 \neq 0\right)$ is.....

(a, b are arbitary constant)

(A) $\frac{dy}{dx} = 0$ (B) $\frac{d^2y}{dx^2} = 0$ (C) $\frac{dy}{dx} = -\frac{a}{b}$ (D) $\frac{dy}{dx} = -\frac{b}{a}$

(112) General solution of Differential equaiton $\frac{dy}{dx} + \frac{1+\cos 2y}{1-\cos 2x} = 0$ is .....

(A) tan y+cot x=c (B) tan y−cot x=c

(C) tan x−cot y=c (D) tan x+cot x=c

(113) General solution of Differential equaiton $x\frac{dy}{dx} + y = xe^x$ is .....

(A) $xy = e^x(x+1) + c$ (B) $xy = e^x(x-1) + c$

(C) $xy = e^x(1-x) + c$ (D) $xy = e^y(y-1) + c$

(114) For Differential equaiton $\frac{dy}{dx} = \frac{1}{x+y+2}$, integreting factor is (I.F.) .....

(A) e^{x+y+2} (B) e^y (C) e^{-y} (D) $\log|x+y+2|$

(115) The equation of line passing through origin and having directional angles (α,β,γ) are $\frac{2\pi}{3}, \frac{\pi}{4}, \frac{\pi}{3}$ respectively.

(A) $x = \frac{y}{-\sqrt{2}} = z$ (B) $\frac{x}{-1} = \frac{y}{-\sqrt{2}} = z$ (C) $x = \frac{y}{-\sqrt{2}} = -z$ (D) $x = \frac{y}{\sqrt{2}} = z$

(116) Direction cosines of line passing through (3,4,5) and (4,5,6).....

(A) (1,1,1) (B) $\left(\sqrt{3},\sqrt{3},\sqrt{3}\right)$ (C) $\left(\frac{1}{\sqrt{3}},\frac{1}{\sqrt{3}},\frac{1}{\sqrt{3}}\right)$ (D) (7,9,11)

(117) The direction of lines $\frac{x-1}{c} = \frac{y+2}{-2} = \frac{z-3}{4}$ and $\frac{x-5}{1} = \frac{y-3}{1} = \frac{z+1}{c}$ is same then c=..... .

(A) −2 (B) 2 (C) 0 (D) 4

(118) Equation of line passing through $(2,3,4)$ and parellel to line

$$\frac{x-1}{3}=\frac{2-y}{-5}=\frac{z-10}{15}$$

(A) $\bar{r}=(2+3k,3+5k,4+15k),k\in R$

(B) $\bar{r}=(2-3k,3-5k,4-15k),k\in R$

(C) $\bar{r}=(2+3k,3-5k,4+15k),k\in R$

(D) none of these

(119) Angle between lines $\frac{x-1}{2}=\frac{y+1}{1}=\frac{1-z}{2}$ and $x=k+1,y=2k-1,z=2k+3,k\in R$ is .....

(A) $\operatorname{cosec}^{-1}\frac{3}{4}$ (B) $\frac{\pi}{3}$ (C) $\sec^{-1}\frac{9}{4}$ (D) $\frac{\pi}{2}$

(120) Direction ratio of line $\frac{3-x}{1}=\frac{y-2}{5}=\frac{2z-3}{1}$ is .....

(A) (1,5,1) (B) $-1:5:\frac{1}{2}$ (C) $-1:5:1$ (D) $1:5:\frac{1}{2}$