ALLEN CAREER INSTITUTE KOTA (RAJASTHAN) TM

Path to Success

FORM NUMBER | | | | | | | | |

CLASSROOM CONTACT PROGRAMME

PATTERN : GUJCET

Time : 3 Hours | **SAMPLE PAPER** | **Max. Marks : 120**

ENGLISH MEDIUM

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. Please check that this question paper contains **14** printed pages.
2. This question paper contains **120** questions. **All** the questions are compulsory.
3. Each question carries **1** mark. Each incorrect response carries $-\frac{1}{4}$ marks.
4. Select proper option to make the statement correct.
5. Read the questions carefully before you answer.
6. The **OMR** sheet is given for answering the questions. The answer to each question is represented by (1) O, (2) O, (3) O, (4) O. Darken the circle ● of the correct answer with ball-pen.
7. **Rough work is to be done on the space provided for this purpose in the Test Booklet only.**

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Corporate Office
ALLEN CAREER INSTITUTE
"SANKALP", CP-6, Indra Vihar, Kota (Rajasthan)-324005
☎ +91-744-2436001 +91-744-2435003 info@allen.ac.in

City Head Office
"SADHYA" Opp. The Grand Bhagwati, Off S.G. Highway, Behind Patel Avenue,
Near Purshottam Bunglow, Bodakdev, Ahmedabad (GUJARAT)-380054
☎ +91-79-49033100 infoadi@allen.ac.in

Ahmedabad Centres

MANINAGAR
3rd Floor Purshottam Mahal,
Opp. Swaminarayan Temple,
Near Jaihind Cross Road,
Railway Crossing Road,
Maninagar, Ahmedabad - 380008
Tel: +91-8511136918, 079-25440105

CHANDKHEDA
3rd Floor,Chanakya Plaza,
Near Swagat Bungalow,
New C.G. Road, Chandkheda,
Ahmedabad - 380024
Tel: +91-79-40306199,
079-40306200

NARANPURA
Satved Complex, 3rd Floor,
Near Dr. Valu's Hospital,
Opp. Gopi Dairy,
Sardar Patel Stadium Road,
Naranpura, Ahmedabad - 380014
Tel: +91-79-40306140, 079-40306141

NIKOL
3rd & 4th Floor,
Sunrise Business Centre,
Nr, Shreeji Sankalp
& Divyajivan Satya,
Nikolgam to Ring Road,
Tel : 079-49033100

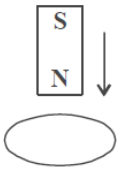
GANDHINAGAR
Office Unit 325, 3rd
Floor, Super Mall 2,
Near GH 0 Circle, S G
Higway Infocity IT
Metropolis,Gandhinagar
Tel : 079-49033100

PART - 1 : PHYSICS

1. A capacitor of capacitance C_1 charged at a certain potential V. It is connected with another uncharged capacitor C_2. What is final p.d. of this new system ?

(A) $\frac{C_2V}{C_1+C_2}$ (B) $\frac{C_1V}{C_1+C_2}$ (C) $\left(1+\frac{C_2}{C_1}\right)V$ (D) $\left(1-\frac{C_2}{C_1}\right)V$

2. The north pole of a magnet is falling on a metallic ring shown in the figure. The direction of induced current, it looked from upside in the ring will be r .....



(A) Clockwise or anticlockwise depending on the metal of the ring

(B) No induced current

(C) Anticlockwise

(D) Clockwise

3. An electron having electric charge e moves in the circular orbit of radius r with frequency f. What will be magnetic moment linked with orbital motion of electron ?

(A) πfer^2 (B) $\frac{\pi fr^2}{e}$ (C) $\frac{\pi fe}{r^2}$ (D) $\frac{\pi er^2}{f}$

4. The frequency of the output signal becomes ..... times by doubling the value of the capacitance in the LC oscillator circuit.

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

5. If the potential energy of the electron in the hydrogen atom is $-\frac{e^2}{8\pi\varepsilon_0 r}$, then what is its kinetic energy

(A) $-\frac{e^2}{4\pi\varepsilon_0 r}$ (B) $\frac{e^2}{8\pi\varepsilon_0 r}$ (C) $-\frac{e^2}{8\pi\varepsilon_0 r}$ (D) $\frac{e^2}{4\pi\varepsilon_0 r}$

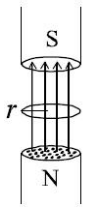
6. A body of mass 200 g moves at the speed of 5 m/hr. So De-Broglie wavelength related to it is of the order ..... ($h = 6.626 \times 10^{-34}$ J.s)

(A) 10^{-10}m (B) 10^{-20} m (C) 10^{-30} m (D) 10^{-40} m

7. At a certain place, the vertical component of the earth's magnetic field is 0.4×10^{-4} T and horizontal component is 0.3×10^{-4} T. What will be the total intensity of magnetic field of the earth ?

