

TARGET – JEE MAIN 2017

DURATION : 1 Hour

Maximum Marks : 120

DATE : 06 – 01– 2017

MEDIUM : ENGLISH

SUBJECT (CHEMISTRY)

TEST PATTERN : (JEE-MAIN)

Please read the instructions carefully. You are allotted 5 minutes specifically for this purpose.

INSTRUCTIONS

PART TEST : 01

A. General :

1. This booklet is your Questions Paper. Do not break the seals of this booklet before being instructed to do so by the invigilators.
2. Blank spaces and blank pages are provided in this booklet for your rough work. No additional sheets will be provided for rough work.
3. Blank papers, clipboards, log tables, slide rules, calculators, cameras, cellular phones, pagers, and electronic gadgets are NOT allowed inside the examination hall.
4. The answer sheet, (OMR), is provided separately.
5. DO NOT TAMPER WITH/MUTILATE THE OMR OR THE BOOKLET.
6. On breaking the seals of the booklet check that it contains **6** pages and all the **30** questions.

B. Filling the OMR :

7. A candidate has to write his / her answers in the OMR sheet by darkening the appropriate bubble with the help of **Black/Blue ball point pen** as the correct answer(s) of the question attempted.
8. Write your Name, Contact number Father's Name with pen in the boxes provided on part of the OMR. **Do not write any of this information anywhere else.**

C. Question Paper Format :

9. The question paper consists of **30 multiple choice questions**. Each question has four choices (A), (B), (C) and (D) out of which **ONLY ONE is correct**.

D. Marking scheme :

10. For each question you will be awarded **4 marks** if you darken the bubble corresponding to the correct answer **ONLY** and **zero marks** if no bubbles are darkened. In all other cases, **minus one (-1) mark** will be awarded.

SYLLABUS

PART TEST # 01

MOLE CONCEPT, ATOMIC STRUCTURE, STATES OF MATTER

PART TEST # 02 [NEXT]

Chemical Equilibrium, Ionic Equilibrium, Thermodynamics

ATOMOS CLASSES

By Er. G.K.Singh.

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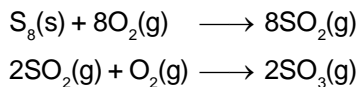
1. If all the O-atoms from 4.4 g CO₂, 6.022 × 10²² molecules of N₂O₅, 0.2 moles of CO and 1.12 L of SO₂ gas at NTP are removed and combined to form O₂ gas, then the resulting gas occupies a volume of at NTP.

- (1) 22.4 L (2) 44.8 L
(3) 33.6 L (4) 11.2 L

2. The mass of Magnesium that contains the same number of atoms as are present in 2g of Calcium is :

- (1) 1.2 g (2) 2.4 g
(3) 0.6 g (4) 1.8 g

3. Sulphur trioxide is prepared by the following two reactions :



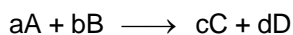
How many grams of SO₃ are produced from 1 mole of S₈ :

- (1) 1280 (2) 640
(3) 960 (4) 320

4. 3.68 g of a mixture of CaCO₃ and MgCO₃ is heated to liberate 0.04 mole of CO₂. The mole % of CaCO₃ and MgCO₃ in the mixture is respectively :

- (1) 50%, 50% (2) 60%, 40%
(3) 40%, 60% (4) 30%, 70%

5. For a reaction :



If initially 'x' moles of 'A' are taken with 'y' moles of 'B', which of the following is correct :

(i) If $\frac{a}{b} = \frac{x}{y}$, then no reactant is left over

(ii) If $\frac{a}{b} > \frac{x}{y}$, then 'B' reactant is limiting reagent

(iii) If $\frac{a}{b} < \frac{x}{y}$, then 'A' is limiting reagent

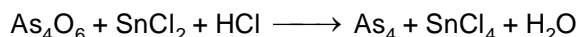
(iv) If $\frac{x}{y} > \frac{a}{b}$, then 'A' is limiting reagent.

- (1) i & iv (2) i & iii
(3) Only i (4) i , ii & iv

6. Identify the correct statement :

- (1) Halogens always have -1 oxidation state in their compounds.
(2) Oxidation number can be zero, negative, positive, integer or fractional.
(3) In OF₂, the oxidation number of F is +1.
(4) Hydrogen is always given + 1 oxidation number in its compounds.

