

Test Booklet Code

D

PCE - 2007

This booklet contains 16 pages.

DO NOT open this Test Booklet until you are asked to do so.

Important Instructions :-

1. The PHYSICS-CHEMISTRY test is consist of 80 questions. Each question carries 1 mark. For each correct response the candidate will get 1 mark. For each incorrect response, $\frac{1}{4}$ mark will be deducted. The maximum marks are 80.
2. The Test is of 2 hour duration.
3. Use **Black Ball Point Pen only** for writing particulars on OMR Answer Sheet marking ● responses.
4. Rough work is to be done on the space provided for this purpose in the Test Booklet only.
5. **On completion of the test, the candidate must handover the Answer Sheet to the Invigilator in the Room / Hall. The candidates are allowed to take away this Test Booklet with them.**
6. The CODE for this Booklet is **D**. Make sure that the CODE printed on the Answer Sheet is the same as that on this booklet . In case of discrepancy, the candidate should immediately report the matter to the Invigilator for replacement of both the Test Booklet and the Answer Sheet.
7. The candidate should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet.
8. Do not write your Seat No. anywhere else, except in the specified space in the Test Booklet / Answer Sheet.
9. Use of white fluid for correction is not permissible on the Answer Sheet.
10. Each candidate must show, on demand his / her Admission Card to the Invigilator.
11. No candidate, without special permission of the Superintendent or Invigilator, should leave his / her seat.
12. Use of Manual Calculator is permissible.
13. The candidate should not leave the Examination Hall without handing over their Answer Sheet to the Invigilator on duty and must sign the Attendance Sheet (Patrak-01). Cases where a candidate has **not** signed the Attendance Sheet (Patrak-01) be deemed not to have handed over the Answer Sheet and dealt with as a unfair means case.
14. The candidates are governed by all Rules and Regulations of the Board with regard to their conduct in the Examination Hall. All cases of unfair means will be dealt with as per Rules and Regulations of the Board.
15. No part of the Test Booklet and Answer Sheet shall be detached under any circumstances.
16. The candidates will write the Correct Test Booklet Code as given in the Test Booklet / Answer Sheet in the Attendance Sheet. (Patrak-01)

Candidate's Name:.....

Exam.Seat No. (in figures).....(in words).....

Name of Exam. Centre:.....Exam. Centre No:.....

Test Booklet Code : Test Booklet No.:

Candidate's Sign..... Block Supt. Sign

PHYSICS

1. Domain formation is the necessary feature of
 - A) all of the above
 - B) ferromagnetism
 - C) paramagnetism
 - D) diamagnetism
2. A coil of self inductance 0.5 mH carries a current of 2A. The energy stored in Joule is
 - A) 1.0
 - B) 0.1
 - C) 0.5
 - D) 0.05
3. A LCR series A.C circuit is tuned to resonance. The impedance of the circuit is now
 - A) R
 - B) $\left[R^2 + \left(\frac{1}{\omega C} - \omega L \right)^2 \right]^{1/2}$
 - C) $\left[R^2 + (\omega L)^2 + \left(\frac{1}{\omega C} \right)^2 \right]^{1/2}$
 - D) $\left[R^2 + \left(\omega L - \frac{1}{\omega C} \right)^2 \right]^{1/2}$
4. Resonance frequency of LCR series a.c. circuit is f_0 . Now the capacitance is made 4 times, then the new resonance frequency will become
 - A) $\frac{f_0}{4}$
 - B) $2f_0$
 - C) f_0
 - D) $\frac{f_0}{2}$
5. If the earth did not have atmosphere, the temperature would be
 - A) none
 - B) less
 - C) more
 - D) same
6. Write dimensional formula for the intensity of radiation.
 - A) $M^1 L^0 T^3$
 - B) $M^1 L^0 T^{-3}$
 - C) $M^1 L^2 T^{-2}$
 - D) $M^1 L^2 T^{-3}$

