# COMMON ENTRANCE TEST - 2007

| DATE | SUBJECT | TIME |
|---|---|---|
| 09 - 05 - 2007 | PHYSICS & CHEMISTRY (COMBINED PAPER) | 10.00 AM to 12.30 PM |

| MAXIMUM MARKS | TOTAL DURATION | MAXIMUM TIME FOR ANSWERING |
|---|---|---|
| 120 | 150 MINUTES | 140 MINUTES |

| MENTION YOUR CET NUMBER | QUESTION BOOKLET DETAILS | |
|---|---|---|
| | VERSION CODE | SERIAL NUMBER |
| | A - 1 | 370241 |

## IMPORTANT INSTRUCTIONS TO CANDIDATES

**(Candidates are advised to read the following instructions carefully, before answering on OMR answer sheet.)**

1. Ensure that you have entered your Name and Register Number of 2nd PUC Annual Examination / 12th Std. in the space provided on the OMR answer sheet.
2. Ensure that CET No. has been entered and shaded the respective circles on the OMR answer sheet.
3. **ENSURE THAT THE TIMING, MARKS PRINTED ON THE OMR ANSWER SHEET ARE NOT DAMAGED/ MUTILATED / SPOILED.**
4. This Question Booklet is issued to you by the invigilator after the 2nd Bell. i.e., after 10.00 a.m.
5. Enter the Serial Number of this question booklet on the OMR answer sheet.
6. Carefully enter the Version Code of this question booklet on the OMR answer sheet and SHADE the respective circles completely.
7. As answer sheets are designed to suit the Optical Mark Reader (OMR) system, please take special care while filling and shading the CET NO. & Version Code of this question booklet.
8. DO NOT FORGET TO SIGN AT THE BOTTOM PORTION OF OMR ANSWER SHEET IN THE SPACE PROVIDED.
9. Until the 3rd Bell is rung at 10.10 a.m. :
   - Do not remove the seal present on the right hand side of this question booklet.
   - Do not look inside this question booklet.
   - Do not start answering on the OMR answer sheet.
10. After the 3rd Bell is rung at 10.10 a.m., remove the seal present on the right hand side of this question booklet and start answering on the OMR answer sheet.
11. This question booklet contains 120 questions and each question will have four different options / choices.
12. During the subsequent 140 minutes :
    - Read each question carefully.
    - Determine the correct answer from out of the four available options / choices given under each question.
    - **Completely darken / shade the relevant circle with a BLUE OR BLACK INK BALLPOINT PEN against the question number on the OMR answer sheet.**

**CORRECT METHOD OF SHADING THE CIRCLE ON THE OMR SHEET IS AS SHOWN BELOW :**


13. Please note that even a minute unintended ink dot on the OMR sheet will also be recognised and recorded by the scanner. Therefore, avoid multiple markings of any kind on the OMR answer sheet.
14. Use the space provided on each page of the question booklet for Rough work AND do not use the OMR answer sheet for the same.
15. After the last bell is rung at 12.30 p.m., stop writing on the OMR answer sheet and affix your LEFT HAND THUMB IMPRESSION on the OMR answer sheet as per the instructions.
16. Hand over the OMR ANSWER SHEET to the room invigilator as it is.
17. After separating and retaining the top sheet (CET Cell Copy), the invigilator will return the bottom sheet replica (Candidate's copy) to you to carry home for self-evaluation.
18. Preserve the replica of the OMR answer sheet for a minimum period of One year.

# PHYSICS

1. A ray of light is travelling from glass to air. (Refractive index of glass = 1.5) The angle of incidence is $50^0$. The deviation of the ray is

1) $Sin^{-1}\left[\frac{Sin\ 50^0}{1.5}\right] - 50^0$ 2) $50^0 - Sin^{-1}\left[\frac{Sin 50^0}{1.5}\right]$

3) $80^0$ 4) $0^0$

2. A vessel of height $2\,d$ is half filled with a liquid of refractive index $\sqrt{2}$ and the other half with a liquid of refractive index $n$. (The given liquids are immiscible). Then the apparent depth of the inner surface of the bottom of the vessel (neglecting the thickness of the bottom of the vessel) will be

1) $\frac{nd}{d+\sqrt{2n}}$ 2) $\frac{\sqrt{2n}}{d\left(n+\sqrt{2}\right)}$

3) $\frac{d\left(n+\sqrt{2}\right)}{n\sqrt{2}}$ 4) $\frac{n}{d\left(n+\sqrt{2}\right)}$

3. A ray of light is incident normally on one face of a right angled isosceles prism. It then grazes the hypotenuse. The refractive index of the material of the prism is

1) 1.732 2) 1.5

3) 1.414 4) 1.33

4. Two thin equiconvex lenses each of focal length 0.2 m are placed coaxially with their optic centres 0.5 m apart. Then the focal length of the combination is