(A) 0.5×10^{-4} T (B) 0.5×10^{-2} T (C) 0.5×10^{-1} T (D) 0.5×10^{0} T

8. A conducting ring of radius r is placed perpendicularly inside a time varying magnetic field given by B = B0 + at, as shown in the figure. B0 and a are positive constant. Find emf produced in the ring.



(A) $-\pi\alpha r^2$ (B) $-\pi\alpha r$ (C) $-\pi\alpha^2 r^2$ (D) $-\pi\alpha^2 r$

9. In the following reaction..... particals are exited ${}_{Z}X^{A} \rightarrow {}_{Z+1}Y^{A} \rightarrow {}_{Z-1}K^{A-4} \rightarrow {}_{Z-1}K^{A-4}$

(A) α,β,γ (B) γ,α,β (C) β,α,γ (D) γ,β,α

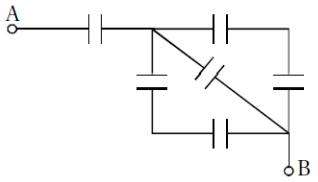
10. Which of the following phenomenon is not common for light and sound ?

(A) Interference (B) Diffraction (C) Refraction (D) Polarisation

11. If the height of a T.V. transmitter tower is doubled, then the region covered by this transmitter .....

(A) becomes double (B) becomes four times (C) becomes three times (D) no change

12. In the given circuit, capacitance of each capacitor is 1 μF. The effective capacitance between points A and B is ..... μF.



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

13. Dimensional formula of $\frac{1}{\mu_0\varepsilon_0}$ is .....

(A) $M^0L^2T^{-2}$ (B) $M^1L^{-2}T^2$ (C) $M^0L^{-1}T^1$ (D) $M^0L^1T^{-1}$

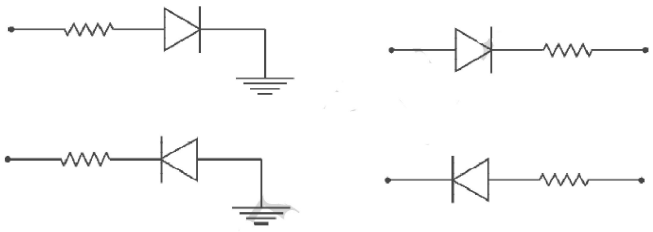
14. The density of electron and holes in an intrinsic semiconductor is n_e and n_h respectively. Which of the following options are true ?

(A) $n_h > n_e$ (B) $n_e > n_h$ (C) $n_e = n_h$ (D) $n_h >> n_e$

15. How many protons, neutrons and nucleons respectively in the ${}^{206}_{82}Pb$ nucleus made up of ?

(A) 82, 206, 288 (B) 206, 82, 288 (C) 82, 124, 206 (D) 124, 82, 206

16. Which of the following P-N junction diode is reverse biased ?



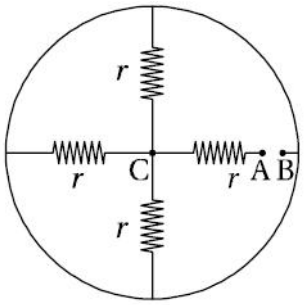
(A) P-N junction diode D_1 (B) P-N junction diode D_2

(C) P-N junction diode D_3 (D) P-N junction diode D_4

17. If the number of undisintegrated nuclei at time t is given by N = N0 $e^{-\lambda t}$, what is the number of nuclei disintegrated between the time t_1 and t_2 ?

(A) $N_0(e^{-\lambda t_2} - e^{-\lambda t_1})$ (B) $N_0(e^{-\lambda t_1} - e^{-\lambda t_2})$ (C) $N_0(e^{\lambda t_2} - e^{\lambda t_1})$ (D) $N_0(e^{\lambda t_1} - e^{\lambda t_2})$

18. In a given circuit, equivalent resistance between A and B = ... Ω.

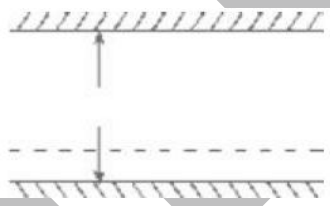


(A) 4r (B) $\frac{5r}{2}$ (C) $\frac{4r}{3}$ (D) $\frac{r}{4}$

19. The ratio of energies of electron in the first excited state to its second excited state in H-atom is .....

(A) 1 : 4 (B) 4 : 9 (C) 9 : 4 (D) 4 : 1

20. What is the type of the semiconductor, for the energy band diagram shown in the figure ?



(A) N-type semiconductor (B) P-type semiconductor

(C) Intrinsic semiconductor (D) Both N and P type semiconductor

21. V and I are given by the following equation in an A.C. circuit :

$V = 100 \sin(100t)$V, $I = 100 \sin\left(100 + \frac{\pi}{3}\right)$mA The power in the circuit is equal to ..... W.

