

THEORY TEST

Time : 45 Minutes

TO THE STUDENT

This theory test contains 40 questions. Each question has four suggested answers. Select the one which is best in each case and then mark your response on the special answer sheet which you will be provided. If you wish to change an answer, do change after crossing the first one. Do not write on the cyclostyled book

Sample Question

24. One plus two equals

- (a) One
(b) Two
(c) Three
(d) four

Sample Answer

24. (a) (b) (c) (d)
☐ ☐ ☒ ☐

1. The NaCl molecule has $\text{Na}^{\times} \overset{\cdot\cdot}{\underset{\cdot\cdot}{\text{Cl}}}$ as its dot structure and it contains. Tick the correct alternative.

- (A) 3 pair of non-bonding electrons.
(B) 2 pair of bonding electrons.
(C) 2 pair of non-bonding electrons.
(D) 4 pair of bonding electrons.

2. A filled or half filled set of p or d orbitals is spherically symmetric. Tick out among the alternatives given below which species has spherical symmetry.

- (A) Fe (B) Cl (C) Na (D) C.

3. NaNO_3 is an example of a/an. Tick the correct alternative.

- (A) Molecular crystal (B) Net work crystal.
(C) Ionic crystal (D) Metallic crystal.

4. In the solid state P_4 crystals are held together by vander-walls forces. One would expect : Tick the correct alternative. 466

- (A) NaCl and P_4 to melt at approximately at the same temperature.
(B) NaCl to melt at a higher temperature than P_4
(C) P_4 to be more soluble in water than NaCl.
(D) P_4 to melt at a higher temperature than NaCl.

5. Four substances were thought to be either a colloid, a precipitate or a solution substance A and C were retained by filtration, however. substance B passed through the filter but was retained by dialysis tubing, Substance D was retained by neither filtration nor dialysis tubing. Substance D is most likely to be. Tick the correct alternative.

- (A) Precipitate (B) Colloid (c) Solution
(D) All of these.

6. Given the reaction $L + M \longrightarrow N + P$. The rate of this reaction could be increased by. Tick the correct alternative.

- (A) Increasing the concentration of M.
(B) Adding a catalyst.
(C) Increasing concentration of L.
(D) All of these.

7. The equilibrium constant for the reaction shown below is a very large number.



If a reaction mixture of C and D are allowed to reach equilibrium, which statement concerning this equilibrium would be true. Tick the correct alternative.

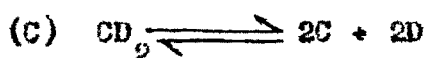
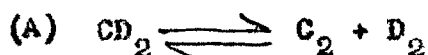
- (A) There is no C or D remaining.
(B) There is much more E formed than either C or D remaining.
(C) There is no E formed.
(D) There are equal numbers of all three materials remaining.

8. The equilibrium constant for a chemical reaction is

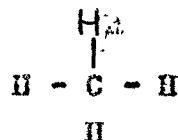
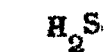
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$$K = \frac{(C)^2 (D)^2}{(CD_2)}$$

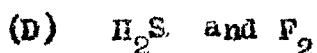
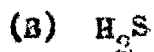
The reaction which best illustrates the equilibrium equation is



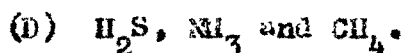
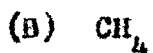
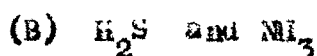
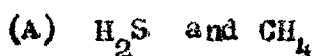
Question 9 & 10 relate to the following structural formulae.



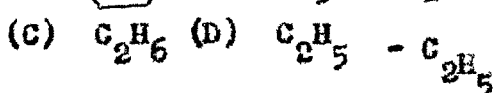
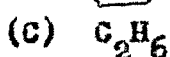
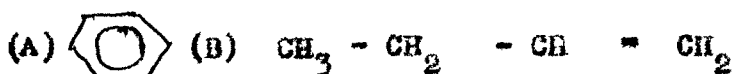
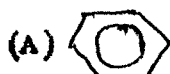
9. The polar molecule/molecules is/are. Tick the correct alternatives.