1) 0.1 m 2) – 0.1 m

3) 0.4 m 4) – 0.4 m

5. A prism of a certain angle deviates the red and blue rays by $8^0$ and $12^0$ respectively. Another prism of the same angle deviates the red and blue rays by $10^0$ and $14^0$ respectively. The prisms are small angled and made of different materials. The dispersive powers of the materials of the prisms are in the ratio

1) 11 : 9 2) 6 : 5

3) 9 : 11 4) 5 : 6

(Space for Rough Work)

6. The electro magnetic theory of light failed to explain
   1) Interference
   2) Diffraction
   3) Polarisation
   4) Photo electric effect

7. Light from two coherent sources of the same amplitude $A$ and wavelength $\lambda$ illuminates the screen. The intensity of the central maximum is $I_0$. If the sources were incoherent, the intensity at the same point will be
   1) $\frac{I_0}{2}$
   2) $I_0$
   3) $2I_0$
   4) $4I_0$

8. In Young's double slit experiment with sodium vapour lamp of wavelength 589 nm and the slits 0.589 mm apart, the half angular width of the central maximum is
   1) $Sin^{-1}0.1$
   2) $Sin^{-1}0.001$
   3) $Sin^{-1}0.0001$
   4) $Sin^{-1}0.01$

9. A single slit Fraunhoffer diffraction pattern is formed with white light. For what wavelength of light the third secondary maximum in the diffraction pattern coincides with the second secondary maximum in the pattern for red light of wavelength $6500\overset{0}{A}$ ?
   1) $9100\overset{0}{A}$
   2) $4642.8\overset{0}{A}$
   3) $4100\overset{0}{A}$
   4) $4400\overset{0}{A}$

10. The head lights of a jeep are 1.2 m apart. If the pupil of the eye of an observer has a diameter of 2 mm and light of wavelength $5896\overset{0}{A}$ is used, what should be the maximum distance of the jeep from the observer if the two head lights are just separated?
    1) 3.39 m
    2) 3.39 km
    3) 33.9 m
    4) 33.9 km

(Space for Rough Work)

**11.** When the angle of incidence is $60^0$ on the surface of a glass slab, it is found that the reflected ray is completely polarised. The velocity of light in glass is

1) $3\times10^8 ms^{-1}$ 2) $2\times10^8 ms^{-1}$

3) $\sqrt{3}\times10^8 ms^{-1}$ 4) $\sqrt{2}\times10^8 ms^{-1}$

**12.** A 20 cm length of a certain solution causes right handed rotation of $38^0$. A 30 cm length of another solution causes left handed rotation of $24^0$. The optical rotation caused by 30 cm length of a mixture of the above solutions in the volume ratio 1 : 2 is

1) right handed rotation of $3^0$ 2) left handed rotation of $3^0$

3) right handed rotation of $14^0$ 4) left handed rotation of $14^0$

**13.** Two identical charges repel each other with a force equal to 10 mgwt when they are 0.6 m apart in air.( $g$ = 10 $ms^{-2}$ ) The value of each charge is

1) $2\mu C$ 2) $2nC$

3) $2\times10^{-7}C$ 4) $2mC$

**14.** The potential of the electric field produced by a point charge at any point $(x, y, z)$ is given by $V = 3x^2 + 5$, where $x, y, z$ are in metres and $V$ is in volts. The intensity of the electric field at (–2, 1, 0) is

1) $-12Vm^{-1}$ 2) $+12Vm^{-1}$

3) $-17Vm^{-1}$ 4) $+17Vm^{-1}$

**15.** The potential of a large liquid drop when eight liquid drops are combined is 20V. Then the pontential of each single drop was

1) 2.5 $V$ 2) 5 $V$

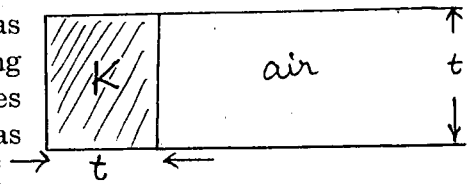
3) 7.5 $V$ 4) 10 $V$

(Space for Rough Work)

**16.** Two indentical capacitors each of capacitance $5\mu F$ are charged to potentials 2 kV and 1 kV respectively. The –ve ends are connected together. When the +ve ends are also connected together, the loss of energy of the system is

1) 1.25 J
2) 5 J
3) 0 J
4) 160 J

**17.** A parallel plate capacitor with air as the dielectric has capacitance $C$. A slab of dielectric constant $K$ and having the same thickness as the separation between the plates is introduced so as to fill one-fourth of the capacitor as shown in the figure. The new capacitance will be




1) $\frac{KC}{4}$
2) $(K+1)\frac{C}{4}$
3) $(K+2)\frac{C}{4}$
4) $(K+3)\frac{C}{4}$

