PGT CHEMISTRY

1. Who launched the 90-day campaign 'Azadi Se Antyodaya Tak'?

(A) Amit Shah

(B) Piyush Goyal

(C) Kiren Rijiju

(D) Giriraj Singh

Correct Answer: (D)

2. Which country signed agreements on training staff and IT cooperation to deepen railway cooperation In Sep 2022?

(A) Russia-India

(B) Ukraine-Turkey

(C) India-Bangladesh

(D) America-India

Correct Answer: (C)

3. The "Donbas War" is currently being fought in

(A) Serbia

(B) Ukraine

(C) Syria

(D) Lebanon

Correct Answer: (B)

4. Pedagogy is the study of

(A) education

(B) learning process

(C) teaching methods

(D) guiding students

Correct Answer: (C)

5. Dyslexia is associated with

(A) mental disorder

(B) mathematical disorder

(C) reading disorder

(D) behavioural disorder

Correct Answer: (C)

6. Which government organizations will develop guidelines for the education of gifted children?

(A) NCERT and NCFCS

(B) NCERT and NCTE

(C) NCERT and NTA

(D) NCERT and SCERT

Correct Answer: (B)

7. Statement I : Methanol and ethanol can be distinguished by Iodoform test.
Statement II : Iodoform test is given by secondary alcohol always.

(A) Statement I is true , statement II is also true , statement II is correct explanation of I.

(B) Statement I is true , statement II is also true, but statement II is not correct explanation of statement I.

(C) Statement I is true , statement II is false.
(D) Statement I is true and statement II is true.
Correct Answer : (C)

8. Consider the reaction: $M^{+n}_{(aq)} + n\,e^- \rightarrow M_{(s)}$. The standard reduction potential values of the elements M1, M2 and M3 are -0.34 V, -3.05 V and -1.66 V respectively. The order of their reducing power will be

(A) M1 > M2 > M3
(B) M3 > M2 > M1
(C) M1 > M3 > M2
(D) M2 > M3 > M1
Correct Answer : (D)

9. For one mole of a van der Waals gas when b = 0 and T = 300 K, the PV vs. 1/V plot is shown below. The value of the van der Waals constant a (atm.litre^2 mol^{-2}) is

[Graph not to scale]

PV (liter-atm mol^{-1})

24.6
23.1
21.6
20.1

0   2.0   3.0

$\dfrac{1}{V}$ (mol liter^{-1})
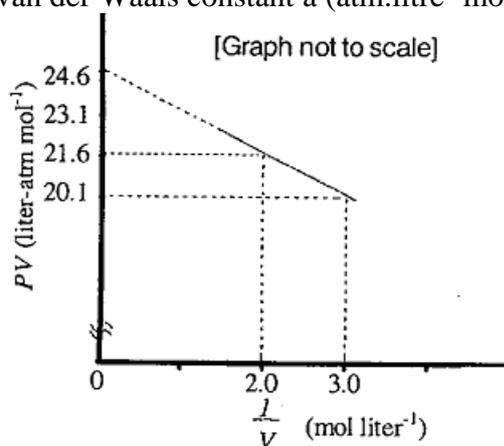
(A) 1.0
(B) 4.5
(C) 1.5
(D) 3.0
Correct Answer : (C)

10. The types of hybridisation of the five carbon atoms from left to right in the molecule $CH_3 — CH = C = CH — CH_3$ are
(A) sp^3, sp^2, sp^2, sp^2, sp^3
(B) sp^3, sp, sp^2, sp^2, sp^3
(C) sp^3, sp^2, sp, sp^2, sp^3
(D) sp^3, sp^2, sp^2, sp, sp^3
Correct Answer : (C)

11. P_A and P_B are the vapour pressure of pure liquid components, A and B, respectively of an ideal binary solution. If X_A represents the mole fraction of component A, the total pressure of the solution will be.

(A) $P_A + X_A (P_B – P_A)$
(B) $P_A + X_A (P_A – P_B)$
(C) $P_B + X_A (P_B – P_A)$
(D) $P_B + X_A (P_A – P_B)$
Correct Answer : (D)

12. Consider the following four electrodes:
$P = Cu^{2+}$ (0.0001 M) / Cu(s)
$Q = Cu^{2+}$ (0.1 M) / Cu(s)
$R = Cu^{2+}$ (0.01 M) / Cu(s)
$S = Cu^{2+}$ (0.001 M) / Cu(s)
If the standard reduction potential of Cu^{2+} / Cu is + 0.34 V, the reduction potentials in volts of the above electrodes follow the order.
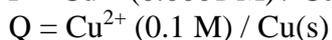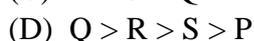
(A) P > S > R > Q
(B) S > R > Q > P
(C) R > S > Q > P
(D) Q > R > S > P
Correct Answer : (D)

