Q1. H_2O_2H2O2 is

A   An oxidising agent

B   A reducing agent

C   Both oxidising and reducing agent

D   Neither oxidising nor reducing agent

Q2. Dead burnt plaster is

A $CaSO_4$CaSO4

B $CaSO_4 \cdot \frac{1}{2}H_2O$CaSO4·12H2O

C $CaSO_4 \cdot H_2O$CaSO4·H2O
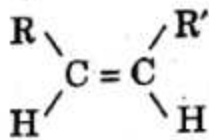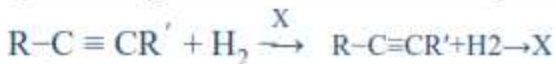
D $CaSO_4 \cdot 2H_2O$CaSO4·2H2O

Q3. Identify the following compound which exhibits geometrical isomerism :

A   But-2-ene

B   But-1-ene

C   Butane

D   Isobutane

Q4. During the fusion of organic compound with sodium metal, nitrogen present in the organic compound is converted into
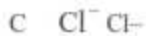
A $NaNO_2$ NaNO2

B $NaNH_2$ NaNH2

C NaCN NaCN

D NaNC NaNC

Q5. The reagent 'X' used for the following reaction is

$$R-C \equiv CR' + H_2 \xrightarrow{X} R-C=CR'+H2 \rightarrow X$$

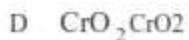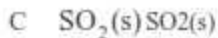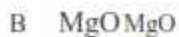$$\begin{array}{c} R \diagdown \diagup R' \\ C = C \\ H \diagup \diagdown H \end{array}$$

A NiNi

B Pd/C Pd/C

C $LiAlH_4$ LiAlH4

D Na/Liquid NH_3 Na/Liquid NH3

Q6. Which of the following ions will cause hardness in water ?

A Ca^{2+} Ca2+

B Na^+ Na+

C   Cl⁻ Cl–

D   K⁺ K+

Q7. Which of the following oxides shows electrical properties like metals ?

A SiO_2 SiO2

B MgO MgO

C $SO_2(s)$ SO2(s)

D CrO_2 CrO2

Q8. Which of the following aqueous solutions should have the highest boiling point ?

A $1·0$ M NaOH 1-0 M NaOH

B $1·0$ M Na_2SO_4 1-0 M Na2SO4

C $1·0$ M NH_4NO_3 1-0 M NH4NO3

D $1·0$ M KNO_3 1-0 M KNO3

Q9. The charge required for the reduction of 1 mole of MnO_4^- MnO4– to MnO_2 MnO2 is

A   1 F

B   3 F

C   5 F

D   7 F

Q10. For the reaction,

$2 SO_2 + O_2 \rightleftharpoons 2 SO_3$, 2SO2+O2⇌2SO3,

the rate of disappearance of O_2 O2 is

2×10^{-4} mol L^{-1} s^{-1} 2×10–4 mol L–1 s–1. The rate of appearance of

SO_3 SO3 is

A 2×10^{-4} molL^{-1}s^{-1} 2×10–4molL–1s–1

B 4×10^{-4} molL^{-1}s^{-1} 4×10–4molL–1s–1

C 1×10^{-4} molL^{-1}s^{-1} 1×10–4molL–1s–1

D 6×10^{-4} molL^{-1}s^{-1} 6×10–4molL–1s–1

Q11. Which of the following electrolytes will have maximum coagulating value for

AgI/Ag$^+$ AgI/Ag+ sol ?

A Na_2S Na2S

B Na_3PO_4 Na3PO4

C Na_2SO_4 Na2SO4

D   NaCl NaCl

Q12. Electrolytic refining is used to purify which of the following metals ?

A Cu and Zn

B Ge and Si

C Zr and Ti

D Zn and Hg

Q13. Dry ice is

A Solid CO CO

B Solid SO_2 SO2

C Solid CO_2 CO2

D Solid O_2 O2

Q14. Which of the following is an amphoteric oxi de ?