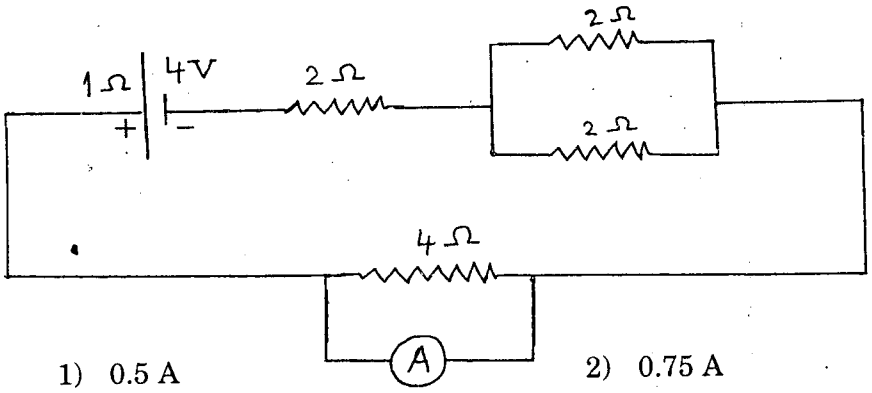
**18.** A current of 5 A is passing through a metallic wire of cross-sectional area $4\times10^{-6}m^2$. If the density of charge carriers of the wire is $5\times10^{26}m^{-3}$, the drift velocity of the electrons will be

1) $1\times10^{-2}ms^{-1}$
2) $1.56\times10^{-3}ms^{-1}$
3) $1.56\times10^{-2}ms^{-1}$
4) $1\times10^{2}ms^{-1}$

**19.** Two bulbs rated 25 W – 220 V and 100 W – 220 V are connected in series to a 440 V supply. Then,

1) both the bulbs fuse
2) neither of the bulbs fuses
3) 25 W bulb fuses
4) 100 W bulb fuses

**20.** The current passing through the ideal ammeter in the circuit given below is




1) 0.5 A
2) 0.75 A
3) 1 A
4) 1.25 A

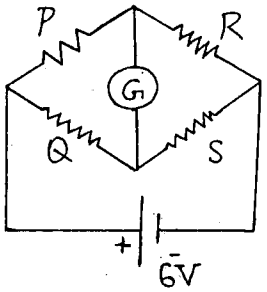
(Space for Rough Work)

21. In the Wheatstone's network given below,

$P = 10\,\Omega$, $Q = 20\,\Omega$

$R = 15\,\Omega$, $S = 30\,\Omega$

The current passing through the battery (of negligible internal resistance) is




1) 0.72 A
2) 0.18 A
3) 0 A
4) 0.36 A

22. A circular coil carrying a certain current produces a magnetic field $Bo$ at its centre. The coil is now rewound so as to have 3 turns and the same current is passed through it. The new magnetic field at the centre is

1) $3Bo$
2) $\frac{Bo}{3}$
3) $9Bo$
4) $\frac{Bo}{9}$

23. A proton and a deuteron with the same initial kinetic energy enter a magnetic field in a direction perpendicular to the direction of the field. The ratio of the radii of the circular trajectories described by them is

1) 1 : 2
2) 1 : 1
3) $1:\sqrt{2}$
4) 1 : 4

24. Two tangent galvanometers $A$ and $B$ have coils of radii 8 cm and 16 cm respectively and resistance $8\,\Omega$ each. They are connected in parallel with a cell of emf 4 $V$ and negligible internal resistance. The deflections produced in the T.G's $A$ and $B$ are $30^0$ and $60^0$ respectively. If $A$ has 2 turns, then $B$ must have

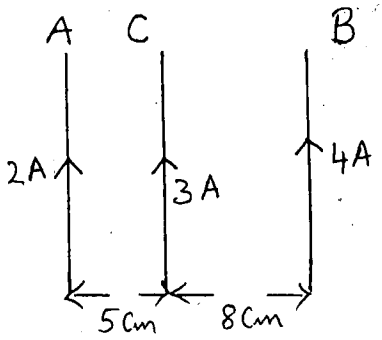
1) 2 turns
2) 6 turns
3) 12 turns
4) 18 turns

25. A charged particle is moving in a magnetic field of strength $B$ perpendicular to the direction of the field. If $q$ and $m$ denote the charge and mass of the particle respectively. Then the frequency of rotation of the particle is

1) $f = \frac{2\pi m}{qB}$
2) $f = \frac{2\pi^2 m}{qB}$
3) $f = \frac{qB}{2\pi m^2}$
4) $f = \frac{qB}{2\pi m}$

(Space for Rough Work)

**26.** $A$ and $B$ are two infinitely long straight parallel conductors. $C$ is another straight conductor of length 1 m kept parallel to $A$ and $B$ as shown in the figure. Then the force experienced by $C$ is




