PCE - 2007

Test Booklet Code

- 1	

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, 4 mark will be deducted. The maximum marks are 80.
- 2. The Test is of 2 hour duration.
- 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 Invigiltor 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.:



PHYSICS

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

7.	A wavelength of a monochromatic light in vacuum is λ . It travels from vacuum to a medium of absolute refractive index μ . The ratio of wavelength of the incident and refracted wave is			
	A) $\mu^2 : 1$	B)	1:1	
	C) $\mu:1$	D)	$1:\mu$	
8.	An object is placed at a distance of 40 cm 20 cm. The image produced is	in fi	cont of a concave mirror of focal length	
	A) real, inverted and smaller in size	B)	real, inverted and of same size	
	C) real and erect	D)	virtual and inverted	
9.	The phenomenon of polarization of electromagnetic waves proves that the electromagnetic waves are			
•	A) neither longitudinal nor transverse	B)	mechanical	
	C) longitudinal	D)	transverse	
10.	The limit of resolution of an optical inst	rume	ent arises on account of	
	A) reflection		diffraction	
	C) polarization	D)	interference	
11.	Two waves coming from two coherent sources having different intensities interfere their ratio of maximum intensity to the minimum intensity is 25. The intensities of the sources are in the ratio			
	A) 25:1	B)	25:16	
	C) 9:4	D)	5:1	
12.	The threshold wavelength for a metal ha	aving	work function W_0 is λ_0 . What is the	
	threshold wavelength for a metal whose work function is $\frac{W_0}{2}$?			
	A) $4\lambda_0$	B)	$2\lambda_0$	
٠	C) $\frac{\lambda_0}{2}$	D	$\frac{\lambda_0}{4}$	

13.	Which of the following has the lonsame velocity?	gest de-Broglie wavelength if they are moving with
	A) neutron	B) proton
	C) α particle	D) β -particle
14.	When a point source of light is a	
	A) 2V ₀	B) V_0
	C) $\frac{V_0}{2}$	D) $\frac{V_0}{4}$
15.	A nucleus at rest splits into two ratio 1 : 2. Their velocities are	nuclear parts having same density and radii in the in the ratio,
	A) 2:1	B) 4:1
	C) 6:1	D) 8:1
16.	In Rutherford's α -scattering exp for impact parameter $b = 0$?	periment, what will be the correct angle of scattering
	A) 180 ⁰	B) 0 ⁰
	C) 270 ⁰	D) 90 ⁰
17.	The wavelength of the matter	waves is independent of
	A) charge	B) momentum
	C) velocity	D) mass
18	The potential energy of the orb $-E$. What is its kinetic energy	ital electron in the ground state of hydrogen atom is
	A) 4E	B) 2 <i>E</i>
	C) $\frac{E}{2}$	D) $\frac{E}{4}$
	(Spa	ce for Rough Work)

current

19	Boolean expression for OR gate	is
	A) $Y = A \cdot B$ C) $Y = A + B$	B) $Y = \overline{A} + \overline{B}$ D) $Y = \overline{A}$
20	. When radio waves passes through and capacitive displacement curr	ionosphero phase disc
	A) 0 rad	B) $\frac{3\pi}{2}$ rad
	C) $\frac{\pi}{2}$ rad	D) π rad
21.22.23.	A) Mobile-phone C) Loud speaker	B) Walky-talky D) Radio on doping intrinsic germanium by B) Boron D) phosphorus is
24.	C) a missing electron N-P-N transistors are preferred to	B) a missing atom D) an excess electron P-N-P transistors because they have nan holes and hence mobility of energy
	(Space for	or Rough Work)

25. A point charge causes an electric flux of $-1.0 \times 10^3 \,\mathrm{Nm^2C^{-1}}$ 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)
$$3.0 \times 10^3 \frac{Nm^2}{C}$$

B)
$$-1.0 \times 10^3 \frac{Nm^2}{C}$$

C)
$$-3.0 \times 10^3 \frac{Nm^2}{C}$$

D)
$$-2.0 \times 10^3 \frac{Nm^2}{C}$$

26. An electric dipole coinsides 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 $\frac{\left|\overline{E}(z)\right|}{\left|\overline{E}(y)\right|} = \dots$