(Space for Rough Work)

13. Which of the following has the longest de-Broglie wavelength if they are moving with same velocity ?
 A) neutron
 B) proton
 C) α particle
 D) β -particle
14. When a point source of light is at a distance of 50 cm from a photoelectric cell, the stopping voltage is found to be V_0 . If the same source is placed at a distance of 1 m from the cell, the stopping voltage will be
 A) $2V_0$
 B) V_0
 C) $\frac{V_0}{2}$
 D) $\frac{V_0}{4}$
15. A nucleus at rest splits into two nuclear parts having same density and radii in the ratio 1 : 2. Their velocities are in the ratio,
 A) 2 : 1
 B) 4 : 1
 C) 6 : 1
 D) 8 : 1
16. In Rutherford's α -scattering experiment, what will be the correct angle of scattering for impact parameter $b = 0$?
 A) 180°
 B) 0°
 C) 270°
 D) 90°
17. The wavelength of the matter waves is independent of
 A) charge
 B) momentum
 C) velocity
 D) mass
18. The potential energy of the orbital electron in the ground state of hydrogen atom is $-E$. What is its kinetic energy ?
 A) $4E$
 B) $2E$
 C) $\frac{E}{2}$
 D) $\frac{E}{4}$

(Space for Rough Work)

25. A point charge causes an electric flux of $-1.0 \times 10^3 \text{ Nm}^2 \text{ C}^{-1}$ to pass through a spherical Gaussian surface of 10.0 cm radius centred on the charge. If the radius of the Gaussian surface were three times, how much flux would pass through the surface ?
- A) $3.0 \times 10^3 \frac{\text{Nm}^2}{\text{C}}$ B) $-1.0 \times 10^3 \frac{\text{Nm}^2}{\text{C}}$
- C) $-3.0 \times 10^3 \frac{\text{Nm}^2}{\text{C}}$ D) $-2.0 \times 10^3 \frac{\text{Nm}^2}{\text{C}}$
26. An electric dipole coincides on Z-axis and its mid point is on origin of the co-ordinate system. The electric field at an axial point at a distance z from origin is $\vec{E}(z)$ and electric field at an equatorial point at a distance y from origin is $\vec{E}(y)$. Here $z = y \gg a$, So $\frac{|\vec{E}(z)|}{|\vec{E}(y)|} = \dots\dots\dots$
- A) 1 B) 4
- C) 3 D) 2
27. A stationary charge produces
- A) none of these fields B) electric field and magnetic field both
- C) a magnetic field only D) an electric field only
28. An electric field is spread uniformly in Y-axis. Consider point A as origin point. The co-ordinates of point B are equal to (0, 2)m. The co-ordinates of point C are (2, 0)m. At points A, B and C, electric potentials are V_A, V_B and V_C respectively. From the following options which is correct ?
- A) $V_A = V_C < V_B$ B) $V_A = V_B = V_C$
- C) $V_A = V_B > V_C$ D) $V_A = V_C > V_B$
29. To increase the charge on the plates of a capacitor means
- A) to decrease the potential difference between the plates
- B) to decrease the capacitance of the capacitor
- C) to increase the capacitance of the capacitor
- D) to increase the potential difference between the plates

(Space for Rough Work)