1) towards $B$ equal to $0.6\times10^{-5}N$
2) towards $A$ equal to $5.4\times10^{-5}N$
3) towards $B$ equal to $5.4\times10^{-5}N$
4) towards $A$ equal to $0.6\times10^{-5}N$

**27.** An electric bulb has a rated power of 50 W at 100 V. If it is used on an a.c. source 200 V, 50Hz, a choke has to be used in series with it. This choke should have an inductance of

1) 1.1 H
2) 0.1 H
3) 1 mH
4) 0.1 mH

**28.** An inductance of $\frac{200}{\pi}$ mH, a capacitance of $\frac{10^{-3}}{\pi}$ F and a resistance of $10\,\Omega$ are connected in series with an a.c. source 220 V, 50Hz. The phase angle of the circuit is

1) $\frac{\pi}{3}$
2) $\frac{\pi}{2}$
3) $\frac{\pi}{4}$
4) $\frac{\pi}{6}$

**29.** A stepdown transformer reduces the voltage of a transmission line from 2200 V to 220 V. The power delivered by it is 880 W and its efficiency is 88%. The input current is

1) 4.65 A
2) 0.465 A
3) 0.0465 A
4) 4.65 mA

**30.** Current in a coil changes from 4 A to zero in 0.1 second and the emf induced is 100 V. The self inductance of the coil is

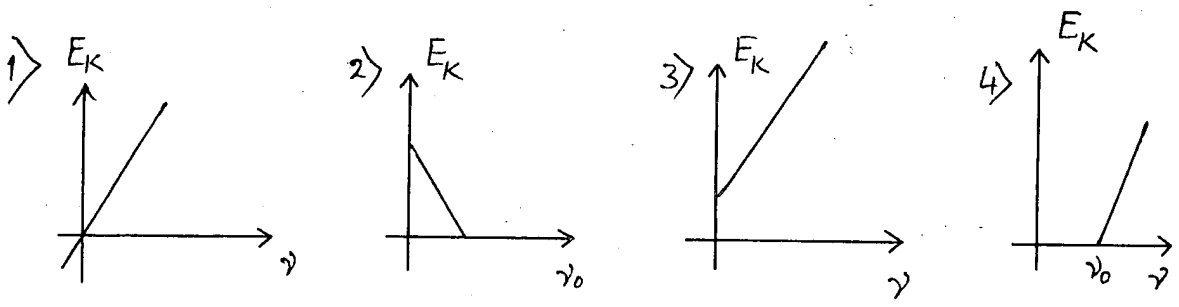
1) 4 H
2) 2.5 H
3) 0.4 H
4) 0.25 H

(Space for Rough Work)

**31.** All components of the electromagnetic spectrum in vacuum have the same

1) Frequency
2) Wavelength
3) Velocity
4) Energy

**32.** Which one of the following graphs represents the variation of maximum kinetic energy ($E_K$) of the emitted electrons with frequency $\nu$ in photoelectric effect correctly ?




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

**33.** $A$ and $B$ are two metals with threshold frequencies $1.8\times10^{14}$ Hz and $2.2\times10^{14}$ Hz. Two identical photons of energy 0.825 eV each are incident on them. Then photoelectrons are emitted in

1) $A$ alone
2) $B$ alone
3) in both $A$ and $B$
4) in neither $A$ nor $B$

(Take $h = 6.6 \times 10^{-34}$ Js)

**34.** The ionization energy of $L_i^{++}$ is equal to

1) hcR
2) 2 hcR
3) 6 hcR
4) 9 hcR

**35.** Electrons in a certain energy level $n = n_1$ can emit 3 spectral lines. When they are in another energy level $n = n_2$. They can emit 6 spectral lines. The orbital speeds of the electrons in the two orbits are in the ratio

1) 1 : 2
2) 2 : 1
3) 3 : 4
4) 4 : 3

(Space for Rough Work)

**36.** The deBroglie wavelength of a proton (charge = $1.6\times10^{-19}C$, mass = $1.6\times10^{-27}kg$) accelerated through a p.d of 1 kV is

1) 0.9 nm
2) $7\overset{0}{A}$
3) $0.9\times10^{-12}$ m
4) $600\overset{0}{A}$

**37.** A radio active element forms its own isotope after 3 consecutive disintegrations. The particles emitted are

1) $2\alpha$ particles and $1\beta$ particle
2) $2\beta$ particles and $1\gamma$ particle
3) $2\beta$ particles and $1\alpha$ particle
4) $3\beta$ particles

**38.** A radio active substance contains 10,000 nuclei and its half life period is 20 days. The number of nuclei present at the end of 10 days is

1) 7,500
2) 8,000
3) 9,000
4) 7,070

**39.** In Raman effect, Stokes' lines are spectral lines having

1) wavelength greater than that of the original line.
2) wavelength less than that of the original line.
3) wavelength equal to that of the original line.
4) frequency greater than that of the original line.