A V_2O_5, Cr_2O_3 V2O5,Cr2O3

B Mn_2O_7, Cr_2O_3 Mn2O7,Cr2O3

C CrO, V_2O_5 CrO,V2O5

D V_2O_5, V_2O_4 V2O5,V2O4

Q15. The IUPAC name of $[Co(NH_3)_4Cl(NO_2)]Cl$ [Co(NH3)4Cl(NO2)]Clis

A   tetraamminechloridonitrito-Ncobalt(III) chloride

B   tetraamminechloridonitrocobalt(II) chloride

C   tetraamminechloridonitrocobalt(I) chloride

D   tetraamminechloridodinitrocobalt(III) chloride

Q16. Which of the following statements is true in case of alkyl halides ?

A   They are polar in nature

B   They can form hydrogen bonds

C   They are highly soluble in water

D   They undergo addition reactions

Q17. Phenol can be distinguished from ethanol by the reagent

A   Bromine water

B   Sodium metal

C   Iron metal

D   Chlorine water

Q18. Which of the following compounds undergoes haloform reaction ?

A CH_3COCH_3 CH3COCH3

B   HCHO HCHO

C CH_3CH_2Br CH3CH2Br

D CH_3-O-CH_3 CH3-O-CH3

Q19. Which of the following will be the most stable diazonium salt
$(R \, N_2^+ \, X^-)$ (R N2+X–) ?

A $CH_3 \, N_2^+ \, X^-$ CH3 N2+X–

B $C_6H_5 \, N_2^+ \, X^-$ C6H5 N2+X–

C $CH_3 \, CH_2 \, N_2^+ \, X^-$ CH3 CH2 N2+X–

D $C_6H_5 \, CH_2 \, N_2^+ \, X^-$ C6H5 CH2 N2+X–

Q20. Which of the following bases is not present in DNA ?

A   Adenine

B   Guanine

C   Cytosine

D   Uracil

Q21. Which one of the following is a polyamide polymer ?

A   Terylene

B   Nylon-6,6

C   Buna-S

D   Bakelite

Q22. In F.C.C. the unit cell is shared equally by how many unit cells ?

A   10

B   8

C   6

D   2

Q23. At a particular temperature, the ratio of molar conductance to specific conductance of 0.01 M NaCl solution is

A $10^5 cm^3 mol^{-1}$ 105cm3mol–1

B $10^3 cm^3 mol^{-1}$ 103cm3mol–1

C $10 cm^3 mol^{-1}$ 10cm3mol–1

D $10^5 cm^2 mol^{-1}$ 105cm2mol–1

Q24. Isotonic solutions are solutions having the same

A   Surface tension

B   Vapour pressure

C   Osmotic pressure

D   Viscosity

Q25. The temperature coefficient of a reaction is 2. When the temperature is increased from $30°C$ 30∘Cto $90°C$ 90∘C, the rate of reaction is increased by

A   150 times

B   410 times

C   72 times

D   64 times

Q26. Gold sol is not a

A   Lyophobic sol

B   Negatively charged sol

C   Macromolecular sol

D   Multimolecular colloid

Q27. The common impurity present in bauxite is

A   CuO CuO

B   ZnO ZnO

C   Fe$_2$O$_3$ Fe2O3

D   Cr$_2$O$_3$ Cr2O3

Q28. Very pure N$_2$ N2 can be obtained by

A   Thermal decomposition of ammonium dichromate

B   Treating aqueous solution of NH$_4$Cl NH4Cl and NaNO$_2$ NaNO2

C   Liquifaction and fractional distillation of liquid air

D   Thermal decomposition of sodium azide

Q29. Which of the following oxidation states is common for all lanthanides ?

A   +2

B   +3

C   +4

D   +5

Q30. The electronic configuration of transition element "X", is +3, oxidation state is [Ar]$_3$d^5 [Ar]3d5. What is its atomic number ?

