NEW STANDARD ACADEMY

SEMRI KOTHI SUPER MARKET, RAEBARELI

CLASS 12 (21-05-2024) DPP (Academy)

PHYSICS

1. A rectangular metal block has dimensions 3cm × 1cm × 1cm. The ratio of the resistance measured between the two opposite rectangular faces to that measured between the two square faces of the block is:

(a) 1:3 (b) 1:9

(c) 3:1 (d) 9:1

2. The resistance of a wire of uniform diameter d and length L is R. The resistance of another wire of the same material but diameter 2d and length 4L will be:

(a) 2R (b) R

(c) R/2 (d) R/8

3. The resistance of a wire of length 300m and cross-section area 1.0 mm^2 made of material of resistivity $1.0 \times 10^{-7}\Omega$m is:

(a) 2Ω (b) 3Ω

(c) 20Ω (d) 30Ω

4. Calculate the resistivity of the material of a wire 1 m long , 0.4 mm in diameter and having a resistance 2Ω:

(a) 300 Ωm (b) 2.51×10^{-7} Ωm

(c) 2×10^{7} Ωm (d) 1×10^{-15} Ωm

5. A wire has a resistance of 10 ohm. Its resistance if it is stretched by one-tenth of its original length is:

(a) 12.1 Ω (b) 7.9 Ω

(c) 11 Ω (d) 9 Ω

Q 6. A wire of 10Ω resistance is stretched to thrice its original length. What will be its new resistivity:

(a) Three times of initial resistivity

(b) one-third of initial resistivity

(c) Equal to initial resistivity

(d) None of these

Q 7. If n, e, τ and m respectively represent the density, charge relaxation t and mass of the electron, then the resistance of a wire of length l and area cross-section A will be:

(a) m$l\ ne^{\ 2}\tau A$ (b) m$\tau^{\ 2} A\ ne^{\ 2}$

(c) ne$^2\tau A\ 2ml$ (d) ne^{2}A $^2m\tau$

Q 8. On increasing the temperature of a conductor, its resistance increases because:

(a) Relaxation time decreases

(b) Mass of the electrons increases

(c) Electron density decreases

(d) None of the above

Q 9. The resistance of a wire is 5 ohm at 50 °C and 6 ohm at 100 °C. The resistance of the wire at 0 °C will be:

(a) 1 ohm (b) 2 ohm

(c) 3 ohm (d) 4 ohm

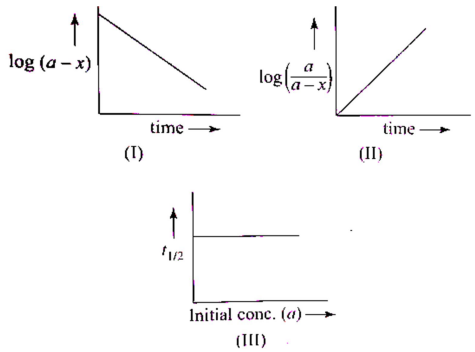
Q 10. The resistance of a semiconductor material (germanium or silicon) _____ with rise in temperature.

(a) increases (b) decreases

(c) Remains the same (d) first increases then decreases

CHEMISTRY

1. Which of the following graphs is/is correct for the first order react

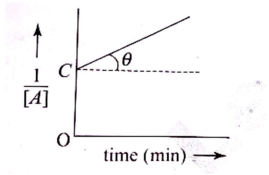


a) I,II

b) II,III

c) I,II,III
d) I,III

2. For a second order reaction A→ product the graph is plotted against $\frac{1}{[A]}$ and time 't'



Tan θ=0.6 and OC=2Lmol^{-1}. The rate of reaction at beginning is.
a) 1.25mol L^{-1}min^{-1} b) 0.150molL^{-1}min^{-1}
c) 0.5 molL^{-1}min^{-1} d) 1.50 molL^{-1}min^{-1}