**40.** The principle of LASER action involves

1) Stimulated emission
2) Population inversion
3) Amplification of particular frequency emitted by the system
4) All of these

(Space for Rough Work)

**41.** The volume of a nucleus is directly proportional to .....

1) $A^{1/3}$ 2) $\sqrt{A}$

3) $A^3$ 4) $A$

(Where $A$ = mass number of the nucleus)

**42.** An electron is

1) A lepton 2) A nucleon

3) Baryon 4) Hadron

**43.** Minority carriers in a p-type semiconductor are

1) Holes 2) Free electrons

3) Both holes and free electrons 4) Neither holes nor free electrons

**44.** In a reverse biased diode when the applied voltage changes by 1 V, the current is found to change by $0.5\,\mu A$. The reverse bias resistance of the diode is

1) $2\,\Omega$ 2) $200\,\Omega$

3) $2\times10^6\,\Omega$ 4) $2\times10^5\,\Omega$

**45.** The truth table given below is for

| $A$ | $B$ | $Y$ |
|---|---|---|
| 0 | 0 | 1 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 0 |

($A$ and $B$ are the inputs, $Y$ is the output)

1) NAND 2) XOR

3) AND 4) NOR

(Space for Rough Work)

**46.** The dimensional formula for impulse is

1) $ML^{-1}T^{-1}$ 2) $M^{-1}LT^{-1}$

3) $ML^{-1}T$ 4) $MLT^{-1}$

**47.** The maximum height attained by a projectile when thrown at an angle $\theta$ with the horizontal is found to be half the horizontal range. Then $\theta$ =

1) $Tan^{-1}\frac{1}{2}$ 2) $\frac{\pi}{4}$

3) $\frac{\pi}{6}$ 4) $Tan^{-1}2$

**48.** A shell of mass 20 kg at rest explodes into two fragments whose masses are in the ratio 2 : 3. The smaller fragment moves with a velocity of 6 $ms^{-1}$. The kinetic energy of the larger fragment is

1) 360 J 2) 144 J

3) 216 J 4) 96 J

**49.** Water rises in plant fibres due to

1) Osmosis 2) Fluid pressure

3) Viscosity 4) Capillarity

**50.** The acceleration due to gravity becomes $\left(\frac{g}{2}\right)$ where $g$ = acceleration due to gravity on the surface of the earth at a height equal to

1) $\frac{R}{2}$ 2) $2R$

3) $\frac{R}{4}$ 4) $4R$

(Space for Rough Work)

**51.** The cylindrical tube of a spray pump has a cross-section of 8 $cm^2$, one end of which has 40 fine holes each of area $10^{-8}$ $m^2$. If the liquid flows inside the tube with a speed of 0.15 $m.min^{-1}$, the speed with which the liquid is ejected through the holes is

1) 0.5 $ms^{-1}$ 2) 0.05 $ms^{-1}$

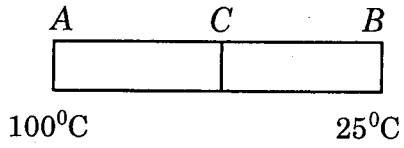
3) 5 $ms^{-1}$ 4) 50 $ms^{-1}$

**52.** During an adiabatic process, the cube of the pressure is found to be inversely proportional to the fourth power of the volume. Then the ratio of specific heats is

1) 1.4 2) 1.67

3) 1.33 4) 1

**53.** Two identical rods $AC$ and $CB$ made of two different metals having thermal conductivities in the ratio 2 : 3 are kept in contact with each other at the end $C$ as shown in the figure. $A$ is at $100^0$C and $B$ is at $25^0$C. Then the junction $C$ is at




1) $50^0$C 2) $75^0$C

3) $60^0$C 4) $55^0$C

**54.** 310 J of heat is required to raise the temperature of 2 moles of an ideal gas at constant pressure from $25^0$C to $35^0$C. The amount of heat required to raise the temperature of the gas through the same range at constant volume is

1) 452 J 2) 276 J

3) 144 J 4) 384 J

**55.** A Carnot's engine operates with source at $127^0$C and sink at $27^0$C. If the source supplies 40 kJ of heat energy, the work done by the engine is

1) 1 kJ 2) 4 kJ

3) 10 kJ 4) 30 kJ

(Space for Rough Work)

**56.** The maximum particle velocity in a wavemotion is half the wave velocity. Then the amplitude of the wave is equal to

1) $\lambda$ 2) $\frac{\lambda}{2\pi}$

3) $\frac{2\lambda}{\pi}$ 4) $\frac{\lambda}{4\pi}$

**57.** The ratio of the velocity of sound in hydrogen $\left(r=\frac{7}{5}\right)$ to that in helium $\left(r=\frac{5}{3}\right)$ at the same temperature is