A   25

B   26

C   27

D   24

Q31. n-Propyl chloride reacts with sodium metal in dry ether to give

A $CH_3-CH_2-CH_2-CH_2-CH_2-CH_3$ CH3–CH2–CH2–CH2–CH2–CH3

B $CH_3-CH_2-CH_3$ CH3–CH2–CH3

C $CH_3-CH_2-CH_2-CH_3$ CH3–CH2–CH2–CH3

D $CH_3-CH_2-CH_2-CH_2-CH_2-CH_2-CH_3$ CH3–CH2–CH2–CH2–CH2–CH2–CH3

Q32. When the vapours of tertiary butyl alcohol are passed through heated copper a t 573 K, the product formed is

A   But-2-ene

B   2-Butanone

C   2-Methyl propene

D   Butanal

Q33. What is the increasing order of acidic strength among the following ?

(i) p-methoxy phenol

(ii) p-methyl phenol

(iii) p-nitro phenol

A ii < iii < i

B iii < ii < i

C i < ii < iii

D i < iii < ii

Q34. Which of the following is more basic than aniline ?

A Diphenylamine

B Triphenylamine

C p-nitroaniline

D Benzylamine

Q35. The two forms of D-Glucopyranose are called

A Diastereomers

B Anomers

C Epimers

D   Enantiomers

Q36. Among the following, the branched chain polymer is

A   Polyvinyl chloride

B   Bakelite

C   Low density polythene

D   High density polythene

Q37. Edge length of a cube is 300 pm. Its body diagonal would be

A   600 pm

B   423 pm

C   519.6 pm

D   450.5 pm

Q38. Which of the following is not a conductor of electricity ?

A   Solid NaCl

B   Cu

C   Fused NaCl

D   Brine solution

Q39. For a cell reaction involving two electron changes,
$E^{\circ}_{cell}=0 \cdot 3$ V Ecello=0-3 V at $25°C$ 25◦C. The equilibrium constant of the
reaction is

A 10^{-10} 10–10

B 3×10^{-2} 3×10–2

C   10

D 10^{10} 1010

Q40. The value of rate constant of a pseudo first order reaction

A   Depends only on temperature

B   Depends on the concentration of reactants present in small amounts

C   Depends on the concentration of reactants present in excess

D   Is independent of the concentration of reactants

Q41. $(CH_3)_3SiCl$(CH3)3SiCl is used dining polymerization of organosilicons
because

A

The chain length of organosilicon polymers can be controlled by adding $(CH_3)_3SiCl$(CH3)3SiCl

B $(CH_3)_3SiCl$(CH3)3SiCl improves the quality and yield of the polymer

C $(CH_3)_3SiCl$(CH3)3SiCl does not block the end terminal of silicone polymer

D $(CH_3)_3SiCl$(CH3)3SiCl acts as a catalyst during polymerisation

Q42. When PbO_2PbO2 reacts with concentrated HNO_3HNO3, the gas evolved is

A NO_2NO2

B O_2O2

C N_2N2

D N_2ON2O

Q43. $KMnO_4$KMnO4 acts as an oxidising agent in alkaline medium. When alkaline $KMnO_4$KMnO4 is treated with KI, iodide ion is oxidised to

A I_2I2

B IO^-IO–

C IO_3^-IO3–

D IO_4^-IO4–

Q44. $[Fe(NO_2)_3Cl_3][Fe(NO2)3Cl3]$ and
$[Fe(O–NO)_3 Cl_3][Fe(O–NO)3 Cl3]$ shows

A   Linkage isomerism

B   Geometrical isomerism

C   Optical isomerism

D   Hydrate isomerism

Q45. Tertiary alkyl halide is practically inert to substitution by SN_2 SN2 mechanism because of

A   Insolubility

B   Instability

C   Inductive effect

D   Steric hindrance

Q46. The products X and Z in the following reaction sequence are

$$\text{benzene} + CH_3 - CH = CH_2 \quad \xrightarrow[\text{Heat}]{AlCl_3/\text{ether}} \quad X$$