35. If velocity of an electron is $(2\hat{i} + 3\hat{j})\text{ms}^{-1}$ and it enters in the magnetic field of $4\hat{k}T$, then
- it will move in the opposite direction to the magnetic field
 - it will move in the direction of the magnetic field
 - its speed will change
 - direction of its velocity will change
36. An electron having 182 eV kinetic energy is moving on a circular path in a magnetic field of $10^{-4}T$. The speed of the electron is (mass of electron $m = 9.1 \times 10^{-31}\text{ kg}$)
- $8 \times 10^7\text{ms}^{-1}$
 - $16 \times 10^7\text{ms}^{-1}$
 - $4 \times 10^7\text{ms}^{-1}$
 - $32 \times 10^{14}\text{ms}^{-1}$
37. A bar magnet of magnetic moment \vec{M} , is placed in a magnetic field of induction \vec{B} . The torque exerted on it is
- $-\vec{B} \cdot \vec{M}$
 - $\vec{M} \times \vec{B}$
 - $-\vec{M} \cdot \vec{B}$
 - $\vec{M} \cdot \vec{B}$
38. To convert a galvanometer into an ammeter, we connect
- high resistance in parallel with it
 - high resistance in series with it
 - low resistance in parallel with it
 - low resistance in series with it
39. The dimensions of RC are same as the dimensions of which of the following ?
- RLC
 - R/L
 - LR
 - L/R
40. What is the self inductance of a coil which produces, self induced emf of $5V$, when the current changes from $3A$ to $2A$ in one millisecond ?
- 5 mH
 - 5 H
 - 50 H
 - 5000 H

(Space for Rough Work)

CHEMISTRY

41. Unit of K for third order reaction is
- A) $\left(\frac{\text{Litre}}{\text{Mole}}\right) \cdot \text{sec}$ B) $\left(\frac{\text{Mole}}{\text{Litre}}\right) \cdot \text{sec}$
- C) $\left(\frac{\text{Litre}}{\text{Mole}}\right)^{-1} \cdot \text{sec}^{-1}$ D) $\left(\frac{\text{Mole}}{\text{Litre}}\right)^{-2} \cdot \text{sec}^{-1}$
42. A reaction is of the first order relative to A and is of second order relative to B . What will be the effect on rate if the concentrations of A and B are doubled ?
- A) Velocity remains constant B) 4 times
- C) 2 times D) 8 times
43. $\text{Ag}_{(s)} \left| \text{Ag}^+_{(aq)} (0.01M) \right| \left| \text{Ag}^+_{(aq)} (0.1M) \right| \text{Ag}_{(s)}$
- $E^0 \text{Ag}_{(s)} / \text{Ag}_{(aq)} = 0.80 \text{ Volt}$
- A) Cell can not function as anode and cathode are of same metal
- B) $E_{\text{cell}} = 0.0592V$
- C) $E_{\text{cell}} = 0.80V$
- D) $E_{\text{cell}} = 0.0296V$
44. Freezing point of urea solution is -0.6°C . How much urea (M.W.= 60 gm/mole) required to dissolved in 3 kg water ? ($K_f = 1.5^\circ\text{C kg mol}^{-1}$)
- A) 3.6 gm B) 2.4 gm
- C) 7.2 gm D) 6.0 gm
45. If $K < 1.0$, what will be the value of ΔG^0 of the following ?
- A) 1.0 B) Zero
- C) Negative D) Positive

(Space for Rough Work)

46. Cellulose is soluble in
 A) None of these
 B) Ammonical cupric hydroxide solution
 C) Organic solvents
 D) Water
47. Which of the following acts as best semipermeable membrane ?
 A) Parchment paper
 B) $Cu_2[Fe(CN)_6]$
 C) Plant cell wall
 D) Cellophane
48. Which observation will be given by

$$\begin{array}{c} CH_3 \\ | \\ CH_3 - C - CH_2 \cdot OH \\ | \\ CH_3 \end{array}$$

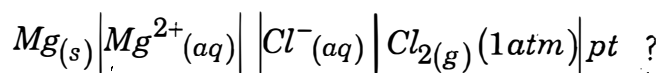
 A) Oily drops are separated
 B) Solution becomes milky
 C) Reaction does not take place
 D) Coloured layer
49. How many O-atoms are shared per SiO_4 tetrahedral in silicate anion of beryl mineral ?
 A) 4
 B) 3
 C) 2
 D) 1
50. A metallic crystal having BCC type stacking pattern, what percentage of volume of this lattice is empty space ?
 A) 68 %
 B) 32 %
 C) 26 %
 D) 74 %
51. What is the energy gap between valence band and conduction band in crystal of insulators ?
 A) Both the bands are overlapped with each other
 B) Very small
 C) Infinite
 D) Very large
52. The physical states of dispersing phase and dispersion medium in colloid like pesticide spray respectively are :
 A) Solid, gas
 B) Gas, liquid
 C) Liquid, gas
 D) Liquid, solid