7. Arsenic estimation can be done by Bettendorff's process. The reaction is given below :



Find out the exact stoichiometric coefficient of the reactants respectively :

(in the order as given in question)

- (1) 2, 4, 6 (2) 1, 6, 12
(3) 2, 8, 20 (4) None of these

8. 75 ml of H₂SO₄ (specific gravity = 1.18) containing 49% H₂SO₄ by mass is diluted to 590 ml. Calcu-



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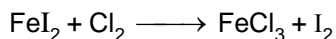
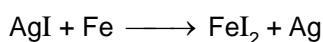
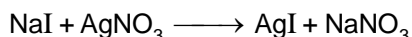
late molarity of the diluted solution :

- (1) 0.7 M (2) 7.5 M
(3) 0.75 M (4) 0.25 M

9. 120 g of solution containing 40% by mass of NaCl is mixed with 200 g of a solution containing 15% by mass NaCl. Determine the mass percent of sodium chloride in the final solution :

- (1) 24.4% (2) 78%
(3) 48.8% (4) 19.68%

10. The following process has been used to obtain iodine from oil-field brines in California :



If 381 kg of iodine is produced per hour, then mass of AgNO_3 required per hour will be :

- (1) 170 kg (2) 340 kg
(3) 255 kg (4) 510 kg

11. The potential energy of the electron present in the ground state of Li^{2+} ion is represented by :

(r = Radius of ground state)

- (1) $+\frac{3e^2}{4\pi\epsilon_0 r}$ (2) $-\frac{3e}{4\pi\epsilon_0 r}$
(3) $-\frac{3e^2}{4\pi\epsilon_0 r^2}$ (4) $-\frac{3e^2}{4\pi\epsilon_0 r}$

12. The radii of two of the first four Bohr orbits of the Hydrogen atom are in the ratio 1 : 4. The energy difference between them may be :

- (1) Either 12.09 eV or 3.4 eV

(2) Either 2.55 eV or 10.2 eV

(3) Either 13.6 eV or 3.4 eV

(4) Either 3.4 eV or 0.85 eV

13. According to Bohr's theory, the ratio of electrostatic force of attraction acting on electron in 3rd orbit of

He^+ ion and 2nd orbit of Li^{2+} ion is $\left(\frac{3}{2}\right)^x$. Then, the

value of x is :

- (1) 7 (2) -6
(3) 6 (4) -7

14. Suppose a hypothetical H-like atom produces a blue, yellow, red and violet line in emission spectrum. Match the above lines with their corresponding possible electronic transition :

Colour of spectral lines Possible transitions

- (1) Blue (p) 6 → 3
(2) Yellow (q) 2 → 1
(3) Red (r) 5 → 2
(4) Violet (s) 4 → 3

- (1) (1) → r, (2) → p, (3) → s, (4) → q
(2) (1) → r, (2) → s, (3) → q, (4) → p
(3) (1) → p, (2) → r, (3) → s, (4) → q
(4) (1) → p, (2) → r, (3) → q, (4) → s

15. In one experiment, a proton having initial kinetic energy of 1 eV is accelerated through a potential difference of 3 V. In another experiment, an α -particle having initial kinetic energy 20 eV is retarded by a potential difference of 2 V. The ratio of de-Broglie wavelengths of proton and α -particle is :

- (1) $2\sqrt{6} : 1$ (2) 8 : 1
(3) 4 : 1 (4) $2\sqrt{2} : 1$



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16. Last line of the Lyman series of H-atom has frequency ν_1 , last line of Lyman series of He^+ ion has frequency ν_2 and 1st line of Lyman series of He^+ ion has frequency ν_3 . Then :

(1) $4\nu_1 = \nu_2 + \nu_3$ (2) $\nu_1 = 4\nu_2 + \nu_3$

(3) $\nu_2 = \nu_3 - \nu_1$ (4) $\nu_2 = \nu_1 + \nu_3$

17. If λ_1 and λ_2 are respectively the wavelengths of the series limit of Lyman and Balmer series of Hydrogen atom, then the wavelength of the first line of the Lyman series of the H-atom is :

(1) $\lambda_1 - \lambda_2$ (2) $\sqrt{\lambda_1 \lambda_2}$

(3) $\frac{\lambda_2 - \lambda_1}{\lambda_1 \lambda_2}$ (4) $\frac{\lambda_1 \lambda_2}{\lambda_2 - \lambda_1}$

18. Which of the following statements is/are INCORRECT :

(1) All spectral lines belonging to Lyman series in Hydrogen spectrum lie in ultraviolet region.

(2) If a light of frequency ν falls on a metal surface having work function $h\nu_0$, photoelectric effect will take place only if $\nu \leq \nu_0$.

(3) The number of photoelectrons ejected from a metal surface in photoelectric effect depends upon the intensity of incident radiations.

