26) ORGANIC COMPOUNDS CONTAINING NITROGEN:

AMINES:

Structure of amines; Classification; Nomenclature; Preparation of amines: reduction of nitro compounds, ammonolysis of alkyl halides, reduction of nitriles, reduction of amides, Gabriel phthalimide synthesis and Hoffmann bromamide degradation reaction; Physical properties; Chemical reactions: basic character of amines, alkylation, acylation, carbyl amine reaction, reaction with nitrous acid, reaction with aryl sulphonyl chloride, electrophilic substitution of aromatic amines-bromination, nitration and sulphonation.

DIAZONIUM SALTS:

Methods of preparation of diazonium salts (by diazotization)

Physical properties; Chemical reactions: Reactions involving displacement of Nitrogen; Sandmeyer reaction, Gatterman reaction, replacement by i) iodiode and fluoride ions ii) hydrogen, hydroxyl and Nitro groups; reactions involving retention of diazo group; coupling reactions; Importance of diazonium salts in synthesis of aromatic compounds.

CYANIDES AND ISOCYANIDES:

Structure and nomenclature of cyanides and isocyanides; Preparation, physical properties and chemical reactions of cyanides and isocyanides.

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MODEL QUESTIONS – MATHEMATICS

1) If $z = x + iy$ and if P represents z in argand plane, then the locus of the point P satisfying $(z)^2 + (\bar{z})^2 = 2$, geometrically represents the following curve

   1) Circle 2) Ellipse 3) Hyperbola 4) Parabola

2) Match the following:

	List A	List B
(I)	Example of bijective function	(a) $f(x+y) = f(xy)\ \forall x,y \in R$
(II)	Example of surjective function	(b) $f(x) = x^2$, $f: R \to R$
(III)	Example of neither surjective nor injective function	(c) $f(x) = 2^x$, $f: R \to (0,\infty)$
(IV)	Example of a constant function	(d) $f(x) = x^2$, $f: R \to (0,\infty)$
		(e) $f(x) = x^2$, $f: (0,\infty) \to R$

The correct match of List (A) from List (B) is

1) d-I b-II e-III a-IV
2) c-I d-II b-III a-IV
3) a-I b-II e-III d-IV
4) d-I c-II b-III a-IV

3) In a triangle ABC, if the exradii $r_1,\ r_2,\ r_3$ are in H. P. then the sides a, b, c are in
   1) A. P. 2) G. P. 3) H. P. 4) A. P. and H. P.

4) A game consists of tossing a coin three times and noting the outcome. A player wins if all the tosses give the same outcome and loses otherwise. The probability that the player loses the game is

1) $\frac{1}{2}$ 2) $\frac{1}{4}$ 3) $\frac{3}{4}$ 4) $\frac{5}{8}$

5) The length of subnormal at any point of the curve $axy^{-2} = 1$, (where a is a constant) is

1) a 2) $2a$ 3) $3a$ 4) a constant

6) If $\bar{a},\ \bar{b},\ \bar{c}$ are non zero vectors then $\left|\left(\bar{a}\ X\ \bar{b}\right).\bar{c}\right| = |\bar{a}||\bar{b}||\bar{c}|$ if and only if

1) $\bar{a},\ \bar{b},\ \bar{c}$ are mutually perpendicular vectors. 2) $|\bar{a}| = |\bar{b}| = |\bar{c}|$.

3) $\bar{a},\ \bar{b},\ \bar{c}$ are unit vectors. 4) $\left(\bar{a},\ \bar{b}\right) = \left(\bar{b},\ \bar{c}\right) = (\bar{c},\ \bar{a}) = \frac{\pi}{3}$.

7. Assertion (A): The system of linear equations
$x - y + z = 0,\ x + 2y - z = 0,\ 2x + y + 3z = 0$ has only trivial solution

Reason(R): If rank of coefficient matrix is 3, then a system of 3 homogeneous linear equations in three variables has only trivial solution

1) Both A & R are True and R is the correct explanation of A.
2) Both A & R are True and R is not correct explanation of A.
3) A is True but R is False.
4) R is True but A is False.

8. Statement I: $\int_0^{\pi/2} \frac{sinx}{sinx+cosx}\ dx = \frac{\pi}{2}$

Statement II: $\int_0^a f(x)dx = \int_0^a f(a-x)dx.$

1. Statement I is True but statement II is false.
2. Statement II is True but statement I is false.
3. Statement I and statement II are True.
4. Both Statements I and II are false.