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

- 30. If the uniform surface charge density on the infinite plane sheet is σ , electric field near the surface will be
 - A) $\frac{\sigma}{2\varepsilon_0}$

B) $\frac{3\sigma}{\varepsilon_0}$

C) $\frac{\sigma}{\varepsilon_0}$

- D) $\frac{2\sigma}{\varepsilon_0}$
- 31. Work done in placing a charge of $8\times10^{-18}C$ on a capacitor of capacitance 800 microfarad is
 - A) $4 \times 10^{-32} J$

B) $32 \times 10^{-32} \text{ J}$

C) $3.1 \times 10^{-26} \text{ J}$

- D) $16 \times 10^{-32} \,\text{J}$
- 32. Two identical coils having same number of turns and carrying equal current have common centre and their planes are at right angles to each other. What is the ratio of magnitude of the resultant magnetic field at the centre and magnetic field due to one of the coils at the centre?
 - A) $\sqrt{2}:1$

B) $1:\sqrt{2}$

C) 2:1

- D) 1:1
- 33. Current of 10 A and 2 A are passed through two parallel wires A and B respectively in opposite directions. If the wire A is infinitely long and length of the wire B is 2m, the force acting on the conductor B which is situated at 10 cm distance from A will be
 - A) $4\pi \times 10^{-7} N$

B) $5 \times 10^{-5} N$

C) $8\pi \times 10^{-7} N$

- D) $8 \times 10^{-5} N$
- **34.** A voltmeter has a resistance of G ohm and range of V volt. The resistance required in series to convert it into a voltmeter of range nV volt is
 - A) nG

B) (n-1)G

C) $\frac{G}{n-1}$

D) $\frac{G}{n}$

35.	If velocity of an electron is $(2\hat{i} + 3\hat{j})$ ms	and it enters in the magnetic field of
٠	$4\hat{k}T$, then	
	A) it will move in the opposite direction	to the magnetic field
	B) it will move in the direction of the r	
	C) its speed will change	
•	D) direction of its velocity will change	
36.		is moving on a circular path in a magnetic
00.	field of $10^{-4}T$. The speed of the electron	is (mass of electron $m = 9.1 \times 10^{-31} \text{ kg}$)
	A) $8 \times 10^7 \text{ms}^{-1}$	B) $16 \times 10^7 \mathrm{ms}^{-1}$
	C) $4 \times 10^7 \text{ms}^{-1}$	D) $32 \times 10^{14} \text{ms}^{-1}$
37.	A bar magnet of magnetic moment \overline{M} , is The torque exerted on it is	s placed in a magnetic field of induction \overline{B} .
	A) $-\vec{B} \cdot \vec{M}$	B) $\overline{M} \times \overline{B}$
	C) $-\overline{M} \cdot \overline{B}$	D) \overline{M} \overline{B}
38.	To convert a galvanometer into an amn	neter, we connect
	A) high resistance in parallel with it	B) high resistance in series with it
	C) low resistance in parallel with it	D) low resistance in series with it
39.	The dimensions of RC are same as the	dimensions of which of the following?
	A) RLC	$_{\mathrm{B})}$ R_{L}
	C) LR	D) L/R
40.	What is the self inductance of a coil where the current changes from 3A to 2A in	hich produces, self induced emf of 5V, when one millisecond ?
٠	A) 5 mH	B) 5 H
	C) 50 H	D) 5000 H

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) $\left(\frac{\text{Litre}}{\text{Mole}}\right)^{-1} \text{sec}^{-1}$

- D) $\left(\frac{\text{Mole}}{\text{Litre}}\right)^{-2} \cdot \sec^{-1}$
- 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.** $Ag_{(s)} |Ag^{+}(aq)_{(0.01M)}| |Ag^{+}(aq)_{(0.1M)}| Ag_{(s)}$

$$E^0 Ag_{(s)}/Ag_{(aq)} = 0.80 \text{ Volt}$$

- A) Cell can not function as anode and cathode are of same metal
- B) $E_{cell} = 0.0592V$
- C) $E_{cell} = 0.80V$
- D) $E_{cell} = 0.0296V$
- 44. Freezing point of urea solution is $-0.6^{\circ}C$. How much urea (M.W.= 60 gm/mole) required to dissolved in 3 kg water ? $(K_f = 1.5^{\circ}C \text{ kg mol}^{-1})$
 - 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