$$\xrightarrow{O_2 / 130°C} Y \xrightarrow[\text{Heat}]{H^+/H_2O} \quad \text{(phenol, OH)} + Z$$
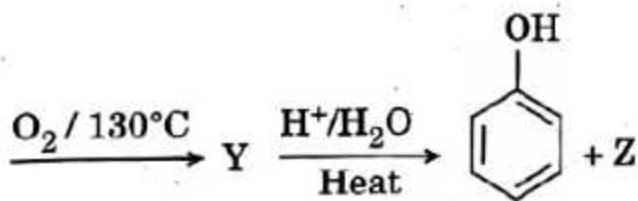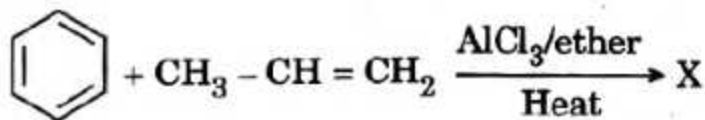
A   Isopropylbenzene and acetone

B   Cumene peroxide and acetone

C   Isopropylbenzene and isopropyl alcohol

D   Phenol and acetone

Q47. The appropriate reagent for the following transformation is

A   Zn–Hg/HCl   Zn–Hg/HCl

B H_2N—NH_2, KOH/ethylene glycol   H2N—NH2,KOH/ethylene glycol

C   Ni/H$_2$ Ni/H2

D   NaBH$_4$ NaBH4

Q48. In the following reaction ..... the compound Z is

CH_3 benzene ring

$$\xrightarrow[\text{CS}_2]{\text{CrO}_2\text{Cl}_2} \quad X \xrightarrow{\overset{\oplus}{H_3O}} Z$$
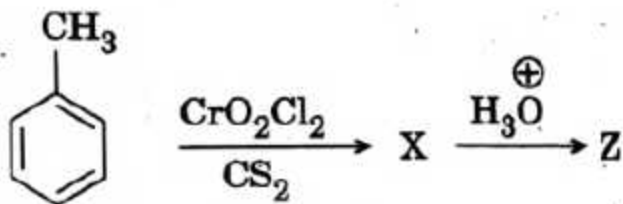
A   Behzoic acid

B   Benzaldehyde

C   Acetophenone

D   Benzene

Q49. The reaction of Benzenediazonium chloride with aniline yields yellow dye. The name of the yellow dye is

A   p-Hydroxyazobenzene

B   p-Aminoazobenzene

C   p-Nitroazobenzene

D   o-Nitroazobenzene

Q50. The glycosidic linkage involved in linking the glucose units in amylose part of starch is

A C_1–C_4 β–linkage C1–C4 β–linkage

B C_1–C_6 α–linkage C1–C6 α–linkage

C C_1-C_6 β-linkage C1–C6 β-linkage

D C_1-C_4 α-linkage C1–C4 α-linkage

Q51. Ziegler-Natta catalyst is used to prepare

A Low-density polythene

B Teflon

C High density polythene

D Nylon-6

Q52. 1.0 g1.0 g of Mg is burnt with 0.28 g of O_2O2 in a closed vessel. Which reactant is left in excess and how much ?

A Mg, 5.8 g

B Mg, 0.58 g

C O_2, 0.24 gO2,0.24 g

D O_2, 2.4 gO2,2.4 g

Q53. The orbital nearest to the nucleus is

A 4f

B 5d

C   4s

D   7p

Q1. The image of the point (1,6,3) in the $\frac{x}{1} = \frac{y-1}{2} = \frac{z-2}{3}$ x1=y-12=z-23 is

A (1,0,7)

B (7,0,1)

C (2,7,0)

D (-1,-6,-3)

Q2. The angle between the lines $2x = 3y = -z$ $2x=3y=-z$ and $6x = -y = -4z$ $6x=-y=-4z$ is

A $0°$ 0°

B $45°$ 45°

C $90°$ 90°

D $30°$ 30°

Q3. The value of k such that the line $\frac{x-4}{1} = \frac{y-2}{1} = \frac{z-k}{2}$ x-41=y-21=z-k2 lies on the place
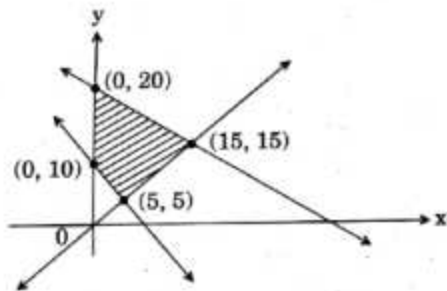$2x - 4y + z = 7$ 2x-4y+z=7 is