9. If $\frac{3x+4}{(x+1)(x^2+x+1)^2} = \frac{A}{x+1} + \frac{B\ x+C}{x^2+x+1} + \frac{Dx+E}{(x^2+x+1)^2}.$, then the value of A is

1) -2 2) -1 3) 1 4) 2

10. The curve $y = x^{1/3}$ has

1) a horizontal tangent at $x = 0$.
2) a vertical tangent at $x = 0$.
3) a vertical tangent does not exist at $x = 0$.
4) an asymtote.

Syllabus for TS EAMCET-2020-E Stream (Engineering Stream)

MODEL QUESTIONS – PHYSICS

1. A body constrained to move along the Z-axis of a co-ordinate system is subjected to a constant force F given by F= (-i+2j+3k)N where i, j, k are unit vectors along X, Y,Z axis of the system respectively. What is the work done by this force in moving the body a distance of 4m along the Z- axis.

   1) 8J 2) 10J 3)12J 4) 16J

2. A body cools from 80^{o}C to 50^{o}C in 5 minutes. Calculate the time it takes to cool from 60^{o}C to 30^{o}C. The temperature of the surrounding is 20^{o}C.

   1) 9 min 2) 6 min 3) 5 min 4) 3 min

3 **Assertion (A):** A car is moving in horizontal circular plan with varying speed, then frictional force is neither pointing towards radial direction nor along the tangential direction.

Reason (R): Components of frictional force are providing tangential and centripetal acceleration in the above situation.

1) A is true & R is true and correct explanation
2) A is true & R is true and not correct explanation
3) A is true & R is false
4) A is false & R is true

4. **Statement (A):** A blue light goes from air to water, it may appear violet in water.

   Statement (B): Lens causes the dispersion in white light.

   Statement (C): Light of shorter wavelength is scattered much more than light of longer wavelength.

   1) A, B, C True 2) A, B True, C False 3) B, C True, A False 4) A, B, C False.

5. Two charges +q and –q are kept apart then at any point on the perpendicular bisector of line Joining the two charges.

   1) The electric field strength is zero.
   2) The electric potential is zero
   3) Both electric potential and electric field strength are zero
   4) Both electric potential and electric field strength are non- zero

6. In the experimental study of photoelectric effect:

Column-I	Column-II
A. If υ (frequency) is increased keeping I (Intensity) and w (work function) constant.	**P**. Stopping potential increases
B. If I is increased keeping υ and w constant.	**Q**. Saturation photo current increases
C. If the distance between anode and cathode increases.	**R**. Maximum K.E of photoelectrons increases.
D. If w is decreased keeping υ and I constant	**S**. Stopping potential remains the same.

1) A $\rightarrow$ P,R B $\rightarrow$ Q,S C $\rightarrow$ S D $\rightarrow$ P,R
2) A $\rightarrow$ P,S B $\rightarrow$ R C $\rightarrow$ Q D $\rightarrow$ Q
3) A $\rightarrow$ S B $\rightarrow$ S,R C $\rightarrow$ Q D $\rightarrow$ Q
4) A $\rightarrow$ S B $\rightarrow$ R C $\rightarrow$ R D $\rightarrow$ Q,S

MODEL QUESTIONS – CHEMISTRY

1. The radius of first orbit of He^+ is
   (1) 0.0529 nm
   (2) 0.0265 nm
   (3) 0.0132 nm
   (4) 0.1158 nm

2. The solubility product of CaF_2 is 3.2×10^{-11}. It's solubility is
   (1) 8×10^{-3} mol L^{-1}
   (2) 8×10^{-4} mol L^{-1}
   (3) 2×10^{-3} mol L^{-1}
   (4) 2×10^{-4} mol L^{-1}

3. Identify the incorrect statement
   (1) Shape of BH_4^- is square planar
   (2) In diamond, each carbon atom undergoes sp^3 hybridisation
   (3) The mixture of CO and H_2 is called synthesis gas
   (4) Silicones have hydrophobic character

4. Assertion (A): S_N2 reactions of optically active halides are accompanied by inversion of configuration.
   Reason (R) : S_N2 reactions proceed through carbocation intermediate
   The correct answer is:
   (1) Both (A) and (R) are true and (R) is the correct explanation of (A)
   (2) Both (A) and (R) are true and (R) is not the correct explanation of (A)
   (3) (A) is true but (R) is not true
   (4) (A) is not true but (R) is true

5. Match the following:

LIST I (Polymer)	**LIST II (Monomer(s))**
(A) Bakelite	(i) 1, 3-Butadiene and Styrene
(B) Buna-S	(ii) Caprolactam
(C) Dacron	(iii) Ethylene glycol and Terphthalic acid
(D) Nylon 6	(iv) Phenol and Formaldehyde

The correct answer is:

(1) A-ii B-iv C-iii D-i
(2) A-i B-iii C-iv D-ii
(3) A-ii B-iv C-i D-iii
(4) A-iv B-i C-iii D-ii

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