3. For a first order reaction, the plot of t against log C gives a straight line with slope equal to
a) $\frac{k}{2.303}$ b) $-\frac{k}{2.303}$ c) $\frac{\ln k}{2.303}$ d) -k
4. In a first order reaction, the reaction substance has half- life period of ten minutes. What fraction of the substance will be left after an hour the reaction has occurred?
a) 1/6 of initial concentration
b) 1/64 of initial concentration
c) 1/12 of initial concentration
d) 1/32 of initial concentration
5. Two substances A($t_{1/2}$=5min) and B($t_{1/2}$=15min) are taken in such a way that initially[A]= 4[B]. The time after which both the concentration will be equal is (assuming reactions are of 1st order)
a) 5min b)15min c)20min
d) concentration can never be equal
6. The rate constant for the reaction A→B is 2×10^{-4} L.mol^{-1} .The concentration of A at which rate of the reaction is $(1/12)\times 10^{-5}$M sec^{-1} is
a) 0.25M b) $(1/20)\sqrt{5/3}$M c) 0.5M
d) None of these
7. In presence of HCl, sucrose gets hydrolysed into glucose and fruct . The concentration of sucrose was found to reduce from 0.4M to 0.2M in 1 hour and to 0.1 M in total of 2 Hours, The order of the t reaction is
a) Zero b)one c)two d) None of th
8. A straight line was obtained on plotting $\log_{10}\frac{dx}{dt}$ vs. $\log_{10}(a\text{-}x)^n$ w an intercept on $\log_{10}\left(\frac{dx}{dt}\right)$ axis equal to 0.6021. The rate constant for the reaction is ___ litre^{n-1} mol^{1}t^{-1}
9. The half life period of a reaction, becomes 16 times when reactant concentration is halved. The order of reaction is____
10. Compounds A and B react with a common reagent with first order kinetics in both cases .If 99% of A must react before 1% of B has reacted. The minimum ratio for their respective rate constants is_ (Given $\frac{2}{2-log}$ = 458)

BIOLOGY

1. The genetic code is called a degenerate code because
a) One codon has many meanings
b) More then one codon has the same meaning
c) One codon hs one meaning
d) There are 64 codons present
2. Activatation of an amino acid during protein synthesis requires a participation of seecific molecule of
a) mRNA b) tRNA
c) rRNA d) All of these
3. The first amino acid in any polypeptide chain of prokaryotes is alwa
a) Formylated arginine b) Lysine
c) Formylated methionine d) methionine
4. Part of a gene which codes for an enzyme is called
a) Cistron b) Exon

c) Intron d) Codon

5. Which one of the following pairs is correctly matched
   a) Ribosomal RNA - Carries amino acide to the site of protein synthesis
   b) Transcription - Process by which protein is Synthesized
   c) Translation - Process by which mRNA carries the information from nucleus to ribosomes
   d) Anticodon - Site of t-RNA molecule that binds to the m-RNA
6. Estimated number of genes in human being is
   a) 3000 b) 80,000
   c) 25,000 d) 3×10^9
7. The probes used in DNA fingerprinting technique are
   a) Radioactive natural DNA/RNA with Known Sequnces
   b) Radioactive synthetic DNA/RNA with unknown sequences
   c) Radioactive natural DNA/RNA with unknown sequences
   d) Radioactive synthetic DNA/RNA with known sequences
8. Which of the following sequence of steps is correct in DNA Fingerprinting?
   a) Southern blotting Electrophoresis, Hybridization, Autoradiography
   b) Autoradiography , Electrophoresis, Hybridization, Southern blotting
   c) Electrophoresis, Southern blotting, Hybridization, Autoradiography
   d) Hybridization, , Southern blotting, Electrophoresis, Autoradiography
9. Hypervariable region of DNA is Formed of
   a) Minisatellite DNA b) Microsatellite DNA
   c) Probes d) Both (1) and (2)
10. Which is a characteristic of DNA sequences at the telomeres?
    a) They consist of guanine and adenine (or thymine)
    b) They consist of repeated sequences.
    c) On strand protrudes beyond the other creating some single – stranded DNA at the end.
    d) All of the above