A -7

B 4

C 4

D 7

Q4. The locus represented by $xy + yz = 0$ xy+yz=0 is

A a pair of perpendicular lines

B a pair of parallel lines

C a pair of parallel planes

D   a pair of perpendicular planes

Q5. The feasible region of an LPP is shown in the figure . If z $= 3x + 9y$, z=3x+9y, then the minimum value of z occurs at

A   (5,5)

B   (0,10)

C   (0,20)

D   (15,15)

Q6. For the LPP; maximise z $= x + 4y$ z=x+4y subject to the constraints
$x + 2y \leq 2$, $x + 2y \geq 8$, x, y ≥ 0 x+2y≤2,x+2y≥8,x,y≥0

A $z_{max} = 4$ zmax=4

B $z_{max} = 8$ zmax=8

C $z_{max} = 16$ zmax=16

D   Has no feasible solution

Q7. For the probability distribution given by

X = x$_i$ X=xi	0	1	2
P$_i$ Pi	$\frac{25}{36}$ 2536	$\frac{5}{18}$ 518	$\frac{1}{36}$ 136

the standard deviation (σ) (σ) is

A $\sqrt{\frac{1}{3}}13$

B $\frac{1}{3}\sqrt{\frac{5}{2}}1352$

C $\sqrt{\frac{5}{36}}536$

D None of the above

Q8. A bag contains 17 tickets numbered from 1 to 17. A ticket is draw at random, then another ticket is drawn at random, then another ticket is drawn without replacing the first one . The probability that both the tickets may show even numbers is

A $\frac{7}{34}734$

B $\frac{8}{17}817$

C $\frac{7}{16}716$

D $\frac{7}{17}717$

Q9. A flashlight has 10 batteries out of which 4 are dead. If 3 batteries are selected without replacement and tested, then the probability that all 3 are dead is

A $\frac{1}{30}130$

B $\frac{2}{8}28$

C $\frac{1}{15}115$

D $\frac{1}{10}110$

Q10. If $|x + 5| \geq 10$ $|x+5|\geq10$ then

A $x \in (-15,5]$ xϵ(-15,5]

B $x \in (-5,5]$ xϵ(-5,5]

C $x \in (-\infty,-15] \cup [5,\infty)$ xϵ(-∞,-15]∪[5,∞)

D $x \in [-\infty, -15] \cup [5, \infty)$ x∈[-∞,-15]∪[5,∞)

Q11. Everybody in a room shakes hands with everybody else. The total number of handshakes is 45. The total number of persons in the room is

A   9

B   10

C   5

D   15

Q12. The constant term in the expansion of $(x^2 - \frac{1}{x^2})^{16}$ (x2–1x2)16 is

A $^{16}C_8 16C8$

B $^{16}C_7 16C7$

C $^{16}C_9 16C9$

D $^{16}C_{10} 16C10$

Q13. If $P(n) :$ " $2^{2n} - 1$ P(n):"22n–1 is divisible by k for all $n \in N$ " nEN" is true, then the value of 'k' is

A   6

B   3

C   7

D   2

Q14. The equation of the line parallel to the line $3x - 4y + 2 = 0$ 3x–4y+2=0 and passing through $(-2, 3)$ (–2,3) is

A $3x - 4y + 18 = 0$ 3x-4y+18-0

B $3x - 4y - 18 = 0$ 3x-4y-18-0

C $3x + 4y + 18 = 0$ 3x+4y+18-0

D $3x + 4y - 18 = 0$ 3x+4y-18-0

Q15. If $\left(\frac{1-i}{1+i}\right)^{96} = a + ib$ (1-il+i)96=a+ib then (a,b) is

A   (1,1)

B   (1,0)

C   (0,1)

D   (0,-1)

Q16. The distance between the foci of a hyperbola is 16 and its eccentricity is $\sqrt{2}$. Its equation is