(Space for Rough Work)

60. What is the percentage of sulphur used in vulcanization of rubber ?
 A) 05 % B) 03 %
 C) 30 % D) 55.0 %
61. Which of the following will be obtained on acetylation of aniline ?
 A) Paracetamol B) *N*-acetyl amino benzene
 C) *O*- amino acetophenone D) *P*-amino acetophenone
62. How many Faradays are needed for reduction of 2.5 mole of $\text{Cr}_2\text{O}_7^{2-}$ into Cr^{3+} ?
 A) 15 B) 12
 C) 6 D) 3
63. What is an oxidation number of carbonyl carbon in Methanal ?
 A) + 3 B) + 2
 C) + 4 D) zero
64. Which of the following is general formula of aldehyde and ketone ?
 A) $\text{C}_n\text{H}_{2n+2}\cdot\text{O}$ B) $\text{C}_n\text{H}_{2n}\cdot\text{O}_2$
 C) $\text{C}_n\text{H}_{2n}\cdot\text{O}$ D) $\text{C}_n\text{H}_{2n+1}\cdot\text{O}$
65. Which of the following compound results into benzene nitrile on its dehydration ?
 A) Benzoic acid B) Benzamide
 C) Benzo phenone D) Benzoyl chloride
66. What will be the bond angle $\text{C}-\text{O}-\text{H}$ in alcohol if hybridisation of C and O atom possess sp^3 hybridisation ?
 A) $109^\circ 28'$ B) $111^\circ 42'$
 C) 109° D) $108^\circ 30'$
67. Which of the following is correct based on Molecular orbital theory for peroxide ion ?
 A) Its bond order is two and it is diamagnetic
 B) Its bond order is one and it is paramagnetic
 C) Its bond order is two and it is paramagnetic
 D) Its bond order is one and it is diamagnetic
68. The number of racemic mixture obtained by optical isomers of 2,3-dihydroxy butanal is / are :
 A) Three B) Two
 C) One D) Zero

(Space for Rough Work)

69. What is the correct Nernst equation for reaction taking place in the following cell



- A) $E_{cell} = E_{cell}^0 - \frac{0.0592}{n} \times \text{Log} \frac{[Cl^{-}]^2}{[Mg^{2+}]}$
- B) $E_{cell} = E_{cell}^0 - \frac{0.0592}{n} \times \text{Log} \frac{[Mg^{2+}]}{[Cl^{-}]}$
- C) $E_{cell} = E_{cell}^0 - \frac{0.0592}{n} \times \text{Log} [Mg^{2+}] [Cl^{-}]^2$
- D) $E_{cell} = E_{cell}^0 - \frac{0.0592}{n} \times \text{Log} \frac{[Mg^{2+}]}{[Cl^{-}]^2}$

70. In a decay series, $^{206}_{82}Pb$ is obtained at the end from $^{238}_{92}U$. How many particles must have been emitted ?

- A) 8
B) 7
C) 6
D) 5

71. The half life period of a radio active material is 15 minutes. What percentage of radioactivity of that material will remain after 45 minutes ?

- A) 17.5 %
B) 15 %
C) 12.5 %
D) 10 %

72. Which of the following complex does not show geometrical isomerism ?

- A) $[Co(NH_3)_4Cl_2]^+$
B) $[Fe(NH_3)_2(CN)_4]^-$
C) $[Cr(OX)_3]^{3-}$
D) $[Co(NH_3)_3(NO_2)_3]$

(Space for Rough Work)