1) $\frac{\sqrt{21}}{5}$ 2) $\frac{\sqrt{42}}{5}$

3) $\sqrt{\frac{5}{21}}$ 4) $\sqrt{\frac{5}{42}}$

**58.** An engine is moving towards a wall with a velocity 50 $ms^{-1}$ emits a note of 1.2 kHz. Speed of sound in air = 350 $ms^{-1}$. The frequency of the note after reflection from the wall as heard by the driver of the engine is

1) 1.2 kHz 2) 1.6 kHz

3) 0.24 kHz 4) 2.4 kHz

**59.** A glass tube is open at both the ends. A tuning fork of frequency $f$ resonates with the air column inside the tube. Now the tube is placed vertically inside water so that half the length of the tube is filled with water. Now the air column inside the tube is in unison with another fork of frequency $f'$. Then

1) $f'=\frac{f}{2}$ 2) $f'=2f$

3) $f'=4f$ 4) $f'=f$

**60.** The surface temperature of the Sun which has maximum energy emission at 500 nm is 6000 K. The temperature of a star which has maximum energy emission at 400 nm will be

1) 6500 K 2) 7500 K

3) 4500 K 4) 8500 K

(Space for Rough Work)

(Space for Rough Work)

# CHEMISTRY

**61.** During the extraction of gold the following reactions take place –

$$Au + CN^- + H_2O \xrightarrow{O_2} [X]$$

$$[X] + Zn \longrightarrow [Y] + Au$$

$X$ and $Y$ are respectively –

1) $\left[Au(CN)_2\right]^-$ and $\left[Zn(CN)_4\right]^{2-}$ 2) $\left[Au(CN)_4\right]^{3-}$ and $\left[Zn(CN)_4\right]^{2-}$

3) $\left[Au(CN)_4\right]^{2-}$ and $\left[Zn(CN)_4\right]^{2-}$ 4) $\left[Au(CN)_2\right]^-$ and $\left[Zn(CN)_6\right]^{4-}$

**62.** The number of gram molecules of chlorine in $6.02 \times 10^{25}$ hydrogen chloride molecules is –

1) 5 2) 50

3) 100 4) 10

**63.** Graphite is a soft solid lubricant extremely difficult to melt. The reason for this anomalous behaviour is that graphite –

1) has molecules of variable molecular masses like polymers.
2) has carbon atoms arranged in large plates of rings of strongly bound carbon atoms with weak interplate bonds.
3) is a non-crystalline substance.
4) is an allotropic form of carbon.

**64.** Paracetamol is a / an

1) antimalarial 2) antipyretic

3) analgesic 4) both 2 and 3

**65.** Which one of the following has maximum number of atoms of oxygen ?

1) 2 g of water 2) 2 g of sulphur dioxide

3) 2 g of carbon dioxide 4) 2 g of carbon monoxide.

(Space for Rough Work)

**66.** Which one of the following shows functional isomerism ?

1) $CH_2Cl_2$ 2) $C_2H_5OH$

3) $C_3H_6$ 4) $C_2H_4$

**67.** In the ionic equation – $BiO_3^- + 6H^+ + Xe^- \longrightarrow Bi^{3+} + 3H_2O$,

the values of $X$ is –

1) 3 2) 4

3) 2 4) 6

**68.** Molarity of a given orthophosphoric acid solution is 3M. It's normality is –

1) 1 N 2) 3 N

3) 0.3 N 4) 9 N

**69.** Acidified sodium fusion extract on addition of ferric chloride solution gives blood red colouration which confirms the presence of –

1) $S$ 2) $N$

3) $N$ and $S$ 4) $S$ and $Cl$

**70.** A body of mass 10 mg is moving with a velocity of 100 $ms^{-1}$. The wavelength of de-Broglie wave associated with it would be –

(Note : $h = 6.63 \times 10^{-34}$ Js )

1) $6.63 \times 10^{-37}$ m 2) $6.63 \times 10^{-31}$ m

3) $6.63 \times 10^{-34}$ m 4) $6.63 \times 10^{-35}$ m

(Space for Rough Work)

**71.** $Mg^{2+}$ is isoelectronic with

1) $Ca^{2+}$ 2) $Na^{+}$

3) $Zn^{2+}$ 4) $Cu^{2+}$

**72.** Gram molecular volume of oxygen at STP is –

1) 11200 $cm^3$ 2) 22400 $cm^3$

3) 5600 $cm^3$ 4) 3200 $cm^3$

**73.** Presence of halogen in organic compounds can be detected using –

1) Beilstien's test 2) kjeldahl test

3) Duma's test 4) Leibig's test

**74.** The electronic configuration of $Cr^{3+}$ is

1) $[Ar]3d^5 4s^1$ 2) $[Ar]3d^2 4s^1$

3) $[Ar]3d^3 4s^0$ 4) $[Ar]3d^4 4s^2$

**75.** The mass of a metal, with equivalent mass 31.75, which would combine with 8 g of oxygen is

1) 31.75 2) 3.175

3) 8 4) 1

(Space for Rough Work)