(4) The series limit wavelength of Balmer series for

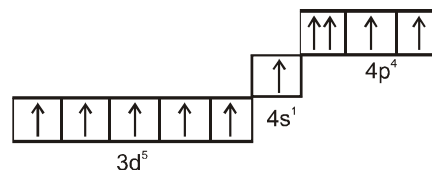
H-atom is $\frac{4}{R}$, where R is Rydberg's constant.

19. In a mixture of sample of H-atoms and He^+ ions,

electrons in all the H-atoms and He^+ ions are present in $n = 4^{\text{th}}$ state. Then, find total number of spectral lines obtained when all the electrons make transition from $n = 4$ upto ground state :

- (1) 12 (2) 6
(3) 11 (4) 16

20. In the following electronic configuration, some rules have been violated :



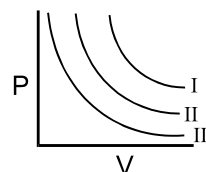
I : Hund

II : Pauli's exclusion

III : Aufbau

- (1) I and II (2) I and III
(3) II and III (4) I, II and III

21. I, II, III are three isotherms respectively at T_1 , T_2 and T_3 as shown in graph. Temperature will be in order



- (1) $T_1 = T_2 = T_3$ (2) $T_1 < T_2 < T_3$
(3) $T_1 > T_2 > T_3$ (4) $T_1 > T_2 = T_3$

22. A vessel of volume 5 litre contains 1.4 g of nitrogen at a temperature 1800 K. The pressure of the gas if 30% of its molecules are dissociated into atoms



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at this temperature is :

- (1) 4.05 atm (2) 2.025 atm
(3) 3.84 atm (4) 1.92 atm

23. Two flasks of equal volume are connected by a narrow tube (of negligible volume) all at 27°C and contain 0.70 mole of H_2 at 0.5 atm. One of the flask is then immersed into a bath kept at 127°C , while the other remains at 27°C . The final pressure in each flask is :

- (1) Final pressure = 0.5714 atm
(2) Final pressure = 1.5714 atm
(3) Final pressure = 0.5824 atm
(4) None of these

24. On the surface of the earth at 1 atm pressure, a balloon filled with H_2 gas occupies 500 mL. This volume is $\frac{5}{6}$ of its maximum capacity. The balloon is left in air. It starts rising. The height above which the balloon will burst if temperature of the atmosphere remains constant and the pressure decreases 1 mm for every 100 cm rise of height is

- (1) 120 m (2) 136.67 m
(3) 126.67 m (4) 100 m

25. A 40 ml of a mixture of H_2 and O_2 at 18°C and 1 atm pressure was sparked so that the formation of water was complete. The remaining pure gas had a volume of 10 ml at 18°C and 1 atm pressure. If the remaining gas was H_2 , the mole fraction of H_2 in the 40 ml mixture is :

- (1) 0.75 (2) 0.5
(3) 0.65 (4) 0.85

26. Two flasks of equal volume are connected by a narrow tube (of negligible volume) all at 27°C and contain 0.70 moles of H_2 at 0.5 atm. One of the flask is then immersed into a bath kept at 127°C , while the other remains at 27°C . The number of

moles of H_2 in flask 1 and flask 2 are :

- (1) Moles in flask 1 = 0.4, Moles in flask 2 = 0.3
(2) Moles in flask 1 = 0.2, Moles in flask 2 = 0.3
(3) Moles in flask 1 = 0.3, Moles in flask 2 = 0.2
(4) Moles in flask 1 = 0.4, Moles in flask 2 = 0.2

27. One litre of a gaseous mixture of two gases effuses in 311 seconds while 2 litres of oxygen takes 20 minutes. The vapour density of gaseous mixture containing CH_4 and H_2 is

- (1) 4 (2) 4.3
(3) 3.4 (4) 5

28. Pure O_2 diffuses through an aperture in 224 second, whereas mixture of O_2 and another gas containing 80% O_2 diffuses from the same in 234 second. The molecular mass of gas will be

- (1) 51.5 (2) 48.6
(3) 55 (4) 46.6

29. A straight glass tube as shown, has 2 inlets X & Y at the two ends of 200 cm long tube. HCl gas through inlet X and NH_3 gas through inlet Y are allowed to enter in the tube at the same time and under the identical conditions. At a point P inside the tube both the gases meet first. The distance of point P from X is :

- (1) 118.9 cm (2) 81.1 cm
(3) 91.1 cm (4) 108.9 cm

30. A teacher enters a classroom from front door while a student from back door. There are 13 equidistant rows of benches in the classroom. The teacher releases N_2O , the laughing gas, from the first bench while the student releases the weeping gas ($\text{C}_6\text{H}_{11}\text{OBr}$) from the last bench. At which row will the students starts laughing and weeping simultaneously

- (1) 7 (2) 10
(3) 9 (4) 8



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