A $x^2 - y^2 = 32$ x2-y2-32

B $\frac{x^2}{4} - \frac{y^2}{9} = 1$ x24-y29-1

C $2x^2 - 3y^2 = 7$ 2x2-3y2-7

D $y^2 - x^2 = 32$ y2-x2-32

Q17. The number of ways in which 5 girls and 3 boys can be seated in a row so the no two boys are together is

A   14040

B   14440

C   14000

D   14400

Q18. If a, b, c are three consecutive terms of an AP and x, y, z are three consecutive terms of a GP, then the value of $x^{b-c} \cdot y^{c-a} \cdot z^{a-b}$ xb–c.yc–a.za–b is

A 0

B xyz

C -1

D 1

Q19. The value of $\lim_{x\to 0}$ $\frac{|x|}{x}$ limx→0|x|x is

A 1

B -1

C 0

D Does not exist

Q20. Let $f(x) = x - \frac{1}{x}$ f(x)=x–1x then $f'(-1)$ f′(–1) is

A 0

B 2

C 1

D -2

Q21. The negation of the statement "72 is divisible by 2 and 3" is

A 72 is not divisible by 2 or 72 is not divisible by 3

B 72 is not divisible by 2 or 72 is divisible by 3

C 72 is not divisible by 2 and 72 is divisible by 3

D   72 is not divisible by 2 and 3

Q22. The probability of happening of an event A is 0.5 and the of B is 0.3 .If A and B are mutually exclusive events, then the probability of neither A nor B is

A   0.4

B   0.5

C   0.2

D   0.9

Q23. In a simultaneous throw of a pair of dice, the probability of getting a total more than 7 is

A $\frac{7}{12}$712

B $\frac{5}{36}$536

C $\frac{5}{12}$512

D $\frac{7}{36}$736

Q24. If A and B are mutually exclusive events , given that $P(A) = \frac{3}{5}, P(B) = \frac{1}{5}$ P(A)=35,P(B)=15, then P(A or B) is

A   0.8

B   0.6

C   0.4

D   0.2

Q25. Let f, g : R → R f,g:R→R be two functions defined as $f(x) = |x| + x$ f(x)=|x|+x and $g(x) = |x| - x \forall x \in R$ g(x)=|x|-x∀x∈R. Then (fog) (x) (fog) (x) for x < 0 x<0 is

A   0

B   4x

C   -4x

D   2x

Q26. A is a set having 6 distinct elements. The number of distinct functions from A to A which are not bijections is

A   6! − 6 6!−6

B 6^6 − 6 66−6

C 6^6 − 6! 66−6!

D   6!6!

Q27. Let $f : R \rightarrow R$ f:R→R be defined by

$$\begin{cases} 2x & ; & x > 3 \\ x^2 & ; & 1 < x \le 3 \\ 3x & ; & x \le 1 \end{cases} \quad \{2x;x>3x2;1<x \le 33x;x\le1$$

Then $f(-1) + f(2) + f(4)$ f(−1)+f(2)+f(4) is

A   9

B   14

C   5

D   10

Q28. If $\sin^{-1} x + \cos^{-1} y = \frac{2\pi}{5}$ sin−1x+cos−1y=2π5 , then $\cos^{-1} x + \sin^{-1} y$ cos−1x+sin−1y is

A $\frac{2\pi}{5}$ 2π5

B $\frac{3\pi}{5}$ 3π5

C $\frac{4\pi}{5}$ 4π5

D $\frac{3\pi}{10}$ 3π10

Q29. The value of the expression $\tan(\frac{1}{2}\cos^{-1}\frac{2}{\sqrt{5}})$ tan(12cos–125) is

A $2-\sqrt{5}$ 2-5

B $\sqrt{5}-2$ 5-2

C $\frac{\sqrt{5}-2}{2}$ 5-22

D $5-\sqrt{2}$ 5-2

Q30. If A = $[\begin{smallmatrix} 2 & -2 \\ -2 & 2 \end{smallmatrix}]$ A=[2–2–22] then $A^n = 2^k A$, An=2kA, where k =