(A) 104 (B) 10 (C) 2.5 (D) 5.0

22. An electric dipole is placed at the centre of a cube. The flux passing through the surface of the cube is

(A) Infinity (B) Zero (C) Cannot be found (D) $\frac{2q}{\varepsilon_0}$

23. Resonance frequency for L – C – R, AC series circuit is f_0 = ...

(A) $\frac{1}{2\pi\sqrt{LC}}$ (B) $\frac{2\pi}{\sqrt{LC}}$ (C) $\frac{\sqrt{LC}}{2\pi}$ (D) $\frac{\sqrt{LC}}{2\pi}$

24. The bands on a carbon resistivity have from left to right, the following colours red, yellow, green, silver. Its resistance is ..... Ω.

(A) $24 \times 10^5 \pm 5\%$ (B) $2.4 \times 10^5 \pm 10\%$ (C) $24 \times 10^5 \pm 10\%$ (D) $2.4 \times 10^5 \pm 5\%$

25. Power P is lost when resistance R_1 is joined with the supply. If resistance R_2 is joined with resistance R_1 power lost in R_1 .....

(A) increases (B) decreases

(C) remains constant (D) increases or decreases that depends on R_1 and R_2.

26. The ionization potentials of hydrogenic ions A and B are V_A and V_B respectively. Now if $V_B > V_A$ then

(A) $r_A > r_B$ (B) $r_A < r_B$ (C) $r_A = r_B$ (D) None of these

27. An object is placed at a distance of 25 cm on the axis of a convex mirror having focal length 20 cm. Find the lateral magnification of an image.

(A) 1.8 (B) 4 (C) –4 (D) $\frac{5}{9}$

28. There are two identical spheres A and B. Now charge Q is established on each sphere. There is a third identical neutral sphere C. Now sphere C is first brought in contact with A and separated then brought in contact with B and separated. After this what will be charge on C ?

(A) Q (B) $\frac{Q}{2}$ (C) $\frac{3Q}{4}$ `(D) $\frac{Q}{4}$

29. For a uniform electric field $\vec{E} = E_0(\hat{i})$, if the electric potential at x = 0 is zero, then the value of electric potential at x = +x will be .....

(A) xE_0 (B) $-xE_0$ (C) x^2E_0 (D) $-x^2E_0$

30. Wavelength of light used in Young's experiment is 5000Å. Distance between two slits is 0.2 mm. Distance between slit and screen is 200 cm. If the central fringe is near x = 0, for third bright fringe x = ...

(A) 1.67 cm (B) 1.5 cm (C) 0.5 cm (D) 5.0 cm

31. In Young's experiment, distance between two slits is 0.28 mm and distance between the slit and the screen is 1.4m. If distance between central bright fringe and third bright fringe is 0.9 cm, wavelength of light used in Young's experiment is .....

(A) 6000 Å (B) 5000 Å (C) 4000 Å (D) 3000 Å

32. If the frequency of 3 kHz signal has to be transmitted through amplitude modulation. Which of the following frequency should use as a carrier frequency ?

(A) 30 Hz (B) 300 Hz (C) 3000 Hz (D) 3 MHz

33. Four wires are made up of same material ..... wire has maximum resistance.

(A) Short and thick (B) Short and thin (C) Long and thick (D) Long and thin

34. Intensity of two sources are different and waves emitting from source experience interference. If ratio of maximum and minimum intensity in interference is 25, intensity of sources is

(A) 5 : 1 (B) 9 : 4 (C) 25 : 16 (D) 25 : 1

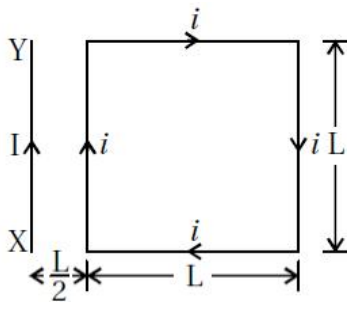
35. A square loop ABCD carrying a current i, is placed near and coplanar with a long straight conductor XY carrying a current I, the net force on the loop will be

(A) $\frac{\mu_0 Ii}{2\pi}$

(B) $\frac{2\mu_0 IiL}{3\pi}$

(C) $\frac{\mu_0 IiL}{2\pi}$

(D) $\frac{2\mu_0 Ii}{3\pi}$



36. Two point charged +8q and -2q are located at x = 0 and x = L respectively. The location of a point on the X-axis at which the net electric field due to these two point charges is zero is.....

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

37. A small linear object of length b is placed on the axis of a concave mirror. The end of the object facing the mirror is at a distance u from the mirror. If R is the radius of curvature of a mirror, the length of the object will be ..... approximately.