MATHS

1. $\begin{vmatrix} 1 & cos\alpha & cos\beta \\ cos\alpha & 1 & cos\gamma \\ cos\beta & cos\gamma & 1 \end{vmatrix} = \begin{vmatrix} 0 & cos\alpha & cos\beta \\ cos\alpha & 0 & cos\gamma \\ cos\beta & cos\gamma & 0 \end{vmatrix}$ holds if $\cos^2\alpha + \cos2\beta + \cos2\gamma =$
   a) 1 b)2 c)3/2 d)1/2
2. The α, β, γ are roots of the equation $x^2(px+q)$= r(x+1), then the value of determinant $\begin{vmatrix} 1+\alpha & 1 & 1 \\ 1 & 1+\beta & 1 \\ 1 & 1 & 1+\gamma \end{vmatrix}$ is
   a) α, β, γ b) $1+\frac{1}{\alpha,}+\frac{1}{\beta}+\frac{1}{\gamma}$ c) 0 d) none of these
3. If a = $\cos\frac{4\pi}{3} + i\sin\frac{4\pi}{3}, then \begin{vmatrix} 1 & 1 & 1 \\ 1 & a & a^2 \\ 1 & a^2 & a \end{vmatrix} is$
   a) Purely
   b) Purely Imaginary
   c) 0
   d) None of these
4. Given that α is a root of x^4=1 with negative principal argument and $\Delta(\alpha)=\begin{vmatrix} 1 & 1 & 1 \\ \alpha^n & \alpha^{n+1} & \alpha^{n+3} \\ \frac{1}{\alpha^{n+1}} & \frac{1}{\alpha^n} & 0 \end{vmatrix} n \in N$

   Now consider the following two statements:

   S_1: Principal argument of $\Delta(\alpha)$ is $-\frac{3\pi}{4}$

   S_2: $|\Delta(\alpha)^2| = 16$
   a) Only S1 is true
   b) Only s2 is true
   c) Both are false
   d) Both are true
5. Let $\Delta_1 = \begin{vmatrix} x & b & b \\ a & x & b \\ a & a & x \end{vmatrix}$ and $\Delta_2 = \begin{vmatrix} x & b \\ a & x \end{vmatrix}$ be two determinants then
   a) $\Delta_1 = 3(\Delta_2)^2$

b) $\frac{d}{dx}$ ($\Delta_{1)}$=3Δ_2

c) $\frac{d}{dx}$ Δ_1=3$(\Delta_2)^2$

d) Δ_1=3$\Delta_2^{3/2}$

6. If $\omega \neq 1$ is a cube root of unity and

$$\Delta = \begin{vmatrix} x+\omega^2 & \omega & 1 \\ \omega & \omega^2 & 1+x \\ 1 & x+\omega & \omega^2 \end{vmatrix}$$

a) 0 b) 1 c)-1 d) none of these

7. If $\alpha\beta\gamma$ are the root of $x^3+px^2+q=0$, where $q \neq 0$, then

$\Delta = \begin{vmatrix} 1/\alpha & 1/\beta & 1/\gamma \\ 1/\beta & 1/\gamma & 1/\alpha \\ 1/\gamma & 1/\alpha & 1/\beta \end{vmatrix}$ equals

a) –p/q b)1/q c)p^2/q d) none of these

8. If a-2b+c=1, then the value of $\begin{vmatrix} x+1 & x+2 & x+a \\ x+2 & x+3 & x+b \\ x+3 & x+4 & x+c \end{vmatrix}$ *is*

a) X b) –x c) -1 d) 1

9. In a triangle ABC, if a, b and c are the sided opposite to angles A,B and C respectively, then the value of

$$\begin{vmatrix} b\cos C & a & c\cos B \\ c\cos A & b & a\cos C \\ a\cos B & c & b\cos A \end{vmatrix}$$

10. If f(x) = $\begin{vmatrix} \sin x & \cos x & \tan x \\ x^3 & x^2 & x \\ 2x & 1 & x \end{vmatrix}$ then $\lim \longrightarrow \frac{f(x)}{x^2} =$