10. The molecule/molecules capable of forming hydrogen bond is/are. Tick the correct alternative.

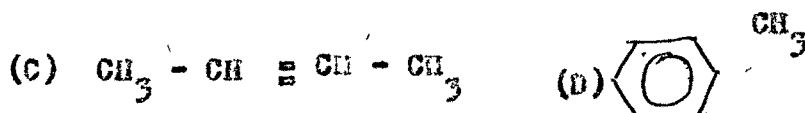
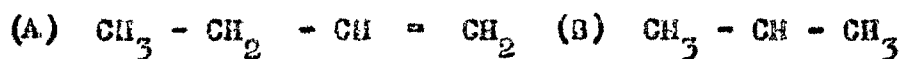


11. The compound which changes the colour of a $KMnO_4$ solution is. Tick the correct alternative.

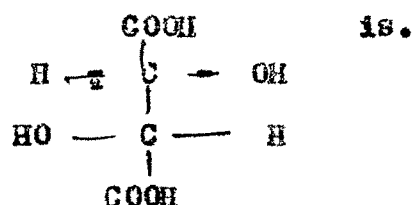


12. An Isomer of $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CH}_3$ is , Tick the correct alternative.

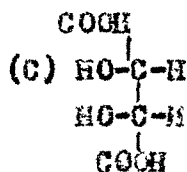
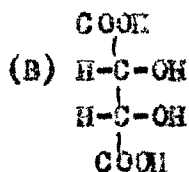
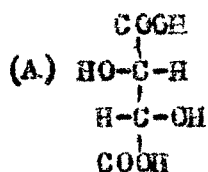
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13. An optical isomer of



Tick the correct alternative.



(D) None of the above

14. A method most suitable for separating the alcoholic content of a ferment is, Tick the correct alternative.

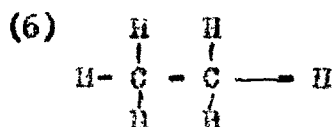
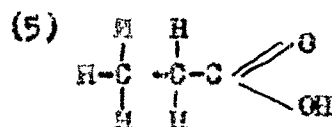
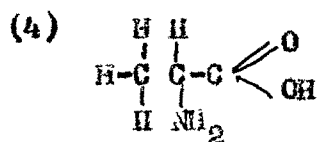
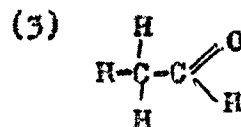
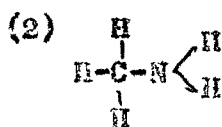
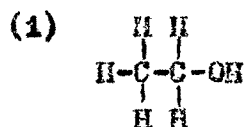
(A) evaporation

(B) Distillation

(C) Filtration

(D) Isomerization.

Below and overleaf are diagrams of six type of organic structures. Carefully examine each structure and complete the questions 15-17.



15. The molecule represented by diagram (5) is, ~~tick~~ 469
the correct alternative.

- (A) an aldehyde (B) A Ketone (C) a Carboxylic acid
(D) an alcohol.

16. The molecule represented by diagram (3) is, ~~tick~~
the correct alternative.

- (A) A Ketone (B) an aldehyde (C) an alcohol
(D) an amine.

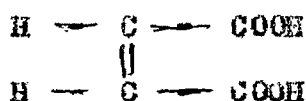
17. The molecule represented by diagram (2) is, ~~tick~~
the correct alternative.

- (A) An acid (B) an ester (C) an amide (D) an amine

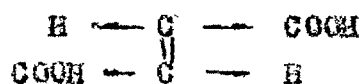
18. An alkane is represented by, the diagram, ~~tick~~ the
correct alternative.

- (A) 4 (B) 5 (C) 6 (D) 2

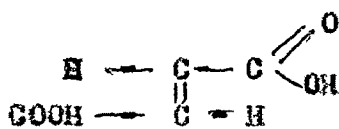
19. Consider the four possible structures with the formula
 $C_4H_4O_4$.



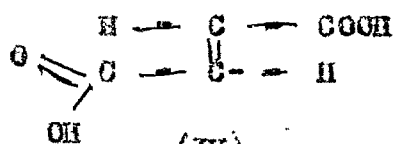
(I)



(II)



(III)



(IV)

Cis-trans isomerism is illustrated by, ~~tick~~ the correct
alternative.

- (A) I and III (B) I and II (C) II and III
(D) II and IV.

20. The compound most likely to burn in air is. Tick the correct alternative.

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- (A) Na_2SO_4 (B) BaSO_4 (C) CH_4 (D) CaCl_2 .

21. Analysis of ^a compound made by a student in the laboratory showed that it contained only C & H elements. What prediction can be made concerning its solubility, tick the correct alternative.

- (A) It is soluble in both water and benzene.
(B) It is soluble in benzene but not in water.
(C) It is soluble in neither water nor benzene.
(D) It is soluble in water but not in benzene.

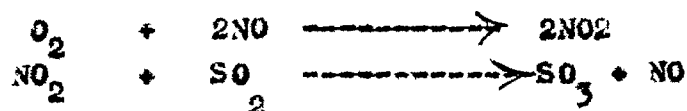
22. Which characteristics ^{are} is typical of the elements in group IIA of the periodic table, tick the correct alternative

- (A) They form 2^+ ions.
(B) The ionic radius is greater than atomic radius.
(C) The oxides dissolve in water to yield acid.
(D) The atomic radius decreases with increasing atomic number.