(A) $b\left(\frac{2u-R}{R}\right)^2$ (B) $b\left(\frac{R}{2u-R}\right)^2$ (C) $\left(\frac{2u-R}{R}\right)$ (D) $b\left(\frac{R}{2u-R}\right)^2$

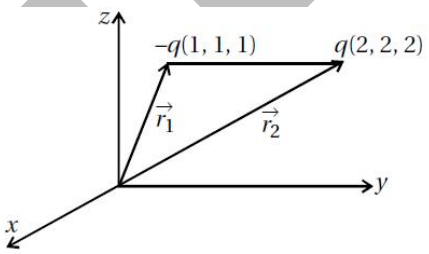
38. A fish in a lake is at a 6.3 m distance from the edge of the lake. If it is just able to see a tree on the edge of the lake, its depth in the lake is 5.52m. Refractive index of the water is

(A) $\frac{3}{4}$ (B) $\frac{3}{8}$ (C) $\frac{4}{3}$ (D) $\frac{8}{3}$

39. Half-life of a radioactive element is 5 min. At the end of 20 min. Its ..... % quantity will remain undisintegrated.

(A) 93.73 (B) 75 (C) 25 (D) 6.25

40. The dipole moment of the charge system shown in figure is $\vec{P}$ = ...



(A) $\frac{29}{\sqrt{3}}\hat{r}_{12}$ (B) $q\sqrt{3}\hat{r}_{12}$ (C) $\frac{9}{\sqrt{3}}\hat{r}_{12}$ (D) $q\sqrt{3}\hat{r}_{21}$

PART - 2 : CHEMISTRY

41. What will be the concentration of cationic vacancy if 10^{-4} mol % of $SrCl_2$ is added to NaCl ? ($N_A = 6.02 \times 10^{23}$)

(A) 6.02×10^{14} mol^{-1} (B) 6.02×10^{17} mol^{-1} (C) 6.02×10^{16} (D) 6.02×10^{15} mol^{-1}

42. In a sample of sea water, 6 mg O_2 is dissolved in 1 kg water. Find concentration of O_2 in ppm for given sample.

(A) 0.6 (B) 6.0 (C) 60.0 (D) 16.0

43. Various steps required to extract Cu from copper pyrites mineral are given as follows.

(i) Calcination (ii) bessimerization (iii) Concentration (iv) smelting

(v) Purification.

What is the correct order ?

(A) (i), (ii), (iii), (iv), (v) (B) (iii), (ii), (iv), (i), (v)

(C) (iii), (i), (iv), (ii), (v) (D) (i), (iii), (iv) (ii), (v)

44. In Which of the following reactions, dinitrogen oxide can be produced?

(A) $4Cu_{(s)} + 10\ HNO_3$ (dil., aq) $\rightarrow$ (B) $3Cu_{(s)} + 8HNO_3$ (10.30 %aq) $\rightarrow$

(C) $Cu_{(s)} + 4HNO_3$ (conc., aq) $\rightarrow$ (D) $Zn_{(s)} + 4HNO_3$ (conc., aq) $\rightarrow$

45. In which of the following, cell potential will be maximum at equilibrium?

(A) $Mg/Mg^{2+}(0.18M)\,||\,Ag^{+}(0.15M)/Ag$ (B) $Al/Al^{3+}(0.2M)\,||\,Zn^{2+}(0.15M)/Zn(s)$

(C) $Mg/Mg^{2+}(0.01M)\,||\,Zn^{2+}(0.005M)/Zn(s)$ (D) Given all options cell potentials are same.

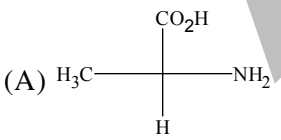
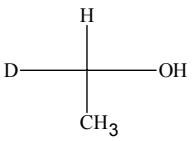
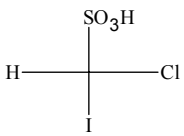
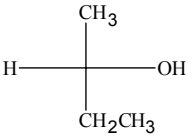
46. 1.8 gm metal is deposited on passing 0.2 F electricity from fused salt of metal M. If atomic mass of metal is 27, find formula of its chloride.

(A) MCl (B) MCl_2 (C) MCl_3 (D) MCl_4

47. Which compound of group-16 can act as strongest reducing agent?

(A) SeO_2 (B) TeO_2 (C) SO_2 (D) PoD_2

48. Which of the following compound has R-configuration?

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

49. What is the change in hybridisation for carbon having ^{-}OH during dehydration reaction of alcohol ?

(A) sp^3 into sp^2 (B) sp^3 into sp (C) sp^2 into sp^3 (D) sp into sp^2

50. Which is not true?

(A) boiling point of o-nitrophenol is less than p-nitrophenol

(B) phenol can be used as analgesic.