40	Callalage is coluble in	АБ-0
46.	Cellulose is soluble in A) None of these	B) Ammonical cupric hydroxide solution
*		D) Water
	C) Organic solvents	b) water
47.	Which of the following acts as best semi	permeable membrane?
÷	A) Parchment paper	B) $Cu_2[Fe(CN)_6]$
		D) Cellophane
	C) Plant cell wall	D) Cenophane
48.	Which observation will be given by	CH_3
	CH_{2}	$_3$ $-C$ $-CH_2$ OH
		CH_3
	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 to	etrahedral in silicate anion of beryl mineral?
	A) 4	B) 3
,	C) 2	D) 1
50.	A metallic crystal having BCC type stact this lattice is empty space?	king pattern, what percentage of volume of
	A) 68 %	B) 32 %
	C) 26 %	D) 74 %
51.	What is the energy gap between valen- insulators?	ce band and conduction band in crystal of
	A) Both the bands are overlapped with	each other
	B) Very small	
	C) Infinite	
	D) Very large	
52.	The physical states of dispersing phase as spray respectively are:	nd dispersion medium in colloid like pesticide
	A) Solid, gas	B) Gas, liquid
	C) Liquid gas	D) Liquid, solid

53. $E_{\text{cell}} = 0.78$ Volt for the following cell.

$$Fe_{(s)} \left| Fe^{2+}_{(aq)} \right| \left| Cu^{2+}_{(aq)} \right| Cu_{(s)}$$

$$(xM) \qquad (0.01M)$$

$$E^{0}Fe/Fe^{2+}_{(aq)} = 0.44V, E^{0}Cu/Cu^{2+}_{(aq)} = -0.34V$$

A) x cannot be predicted

B) x = 0.01M

C) x > 0.01M

- D) x < 0.01M
- 54. Which scientists diffracted the moving electron by using Ni metal crystal like X-rays?
 - A) Max Plank and Hemilton
- B) De-Broglie and Schrodinger
- C) Goudsmit and Uhlenbeck
- D) Davison and Germer
- 55. Which of the following is used as an oxidising agent in hybrid fuel?
 - $^{\circ}$ A) CrO_3

B) Cr_2O_3

C) N_2O_4

- D) H_2O_2
- 56. Select the basic dye from the following
 - A) Methyl Red

B) Congo Red

C) Melachite Green

- D) Methyl Orange
- 57. Which of the following is incorrect for Glucose?
 - A) it contains four -CHOH group
- B) it contains one ketone group
- C) it contains one $-CH_2OH$ group
- D) it contains one -CHO group
- 58. Deficiency of Vitamin H causes
 - A) Climit To Car
 - A) Skin diseases

B) Scurvy

C) Burning of eyes

- D) Anaemia
- 59. The correct formula of salt formed by the neutralisation of hypophosphorous acid with NaOH is:
 - A) Na_3PO_2