**76.** Benzene reacts with chlorine in sunlight to give a final product –

1) $C_6H_5Cl$ 2) $C_6Cl_6$

3) $C_6H_6Cl_6$ 4) $CCl_4$

**77.** In the periodic table metals usually used as catalysts belong to

1) s - block 2) p - block

3) d - block 4) f - block

**78.** Dalton's law of partial pressures is applicable to which one of the following systems ?

1) $CO + H_2$ 2) $H_2 + Cl_2$

3) $NO + O_2$ 4) $NH_3 + HCl$

**79.** The general formula of a cycloalkane is

1) $C_nH_{2n+2}$ 2) $C_nH_{2n-2}$

3) $C_nH_{2n}$ 4) $C_nH_n$

**80.** In acetylene molecule, between the carbon atoms there are –

1) three sigma bonds 2) two sigma and one pi bonds

3) one sigma and two pi bonds 4) three pi bonds

(Space for Rough Work)

**81.** Denatured alcohol is

1) Rectified spirit
2) Undistilled ethanol
3) Rectified spirit + methanol + naphtha
4) Ethanol + methanol

**82.** During the formation of a chemical bond

1) energy decreases
2) energy increases
3) energy of the system does not change
4) electron-electron repulsion becomes more than the nucleus-electron attraction

**83.** One mole of oxygen at 273 k and one mole of sulphur dioxide at 546 k are taken in two separate containers, then,

1) kinetic energy of $O_2$ > kinetic energy of $SO_2$.
2) kinetic energy of $O_2$ < kinetic energy of $SO_2$.
3) kinetic energy of both are equal.
4) None of these

**84.** $+I$ effect is shown by

1) $-NO_2$
2) $-Cl$
3) $-Br$
4) $-CH_3$

**85.** Formation of coloured solution is possible when metal ion in the compound contains

1) paired electrons
2) unpaired electrons
3) lone pair of electrons
4) none of these

(Space for Rough Work)

**86.** Which of the following is an intensive property ?

1) temperature 2) surface tension
3) viscosity 4) all of these

**87.** Hofmann's bromamide reaction is to convert

1) amine to amide 2) amide to amine
3) alcohol to acid 4) acid to alcohol

**88.** IUPAC name of $Na_3\left[Co(NO_2)_6\right]$ is

1) sodium cobaltinitrite 2) sodium hexanitrito cobaltate (III)
3) sodium hexanitro cobalt (III) 4) sodium hexanitrito cobaltate (II)

**89.** Thermodynamic standard conditions of temperature and pressure are

1) $0^0$C and 1 atm 2) 273 k and 101.3 k Pa
3) 298 k and 1 atm 4) $0^0$C and 101.3 k Pa

**90.** How many chiral carbon atoms are present in 2, 3, 4 - trichloropentane ?

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

(Space for Rough Work)

**91.** The number of unidentate ligands in the complex ion is called

1) EAN
2) Coordination number
3) primary valency
4) oxidation number

**92.** $2SO_{2(g)} + O_{2(g)} \overset{V_2O_5}{\rightleftharpoons}$ is an example for

1) irreversible reaction
2) heterogenous catalysis
3) homogenous catalysis
4) neutralisation reaction

**93.** The amino acid which is not optically active is

1) glycine
2) alanine
3) serine
4) lactic acid

**94.** For a stable molecule the value of bond order must be

1) negative
2) positive
3) zero
4) there is no relationship between stability and bond order.

**95.** Which one of the following is a second order reaction ?

1) $CH_3COOCH_3 + NaOH \longrightarrow CH_3COONa + H_2O$
2) $H_2 + Cl_2 \xrightarrow{\text{sunlight}} 2HCl$
3) $NH_4NO_3 \longrightarrow N_2 + 3H_2O$
4) $H_2 + Br_2 \longrightarrow 2HBr$

(Space for Rough Work)

**96.** According to Bayer's strain theory which is highly stable ?

1) cyclohexane
2) cycloheptane
3) cyclopentane
4) cyclobutane

**97.** The number of antibonding electron pairs in $O_2^{2-}$ molecular ion on the basis of molecular orbital theory is

[Note - Atomic number of $O$ is 18]

1) 2
2) 3
3) 4
4) 5

**98.** Hydroxyl ion concentration of 1M $HCl$ is

1) $1\times10^{-14}$ mol dm$^{-3}$
2) $1\times10^{-1}$ mol dm$^{-3}$
3) $1\times10^{-13}$ mol dm$^{-3}$
4) $1\times10^{1}$ mol dm$^{-3}$