(C) phenol is more soluble in water than chlorobenzene

(D) Phenol can be neutralised by Sodium Carbonate.

51. $3ClO^{-} \rightarrow ClO_3^{-} + 2Cl^{-}$, Which of the following option show correct order of this reaction?

(A) rate = K $(ClO^{-})^2$ (B) rate = K $(ClO^{-})^3$ (C) rate = K (ClO^{-}) (D) rate = K $(ClO^{-})^3$

52. Which catalyst is used for following reaction ? α–Olefine + CO + H_2 $\rightarrow$Aldehyde

(A) MO (VI) Complex compound (B) Ni/Pd Complex compound

(C) Ni/Cd Complex compound (D) Rh/Pd Complex compound

53. Which of the following ion has highest spin magnetic moment ?

(A) Mn^{2+} (B) Fe^{2+} (C) CO^{2+} (D) NJ^{2+}

54. If Δ_0< P.E. for Octanhedral complex then which of the following is correct for d^6–configuration?

(A) $t_2g^3e_g^3$ (B) $t_{2g}{}^6e_g^0$ (C) $t_2g^5e_g^1$ (D) $t_2g^4e_g^2$

55. Which of the following complex is the most stable?

(A) $[Cr(SCN)_6]^{3+}$ (B) $[Cr(H_2O)_6]^{3+}$ (C) $[CrF_6]^{3-}$ (D) $[Cr(OH)_6]^{3-}$

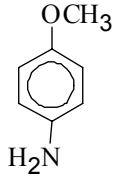
56. $>C=O + H_2N-Z \xrightarrow[-H_2O]{H^+}$ x Aldehyde. If Z = R then find product X = ...

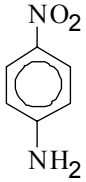
(A) Oxime (B) Hydrozone (C) Schiff' reagent (D) Semi-carbozone

57. $X \xrightarrow{\text{Reduction}} Y \xrightarrow{HNO_2} CH_3CH_2OH$ then identify X.

(A) CH_3CN (B) CH_3CONH_2 (C) $CH_3CH_2NO_2$ (D) All of them.

58. Which of the following is the strogest base?

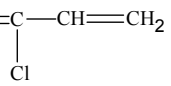
(A) 

(B) 

(C) 

(D) 

59. Which polymer is used to prepare gasket ?

(A) $C_6H_5CH = CH_2$ (B) $CH_2 = CH \cdot CN$ (C) $CF_2 = CF_2$ (D) 

60. Barbituric acids and its derivaties are knows as:

(A) Anesthetics (B) Antiseptic (C) Mild analgesic (D) Anti Bacterial

61. If 'a' is the edge length for a cubic system then what is the proportion of radii of spheres of simple cube, body centred cube and face centred cube.

(A) $\frac{1}{2}a : \frac{\sqrt{3}}{4}a : \frac{1}{2\sqrt{2}}a$ (B) $\frac{1}{2}a : \sqrt{3}a : \frac{1}{\sqrt{2}}a$ (C) $\frac{1}{2}a : \frac{\sqrt{3}}{2}a : \frac{\sqrt{3}}{\sqrt{2}}a$ (D) $a : \sqrt{3}a : \sqrt{2}a$

62. Which of the following solutions has the highest Osmotic pressure?

(A) 0.05 M $Al(NO_3)_3$ (B) 0.05 M $K_4[Fe(CN)_6]$

(C) 0.05 M $K_3[Fe(CN)_6]$ (D) 0.04 M $FeSO_4 \cdot (NH_4)_2SO_4.6H_2O$

63. The change in free energy for the reaction of decomposition of Al_2O_3 at 500° C is as follows :

$\frac{2}{3}Al_2O_3 \longrightarrow \frac{4}{3}Al + O_2 \quad \Delta_rG = +965 \text{ kJ mol}^{-1}$.

What is the minimum emf required to carry out electrolytic reduction of Al_2O_3 at 500° C?

(A) 2.5 V (B) 5.0 V (C) 4.5 V (D) 3.0 V

64. What is the percentange of silver in german–silver alloy?

(A) 15% (B) 20% (C) 10% (D) 0%

65. Which of the following method is used to purify Gallium arsenide ?

(A) Froth -floatation method (B) Van-Arkel method

(C) Zone-refining method (D) Electrolysis method

66. What is the correct decreasing order of acidity for Oxoacids of group-15 elements?

(A) HNO_3, H_3SbO_4, H_3AsO_4, H_3PO_4 (B) H_3PO_4, H_3AsO_4, H_3SbO_4, HNO_3

(C) HNO_3, H_3PO_4, H_3AsO_4, H_3SbO_4 (D) HNO_3, H_3AsO_4, H_3PO_4, H_3SbO_4

67. What is the IUPAC name of chloral hydrate?

(A) 2, 2, 2 – Trichloro ethanal (B) 2, 2, 2 – Trichloro ethanol

(C) 2, 2, 2 - Trichloro ethane–1, 1–diol (D) 2, 2, 2 – Trichloro ethane –1, 1–dial

68. An organic compound X (C_4H_9Br) reacts with alcoholic KOH to give two isomeric product with formula C_4H_8. Ozonolysis of one of the product gives CH_3CHO while other product gives two different products on same reaction then what is compound X?