23. A white precipitate is ^γ formed when lead nitrate solution reacts with sodium chloride solution. A similar precipitate is formed when hydrochloric acid solution reacts with lead nitrate. What is the formula of the precipitate, tick the correct alternative.

- (A) $\text{Pb}(\text{NO}_3)_2$ (B) PbCl_2 (C) HCl (D) NaNO_3

24. Three different substances O_2 , NO and SO_2 react and a two step reaction occurs.



which substance is the catalyst. Tick the correct alternative.

- (A) O_2 (B) NO (C) SO_2 (D) SO_3

25. Which of the following chemical bond has the least ionic character. Tick the correct alternative.

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- (A) P-----Cl. (B) Na ----Cl (C) Cl----Cl
(D) H-----Cl.

26. Which of the below given statement is the characteristics of group VII-A elements in the periodic table. Tick the correct alternative.

- (A) All are easily oxidised.
(B) All are found free in nature.
(C) All ^{ex} tend to gain one electron.
(D) The attraction for electrons increases with increasing atomic number.

27. Arrhenius^a theory visualises that in case of reaction between an acid and a base, it always produces, Tick the correct alternative.

- (A) Water (B) Salt (C) Water & Salt (D) None of the above.

28. What can be the probable formula for the oxide of an element X in group II A of the periodic table, Tick the correct alternative.

- (A) X O₂ (B) X O (C) X₂O (D) X₂O₃

29. In molecular crystals such as those of Ne and N₂, which type of bonding exists between the molecules. Tick the correct alternative.

- (A) Ionic (B) Vander-waals (C) Covalent
(D) Hydrogen.

30. Below given are some of the electronic configurations which one of them represents atoms of the element having the highest second ionization potential, Tick the correct alternative.

- (A) 1s², 2s², 3s⁴ (B) 1s², 2s², 2p⁵
(C) 1s², 2s², 2p⁶, 3s¹ (D) 1s², 2s², 2p⁶.

31. Which one among them are allotropes. Tick the correct alternative.

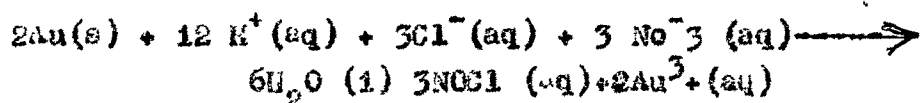
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- (A) ${}^{238}_{92}\text{U}$ • ${}^{239}_{92}\text{U}$ (B) Sn^{2+} , Sn^{4+}
 (C) O_2 , O_3 (D) K^+ , Ar.

32. The melting points of some of the elements of group VII A are F = - 223°C, Cl = - 101.6°C, Br = -7.2°C, I = 113.5°C. What value can be a reasonable prediction for the melting point of Astatine (Atomic number 85).

- (A) - 150 °C (B) - 50°C (C) 100°C (D) 200°C

33. In the below given equation which element is oxidised.



Tick the correct alternative.

- (A) Gold (B) Oxygen (C) Nitrogen (D) Chlorine.

34. The most effective method of changing a gas into a liquid is, tick the correct alternative.

- (A) Increase the temperature and pressure.
 (B) Reduce the temperature and increases pressure.
 (C) Reduce the temperature and pressure.
 (D) Increase the temperature and reduce pressure.

35. In the group I A elements, which orbital provides the electron most used in bonding, tick the correct alternative.

- (A) s (B) p (C) d (D) f

36. Which among these compounds exhibit the greatest covalent character, tick the correct alternative.

- (A) NO (B) KCl (C) CaO (D) Rb S

37. In the nuclear reaction ${}_{7}^{14}\text{N} + {}_{2}^{4}\text{He} \longrightarrow {}_{6}^{14}\text{C} + ?$

Which particle completes the equation. Tick the correct alternative.

(A) Beta (B) Proton (C) Neutron (D) Deuteron.

38. An isotope on bombardment with Alpha-particles will give ${}_{8}^{17}\text{O}$ and ${}_{1}^{1}\text{H}$. Tick the correct alternative.

(A) ${}_{6}^{14}\text{C}$ (B) ${}_{7}^{15}\text{N}$ (C) ${}_{8}^{16}\text{O}$ (D) ${}_{7}^{14}\text{N}$

39. Most of the organic insecticides are, Tick the correct alternative.

(A) Fatty Acids (B) Poly Alcohols
(C) Heavily chlorinated Hydrocarbons (D) Amines.

40. Among the following compounds which one is a proteolytic enzyme, Tick the correct alternative.

(A) Diastase (B) Zymase (C) Pepsin (D) Insulin.

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