A 2^{n-1} 2n-1

B n+1

C n-1

D 2(n-1)

Q31. If $[\begin{smallmatrix} 1 & 1 \\ -1 & 1 \end{smallmatrix}][\begin{smallmatrix} x \\ y \end{smallmatrix}]=[\begin{smallmatrix} 2 \\ 4 \end{smallmatrix}]$ [11–11][xy]=[24] then the values of x and y respectively are

A -3, -1

B 1,3

C 3,1

D -1,3

Q32. A = $[\begin{smallmatrix} \cos\alpha & \sin\alpha \\ -\sin\alpha & \cos\alpha \end{smallmatrix}]$ A=[cosαsinα–sinαcosα] , then AA' = AA'=

A   A

B   Zero matrix

C   A'

D   I

Q33. If x, y, z ∈ R, x,y,z∈R, then the value of determinant
$$\begin{vmatrix} (5^x+5^{-x})^2 & (5^x-5^{-x})^2 & 1 \\ (6^x+6^{-x})^2 & (6^x-6^{-x})^2 & 1 \\ (7^x+7^{-x})^2 & (7^x-7^{-x})^2 & 1 \end{vmatrix}$$ |(5x+5-x)2(5x-5-x)21(6x+6-x)2(6x-6-x)21(7x+7-x)2(7x-7-x)21| is

A   10

B   12

C   1

D   0

Q34. The value of determinant $\begin{vmatrix} a-b & b+c & a \\ b-a & c+a & b \\ c-a & a+b & c \end{vmatrix}$ |a-bb+cab-ac+abc-aa+bc| |a-bb+cab-bb+cab-ac+abc-aa+bc|a-bb+cab-ac+abc-aa+bc|a-bb+cab-ac+abc-aa+bc| a-bb+cab-ac+abc-aa+bc is

A   a³ + b³ + c³   a3+b3+c3

B   3abc3abc

C   a³ + b³ + c³ − 3abc   a3+b3+c3-3abc

D   a³ + b³ + c³ + 3abc   a3+b3+c3+3abc

Q35. If (x₁, y₁), (x₂, y₂) (x1,y1),(x2,y2) and (x₃, y₃) (x3,y3) are the vertices of a triangle whose area is
'k' square units, then $\begin{vmatrix} x_1 & y_1 & 4 \\ x_2 & y_2 & 4 \\ x_3 & y_3 & 4 \end{vmatrix}^2$ |x1y14x2y24x3y34|2 |x1y14x2y24x3y34|2 is

A 32/k² 32/k2

B 16/k² 16/k2

C 64/k² 64/k2

D 48/k² 48/k2

Q36. Let A be a square matrix of order 3 × 3 3×3, then $|5A|$ = $|5A|$=

A 5|A| 5|A|

B 125|A| 125|A|

C 25|A| 25|A|

D 15|A| 15|A|

Q37. If

$$f(x) = \begin{cases} \dfrac{\sqrt{1+kx}-\sqrt{1-kx}}{x} & \text{if } -1 \le x < 0 \\ \dfrac{2x+1}{x-1} & \text{if } 0 \le x \le 1 \end{cases}$$

f(x)={1+kx−1−kxxif −1≤x<02x+1x−1if 0≤x≤1

is continuous at x = 0, then the value of k is

A k-1

B k--1

C k-0

D k-2

Q38. If $\cos y = x \cos(a + y)$ cos y=x cos(a+y) with $\cos a \ne \pm 1$ cos a≠±1, then $\frac{dy}{dx}$dydx is equal to

A $\dfrac{\sin a}{\cos^2(a+y)}$ sin acos2(a+y)

B $\dfrac{\cos^2(a+y)}{\sin a}$ cos2(a+y)sin a

C $\dfrac{\cos a}{\sin^2(a+y)}$ cos asin2(a+y)

D $\frac{\cos^2(a+y)}{\cos a}$ cos2(a+y)cos a

Q39. If f(x) = | cos x − sin |x   f(x)=|cos x−sin|x, then f′ ($\frac{\pi}{6}$) f′(π6) is equal to