(A) 2–bromobutane (B) 2–bromopentane (C) 1,2–Dibromobutane (D) 3-Bromopentane

69. What is the product obtained on reaction of salicylic acid with sodalime followed by oxidation with Chromic acid?

(A) Benzoic acid (B) Benzene (C) 1,4–Benzoquinone (D) Salicaldehyde

70. For a reaction , rate = k $(A)^x(B)^y$. If concetration of A is halved and B is doulbed then the rate of reaction will be?

(A) $\left(2x+\frac{1}{2}y\right)$ (B) $\left(x\frac{1}{2}+y^2\right)$ (C) 2^{y-x} (D) $\frac{1}{2(x+y)}$

71. Which of the following electrolyte is the best for co-agulation of solution prepared by hydrolysis of Ferric chloride with water?

(A) Sodium phosphate (B) Sodium nitrate (C) Potassium chloride (D) Magnesium sulphate

72. $_{65}Gd^{+3}$ iron is stable because.

(A) 4f -orbital is completely filled (B) 4f - orbital is half -filled

(C) It has inert gas configuration (D) 4f-orbital is completely empty

73. 1 mole $CO(NH_3)_5Cl_3$ complex give 3 mole ions on dissolving in water. One mole of same complex gives two mole $AgCl_{(s)}$ with 2 moles of $AgNO_3$. Then complex will be..

(A) $[CO(NH_3)_3\ Cl_2]2NH_3$ (B) $[CO(CH_3)_4\ Cl_2]Cl.NH_3$

(C) $[CO(NH_3)_3\ Cl]Cl_2$ (D) $[CO(NH_3)_4\ Cl_2]Cl_2.NH_3$

74. What is X in Cr(CO)x ?

(A) 4 (B) 5 (C) 6 (D) 3

75. The values of pK_b for their unkonown acid compounds x, y, z, w are 10.25, 9.24, 9.12, 9.80 respectively. then which has highest acidic strenght?

(A) y (B) z (C) x (D) w

76. Which of the following compound can give silver mirror test?

(A) Methanal (B) Ehanal (C) Propanone (D) (A) and (B) both

77. $A \xrightarrow[873K]{3H_2(Ni)} B \xrightarrow[273-278K]{(HNO_2)} C \xrightarrow{HBF_4} D \xrightarrow[Cu,\ \Delta]{NaNO_2(aq)} E \xrightarrow[Fe+HCl]{6(H)} F \xrightarrow[[Pyridine\ CH_3COOH]]{(CH_3CO)_2O} G$

In the above reaction G is N-Phenyl ethanamide then which two products are aniline?

(A) A and C (B) B and F (C) A and E (D) C and F

78. Which aqueous solution is used as an antiseptic for eyes in washing solution?

(A) Boric Acid (B) 0.2 phenol (C) Bithional (D) Furacin

79. Which vitamine is water as well as fat soluble?

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

80. Which compound is used to remove protein from sample in therapeutic chemical test?

(A) Trichloro acetic acid (B) Ethanol

(C) Benzene (D) Propanal

PART-3 : MATHEMATICS

81. The local maximum value of f(x) = $x+\frac{1}{x}$ is, $x \neq 0$

(A) 2 (B) –2 (C) 4 (d) –4

82. The function $F(x)=\sum_{k=1}^{5}(x-k)^2$ is attain minimum value at x = ...

(A) 3 (B) 2 (C) 1 (D) 4

83. Side of an equilateal triangle increases at the rate of $\sqrt{3}$ cm/sec. Rate of change of its area is ..... when length of side is 10 cm.

(A) 25 cm^2/sec (B) 15 cm^2/sec (C) 35 cm^2/sec (B) $15\sqrt{3}$ cm^2/sec

84. $\int e^x(\cot x-\cot^2 x)dx$ = ...

(A) e^x $cosec^2x$ (B) e^x cotx (C) e^x (cot x+1) (D) e^x (cot x–1)

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

(A) $\frac{e^{2x}}{2}\log 2x$ (B) e^{2x} log2x (C) $\frac{e^x}{2}\log x$ (D) $\frac{e^{2x}}{2}\log x$

86. $\int[f(x)g''(x)-f''(x)g(x)]dx$ = ...