**99.** Geometrical isomerism is shown by

1) $-C-C-$
2) $-C\equiv C-$
3) $\diagdown C=C\diagup$
4) None of these

**100.** The oxidation state of iron in $K_4\left[Fe(CN)_6\right]$ is

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

(Space for Rough Work)

**101.** In which of the following process, a maximum increase in entropy is observed ?

1) dissolution of salt in water
2) condensation of water
3) sublimation of naphthalene
4) melting of ice

**102.** Decomposition of benzene diozonium chloride by using $Cu_2Cl_2/HCl$ to form chlorobenzene is

1) Cannizarro's reaction
2) Kolbe's reaction
3) Sandmeyer's reaction
4) Raschig's reaction

**103.** Which complex can not ionise in solution ?

1) $\left[pt(NH_3)_6\right]Cl_4$
2) $K_2\left[pt(F_6)\right]$
3) $K_4\left[Fe(CN)_6\right]$
4) $\left[CoCl_3(NH_3)_3\right]$

**104.** Considering the reaction $C_{(s)} + O_{2(g)} \rightarrow CO_{2(g)} + 393.5$ kJ the signs of $\Delta H$, $\Delta S$ and $\Delta G$ respectively are

1) $-, +, -$
2) $-, -, -$
3) $-, +, +$
4) $+, -, -$

**105.** The product formed when hydroxylamine condenses with a carbonyl compound is called

1) hydrazone
2) hydrazine
3) oxime
4) hydrazide

(Space for Rough Work)

**106.** Which of the following forms a colourless solution in aqueous medium?

1) $Ti^{3+}$ 2) $Sc^{3+}$

3) $V^{3+}$ 4) $Cr^{3+}$

**107.** When a sulphur sol is evaporated sulphur is obtained. On mixing with water sulphur sol is not formed. The sol is

1) hydrophilic 2) hydrophobic

3) reversible 4) lyophilic

**108.** An alkyl halide reacts with alcoholic ammonia in a sealed tube, the product formed will be

1) a primary amine 2) a secondary amine

3) a tertiary amine 4) a mixture of all the three

**109.** When conc. $H_2SO_4$ is heated with $P_2O_5$, the acid is converted into

1) sulphur

2) sulphur dioxide

3) sulphur trioxide

4) a mixture of sulphur dioxide and sulphur trioxide

**110.** Entropy of the universe is

1) continuously increasing 2) continuously decreasing

3) zero 4) constant

(Space for Rough Work)

**111.** Which of the following salts on being dissolved in water gives pH > 7 at $25^0C$ ?

1) $NH_4CN$ 2) $NH_4Cl$

3) $KNO_3$ 4) $KCN$

**112.** The reagent used in Clemmenson's reduction is

1) alc. $KOH$ 2) aq. $KOH$

3) $Zn-Hg$ / con. $HCl$ 4) Conc. $H_2SO_4$

**113.** When $KBr$ is dissolved in water, $K^+$ ions are

1) oxidised 2) reduced

3) hydrolysed 4) hydrated

**114.** The noble gas mixture is cooled in a coconut bulb at 173 $K$. The gases that are not adsorbed are

1) $He$ and $Ne$ 2) $Ar$ and $Kr$

3) $He$ and $Xe$ 4) $Ne$ and $Xe$

**115.** The volume of 10$N$ and 4$N$ $HCl$ required to make 1 litre of 7$N$ $HCl$ are

1) 0.75 litre of 10$N$ $HCl$ and 0.25 litre of 4$N$ $HCl$

2) 0.80 litre of 10$N$ $HCl$ and 0.20 litre of 4$N$ $HCl$

3) 0.60 litre of 10$N$ $HCl$ and 0.40 litre of 4$N$ $HCl$

4) 0.50 litre of 10$N$ $HCl$ and 0.50 litre of 4$N$ $HCl$

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(Space for Rough Work)

**116.** A metal present in insulin is

1) copper 2) iron

3) zinc 4) aluminium

**117.** Carbon forms two oxides which have different compositions. The equivalent mass of which remains constant ?

1) carbon 2) oxygen

3) neither carbon nor oxygen 4) both carbon and oxygen

**118.** Maximum number of molecules of $CH_3I$ that can react with a molecule of $CH_3NH_2$ are

1) 1 2) 2

3) 4 4) 3

**119.** Ellingham diagram represents a graph of

1) $\Delta G$ Vs $T$ 2) $\Delta G^0$ Vs $T$

3) $\Delta S$ Vs $P$ 4) $\Delta G$ Vs $P$

**120.** Identify the ore not containing iron

1) chalcopyrites 2) carnallite

3) siderite 4) limonite

(Space for Rough Work)

(Space for Rough Work)

# A-1