B) Na_3PO_3

C) NaH_2PO_2

D) Na_2HPO_2

60.	What is the percentage of	sulphur used in vi	ulcanization of rubber	r ?
	A) 05 %		03 %	
	C) 30 %	D)	55.0 %	
61.	Which of the following wi	ll be obtained on a	cetylation of aniline	?
01.	A) Paracetamol	B)	N-acetyl amino ben	zene
	C) O- amino acetophenor	ne · D)	P-amino acetophen	one
62.	How many Faradays are	needed for reduction	of 2.5 mole of Cr_2C	0_7^{2-} into Cr^{3+} ?
	A) 15	B)	12	
	C) 6	D)	3	
63.	What is an oxidation nur	nber of carbonyl car	bon in Methanal?	
	A) + 3	e .	+ 2	
	C) + 4	D) zero	
64.	Which of the following is	general formula of	f aldehyde and keton	e ?
	A) C_nH_{2n+2} O		$C_nH_{2n}\cdot O_2$	
	C) $C_nH_{2n}\cdot O$	D	$C_nH_{2n+1}\cdot O$	
65.	Which of the following c	ompound results int	o benzene nitrile or	n its dehydration?
00.	A) Benzoic acid) Benzamide	
	C) Benzo phenone	D) Benzoyl chloride	
66.	What will be the bond	angle C-O-H in alc	cohol if hybridisation	of C and O atom
	possess sp ³ hybridisation	•		
	A) 109 ⁰ 28′		3) 111 ⁰ 42'	
	C) 109 ⁰	•	0) 108 ⁰ 30′	
67.				y for peroxide ion?
01,	A) Its bond order is tw		· · ·	•
	B) Its bond order is on			
	C) Its bond order is tw			•
	D) Its bond order is on			
68 .	The number of racemic is / are:	mixture obtained by	optical isomers of 2,	3-dihydroxy butana
	A) Three	1	B) Two	
	C) One		D) Zero	

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

$$Mg_{(s)}|Mg^{2+}(aq)||Cl^{-}(aq)|Cl_{2(g)}(1atm)|pt|$$
?

A)
$$E_{cell} = E_{cell}^0 - \frac{0.0592}{n} \times \frac{\left[Cl^-\right]^2}{\left[Mg^{2+}\right]}$$

$$_{\mathrm{B)}} \ E_{cell} = E_{cell}^{0} - \frac{0.0592}{n} \times \frac{Log}{\left[Cl^{-}\right]}$$

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

$$_{\mathrm{D)}} \ E_{cell} = E_{cell}^{0} - \frac{0.0592}{n} \times \underbrace{Log}_{}^{\left[Mg^{2+}\right]}$$

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) $\left[Co(NH_3)_4Cl_2\right]^+$

B) $\left[Fe(NH_3)_2(CN)_4 \right]^{-1}$

C) $\left[Cr(OX)_3 \right]^{3-}$

D) $\left[Co(NH_3)_3 (NO_2)_3 \right]$

73 .	What will be the theoretical value of magnetic momentum (μ), when CN^- ligands			
	join Fe^{3+} ion to yield complex. A) 2.83 BM B) 3.87 BM			
	C) 5.92 BM D) 1.73 BM			
74.	In which of the following ions, d - d transition is not possible?			
	A) Ti^{4+} B) Cr^{3+}			
•	C) Mn^{2+} D) Cu^{2+}			
75 .	Of the following outer electronic configuration of atoms, the highest oxidation state is achieved by which one of them?			
	A) $(n-1)d^5ns^2$ B) $(n-1)d^8ns^2$ C) $(n-1)d^5ns^1$ D) $(n-1)d^3ns^2$			
	C) $(n-1)d^5ns^1$ D) $(n-1)d^3ns^2$			
76.	Which one of the following ore is not an ore of Al?			
	A) Anglesite B) Mica			
	C) Beryl D) Orthoclase			
77.	Which of the following is isolated in pure form?			
,	A) $HClO_4$ B) $HClO_3$			
•	C) $HClO_2$ D) $HClO$			
78.	Which of the following has the highest proton affinity?			
	A) Stibine (SbH_3) B) Arsine (AsH_3)			
٠	C) Phosphine (PH_3) D) Ammonia (NH_3)			
79.	Peptisation is the process in which			
	A) Suspension is converted into true solution.B) Precipitates dissolve to give true solution.			
	C) Colloid particles gets settled as precipitates.			
	D) Precipitates are converted into colloid.			
80.	order,			
	A) $Al^{3+} > Ba^{2+} > Na^{+}$ B) $Cl^{-} > SO_{4}^{2-} > PO_{4}^{3-}$ C) $PO_{4}^{3-} > Cl^{-} > SO_{4}^{2-}$ D) $Na^{+} > Al^{3+} > Ba^{2+}$			
	C) $PO_4^{3-} > Cl^- > SO_4^{2-}$ D) $Na^+ > Al^{3+} > Ba^{2+}$			