A $-\frac{1}{2}(1+\sqrt{3})$ −12(1+3)

B $\frac{1}{2}(1+\sqrt{3})$ 12(1+3)

C $-\frac{1}{2}(1-\sqrt{3})$ −12(1−3)

D $\frac{1}{2}(1-\sqrt{3})$ 12(1−3)

Q40. If y = $\sqrt{x+\sqrt{x+\sqrt{x+...\infty}}}$, y=x+x+x+...∞, they $\frac{dy}{dx}$ = dydx=

A $\frac{1}{y^2-1}$ 1y2−1

B $\frac{1}{2y-1}$ 12y+1

C $\frac{2y}{y^2-1}$ 2yy2−1

D $\frac{1}{2y-1}$ 12y−1

Q41. If= { $\begin{array}{c} \frac{\log_e x}{x-1} \\ k \end{array}$: $\begin{array}{c} x \neq 1 \\ x = 1 \end{array}$ ={logexx−1;x≠1k;x =1 is continuous at x = 1, then the value of k is

A   e

B   1

C   -1

D   0

Q42. Approximate change in the volume V of a cube of side x metres caused by increasing the side by 3% is

A   0.09 x³ m³ 0.09 x3 m3

B $0.03 \, x^3 \, m^3$ 0.03 x3 m3

C $0.06 \, x^3 \, m^3$ 0.06 x3 m3

D $0.04 \, x^3 \, m^3$ 0.04 x3 m3

Q43. The maximum value of $\left(\frac{1}{x}\right)^x$ (1x)x is

A   ec

B e^e ec

C $e^{1/e}$ el/e

D $\left(\frac{1}{e}\right)^{1/e}$ (1e)1/e

Q44. $f(x) = x^x$ f(x)=xx has stationary point at

A   x = e x~c

B $x = \frac{1}{e}$ x~le

C   x = 1 x~1

D $x = \sqrt{e}$ x~c

Q45. The maximum area of a rectangle inscribed in the circle
$(x + 1)^2 + (y - 3)^2 = 64$ (x+1)2+(y-3)2=64 is

A   64 sq. units

B   72 sq. units

C   128 sq. units

D   8 sq. units

Q46. $\int \frac{1}{1+e^x} dx$ ∫11+exdx is equal to

A $\log_e\left(\frac{e^x+1}{e^x}\right) + c$ loge(ex+1ex)+c

B $\log_e\left(\frac{e^x-1}{e^x}\right) + c$ loge(ex−1ex)+c

C $\log_e\left(\frac{e^x}{e^x+1}\right) + c$ loge(exex+1)+c

D $\log_e\left(\frac{e^x}{e^x-1}\right) + c$ loge(exex−1)+c

Q47. $\int \frac{1}{\sqrt{3-6x-9x^2}} dx$ ∫13−6x−9x2dx is equal to

A $\sin^{-1}\left(\frac{3x+1}{2}\right) + c$ sin-1(3x+12)+c

B $\sin^{-1}\left(\frac{3x+1}{6}\right) + c$ sin-1(3x+16)+c

C $\frac{1}{3}\sin^{-1}\left(\frac{3x+1}{2}\right) + c$ 13sin-1(3x+12)+c

D $\sin^{-1}\left(\frac{2x+1}{3}\right) + c$ sin-1(2x+13)+c

Q48. $\int e^{\sin x} \cdot \left(\frac{\sin x+1}{\sec x}\right) dx$ ∫esinx.(sinx+1secx)dx is equal to

A sin x. $e^{\sin x}$ + c sin x.esin x+c

B cos x. $e^{\sin x}$ + c cos x.esin x+c

C $e^{\sin x}$ + c esin x+c

D $e^{\sin x}$ (sin x + 1) + c esin x(sin x+1)+c

Q49. $\int_{-2}^{2} |x \cos \pi x| dx$ ∫-22|x cos πx|dx is equal to

A $\frac{8}{\pi}$ 8π

B $\frac{4}{\pi}$ 4π

C $\frac{2}{\pi}$ 2π

D $\frac{1}{\pi}$