(A) f(x) g'(x)+ c (B) f'(x) g(x) + c
(C) f(x) g' (x) + f''(x) g (x) +c (D) f(x) g'(x) –f' (x) g(x) + c

87. $\int 2^x(f'(x)+\log 2.f(x))dx = ... + c$

(A) 2^x f'(x) (B) 2^x f(x) (C) 2^x(log2) f(x) (D) (log2) f(x)

88. $\int_1^e 10^{\log_e x}dx = ...$

(A) $10\log_e(10e)$ (B) $\frac{10e-1}{\log_e 10e}$ (C) $\frac{10e}{(\log_e 10)e}$ (D) (10e) loge(10e)

89. $\int_0^{\sqrt{2}}[x^2]dx = ...$

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

90. $\int_0^{1000} e^{x-[x]}dx =$

(A) e^{1000}–1 (B) $\frac{e^{1000}-1}{e-1}$ (C) 1000 (e–1) (D) $\frac{e-1}{1000}$

91. The area bounded by the curve y = x|x|, X axis and the linex x = –1 and x = 1 is

(A) 0 (B) $\frac{1}{3}$ (C) $\frac{2}{3}$ (D) $\frac{4}{3}$

92. The order and degree of diffential equation $\sqrt{\sin x}\left(dx+dy\right)=\sqrt{\cos x}\left(dx-dy\right)$ are ..... and ..... respectively.

(A) 1, 2 (B) 2, 2 (C) 1, 1 (D) 2, not obtained

93. The differential equation of the family $y = ax + a^2$ (a is arbitary constant) is :

(A) $y=x.\frac{dy}{dx}$ (B) $y=x.\frac{dy}{dx}+\left(\frac{dy}{dx}\right)^2$ (C) $y=x\left(\frac{dy}{dx}\right)^2$ (D) $y=x.\frac{dy}{dx}+a^2$

94. If for vectors $\bar{a},\bar{b}$ and $\bar{c}$, $[\bar{a}\ \bar{b}\ \bar{c}]=4$ then $\left[\bar{a}\times\bar{b}\quad\bar{b}\times\bar{c}\quad\bar{c}\times\bar{a}\right]=$.....

(A) 16 (B) 64 (C) 4 (D) 18

95. for non-zero non collinear vectors $\bar{a},\bar{b},\bar{c}$ and $\bar{a}\times\bar{b}=\bar{b}\times\bar{c}=\bar{c}\times\bar{a}$ then $\bar{a}+\bar{b}+\bar{c}$ = ...

(A) abc (B) –1 (C) $\bar{0}$ (D) 1

96. If $\begin{vmatrix} a & a^2 & 1+a^3 \\ b & b^2 & 1+b^3 \\ c & c^2 & 1+c^3 \end{vmatrix}=0$ and (1, a, a^2) (1, b, b^2), (1, c, c^2) are non-coplaner vectors then abc = ...

(A) 0 (B) 2 (C) –1 (D) 1

97. Normal of a plane passing through (3, 2, 0) and containing the line $\frac{x-3}{1}=\frac{7-6}{5}=\frac{z-4}{4}$ is :

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

98. The measure of the angle between the lines whose direction numbers are (l, m, n,) and (m–n, n–l, l–m) is

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

99. If a plane has x-intercept *l*, Y- intercept m and z-intercept n and is at k units distance from the origin, then .....

(A) $\frac{1}{l^2}+\frac{1}{m^2}+\frac{1}{n^2}=\frac{1}{k^2}$ (B) $\frac{1}{l^2}+\frac{1}{m^2}+\frac{1}{n^2}=\frac{1}{k^2}$ (C) $\frac{1}{l^2}+\frac{1}{m^2}+\frac{1}{n^2}=\frac{1}{3k^2}$ (D) $\frac{1}{l}+\frac{1}{m}+\frac{1}{n}=k$

100. The area bounded by the curve $y = 2x - x^2$ and x-axis is .....

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

101. $f : R-\left\{\frac{1}{q}\right\}\longrightarrow R-\left\{\frac{p}{q}\right\}, f(x)=\frac{px-1}{qx-1}$, $p \neq q$, then f is

(A) one-one and onto (B) many-one and not onto

(C) one-one and not onto (D) many-one and onto

102. If f : R → R, f(x) = x^3, g : R → R, g(x)= 3^x, then {x|(fog) (x) = (gof) (x)} = ...

(A) {0} (B) $\{0,\sqrt{3},-\sqrt{3}\}$ (C) R (D) {0,3}

103. The inverse element of a for the binary operations * defined by a * b = a + b – ab, a, b ∈ z is :

(A) $\frac{a}{a-1}$ (B) $\frac{a}{1-a}$ (C) $\frac{a-1}{a}$ (D) $\frac{a+1}{a}$

104. The value of cos ($\cos^{-1}x + \cos^{-1}y$) + cos ($\sin^{-1}x + \sin^{-1}y$) is :

(A) 0 (B) π (C) $\frac{\pi}{2}$ (D) –π

105. If $-1 \le x, y, z, \le 1$ such that $\sin^{-1} x + \sin^{-1}y + \sin^{-1}z = \frac{3\pi}{2}$, then $x^{100} + y^{101} + z^{102} - \frac{9}{x^{100}+y^{101}+z^{102}}$ =