13. The correct stability order of the following resonance structures is
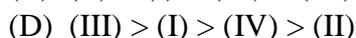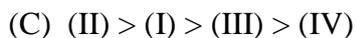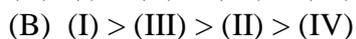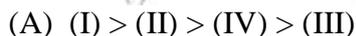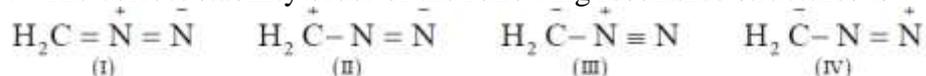
(A) (I) > (II) > (IV) > (III)
(B) (I) > (III) > (II) > (IV)
(C) (II) > (I) > (III) > (IV)
(D) (III) > (I) > (IV) > (II)
Correct Answer : (B)

14. The hydrogen electron de-exits from its 3rd excited state. Which are true and false statements for it. Assign T for true and F for the false.
 (i) It emits the radiation giving the lines in the Lyman Balmer and Paschen series.
 (ii) It emits radiation of only UV and visible regions and not infrared region.
 (iii) It emits the radiation of smallest wavelength giving the line in Lyman series.
(iv) It will emit the radiation of the highest frequency giving line in Pfund series

(A) TFTF
(B) FTFT
(C) TTFF
(D) FFTT
Correct Answer : (A)

15. The Δ_O value of $[Ni(H_2O)_6]^{+2}$ is 8500 cm^{-1}. The Δ_O values for $[NiCl_4]^{4-}$ and $[Ni(NH_3)_4]^{2+}$ compared to $[Ni(H_2O)_6]^{2+}$ are

(A) higher and lower respectively
(B) lower and higher respectively
(C) higher in both complex ions
(D) lower in both complex ions
Correct Answer : (B)

16. Classify the following species as Electrophiles (E) and

Nucleophiles (N) in routine organic synthesis SO_3 , Cl^+ , CH_3NH_2 ,

H_3O^+ , BH_3 and CN^{-1}

(A) $E = SO_3$, Cl^+ , BH_3 $N = CH_3NH_2$, H_3O^+, CN^{-1}

(B) $E = H_3O^+$, Cl^+ $N = CH_3NH_2$, SO_3 , CN^{-1}, BH_3
(C) $E = H_3O^+$, Cl^+ , BH_3 $N = CH_3NH_2$, SO_3 , H_3O^+ , BH_3
(D) $E = H_3O^+$, Cl^+ , BH_3 , SO_3 $N = CH_3NH_2$, CN^{-1}
Correct Answer : (D)

17. The order of reactivity of Phenyl Magnesium Bromide with the following compounds is
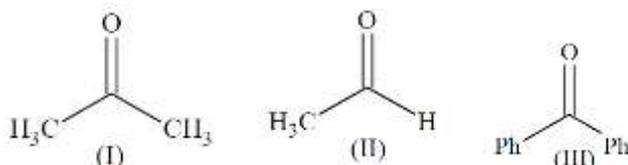
(A) (II) > (III) > (I)
(B) (I) > (III) > (II)
(C) (II) > (I) > (III)
(D) All react with the same rate
Correct Answer : (C)

18. The most stable carbocation among the following is

(A)
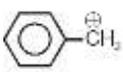
(B)
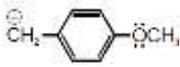
(C)
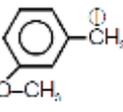
(D)
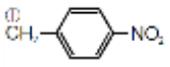
Correct Answer : (B)

19. The correct order of stability of the resonance structures

$$H_2C=\overset{+}{N}=\overset{-}{N} \quad H_2\overset{+}{C}-N=\overset{-}{N} \quad H_2\overset{-}{C}-\overset{+}{N}\equiv N \quad H_2\overset{-}{C}-N=\overset{+}{N}$$
$$\text{(I)} \qquad\qquad \text{(II)} \qquad\qquad \text{(III)} \qquad\qquad \text{(IV)}$$
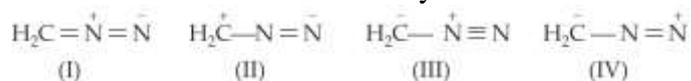
(A) I > II > IV > III
(B) I > III > II > IV
(C) II > I > III > IV
(D) III > I > IV > II
Correct Answer : (C)

CASE STUDY BASED QUESTION:

The enthalpy of a system is defined as the sum of the internal energy of the system and the energy that arises due to its pressure and volume. Mathematically, the enthalpy is defined by the equation,

H = U + PV

Enthalpy change (ΔH) of a system is the heat absorbed or evolved by the system at constant pressure.

$\Delta H = qp$, $\Delta H = \Delta U + P\Delta V$

20. Which of the following is not correct about enthalpy?
(A) It is an extensive property.
(B) It is not a state function.
(C) Its absolute value cannot be determined.
(D) Enthalpy of a compound is equal to the enthalpy of formation of that compound.

Correct Answer : (B)