(A) 0 (B) 1 (C)–1 (D) 3

106. If a ≠ 0, b ≠ 0 , c ≠ 0 and $\begin{vmatrix} 0 & x^3+a & x^5+b \\ x^2-a & 0 & x^3-c \\ x^4-b & x^2+c & 0 \end{vmatrix} = 0$ then x =

(A) 0 (B) 1 (C) a + b + c (D) –(a + b + c)

107. $\begin{vmatrix} \binom{10}{4} & \binom{10}{5} & \binom{11}{m} \\ \binom{11}{6} & \binom{11}{7} & \binom{12}{m+2} \\ \binom{12}{8} & \binom{12}{9} & \binom{13}{m+4} \end{vmatrix} = 0$ then m = ...

(A) 6 (B) 5 (C) 4 (D) 1

108. If A = $\begin{bmatrix} 3 & -1+x & 2 \\ 3 & -1 & x+2 \\ x+3 & -1 & 2 \end{bmatrix}$ is singular and x ∈ [–5, –2], then x = ...

(A) 0 (B) –2 (C) –4 (D) 0, –4

109. If A = BX, A = $\begin{bmatrix} 1 & -2 \\ -3 & 5 \end{bmatrix}$ and B = $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, then matrix X = ...

(A) I_2 (B) A^{-1} (C) A (D) –A

110. If f(x) = $\log_3 (\log_5 x)$, then f'(x) = ...

(A) $\frac{1}{x \log_e x \log 3}$ (B) $\frac{1}{x \log_e x}$ (C) $\frac{1}{x \log_e 3 \log_e 5}$ (D) $\frac{1}{x \log_e x \log 5}$

111. If y = sin x + e^x, then $\frac{d^2x}{dy^2}$ = ...

(A) $(-\sin x + e^x)^{-1}$ (B) $\frac{\sin x - e^x}{(\cos x + e^x)^2}$ (C) $\frac{\sin x - e^x}{(\cos x + e^x)^3}$ (D) $\frac{\sin x + e^x}{(\cos x + e^x)^3}$

112. If $y = x^{xx}...\infty$, then $\frac{dy}{dx}$ = ...

(A) yx^{y-1} (B) $\frac{y^2}{x(1-y\log x)}$ (C) $\frac{y}{x(1+y\log x)}$ (D) None of these

113. $\int e^{x\log 2}\, e^x\, dx = ... + c$

(A) $2^x e^x$ (B) $\frac{(2e)^x}{(1+\log 2)}$ (C) $\frac{e^x}{\log(2e)}$ (D) $\frac{2^x}{1+\log_e 2}$

114. $\int \frac{x^2 dx}{(x+x\log x)^3} = ... + c$

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

115. $\int x^{4x}(1+\log x)\,dx = ... + c$

(A) $\frac{x^{5X}}{5}$ (B) $\frac{x^{4X}}{4}$ (C) x^{4X} (D) x^{5X}

116. For a post, husband and wife go for interview. If the pobaility that husband is selected is $\frac{1}{7}$ and the probability that wife is selected to $\frac{1}{5}$, then the probabiity that only one of them is selected is

(A) $\frac{4}{35}$ (B) $\frac{6}{35}$ (C) $\frac{2}{7}$ (D) $\frac{1}{35}$

117. If A and B are independent events such thth P(B) = $\frac{2}{7}$, P (A∪B') = 0.8 then P(A) = ...

(A) 0.1 (B) 0.2 (C) 0.3 (D) 0.41

118. One ticket is selected at random from 100 tickets numbered, 00, 01, 02.. 98, 99. If A and B denote repsectively the sum and the product of the digits on the tickets, then P(A = 9 / B = 0) = ...

(A) $\frac{2}{17}$ (B) $\frac{2}{19}$ (C) $\frac{2}{21}$ (D) $\frac{2}{11}$

119. The corner points of the feasible region determined by the system of linear constraints are (0, 15) (15, 15) (25, 25), (10, 35) (10, 0). Let z = px + qy, where p, q, > 0. Condition on p and q so that the maximum of z occurs at both of points (25, 25) and (10, 35) is .....

(A) 3p = q (B) p = 2q (C) 2p = 3q (D) 3p = 2q

120. Objective function of a linear programming problem is .....

(A) a constant (B) a function to be optimized

(C) an inequality (D) a quadratic equation