FINAL ANSWER KEY

Question Paper Code: 16/2025/OL Exam:KEAM 2025 BPHARM-3 Date of Test: 29-04-2025

- **1.** A solution is prepared by adding 4 g of a substance to 46 g of ethanol. What is the mass percentage of the solute?
- A) 8%
- **B)** 10%
- **C)** 4%
- **D)** 6%
- **E)** 12%

Correct Answer : Option A

- 2. The order of energy of orbital in the same subshell is
 - A) $E_{2s}(Na) > E_{2s}(Li) > E_{2s}(K)$
 - **B**) $E_{2s}(Li) > E_{2s}(Na) > E_{2s}(K)$
 - c) $E_{2s}(K) > E_{2s}(Na) > E_{2s}(Li)$
 - **D**) $E_{2s}(Li) > E_{2s}(K) > E_{2s}(Na)$
 - E) $E_{2s}(Na) > E_{2s}(K) > E_{2s}(Li)$

Correct Answer : Option B

Which of the following is correct about the stability of half filled and completely filled subshells?

- **3**. (i) Relatively small shielding
- (ii) Larger coulombic repulsion energy
- (iii) Smaller exchange energy
- (iv) Smaller coulombic repulsion energy

- (v) Larger exchange energy
- **A**) (i), (ii) and (iii)
- **B**) (i), (iii) and (v)
- **c**) (i), (iv) and (v)
- D) (ii), (iii) and (v)
- **E**) (i), (ii) and (iv)

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Correct Answer : Option C
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- 4. The correct order of ionization enthalpy is
- A) C < B < O < N
 B) B < O < C < N
 C) N < C < O < B
 D) B < C < O < N

 $\mathsf{E}) \ \mathsf{C} < \mathsf{B} < \mathsf{O} < \mathsf{N}$

Correct Answer : Option D

- 5. The increasing order of atomic radii is
 - **A**) C < N < O < F
 - **B**) F < O < C < N
 - **c**) O < F < N < C
 - $\mathsf{D}) \quad \mathsf{F} < \mathsf{N} < \mathsf{O} < \mathsf{C}$
 - $\mathsf{E}) \quad \mathsf{F} < \mathsf{O} < \mathsf{N} < \mathsf{C}$

Correct Answer : Option E

- 6. Which of the following molecule has expanded octet?
 - A) BCl_3
- **в**) *NO*₂
- c) NO
- D) SF_6
- **с**) *BeH*₂

Correct Answer : Option D

- 7. Which of the following molecule has 3 bond pairs and 2 lone pairs of electrons?
- A) NH_3
- в) *SO*₂
- c) ClF_3
- D) SF_4
- **с**) *H*₂*O*

Correct Answer : Option C

- 8. Which of the following is an extensive property?
 - A) Molar volume
 - B) Internal energy
 - \boldsymbol{c}) Temperature
 - D) Density
 - E) Pressure

Correct Answer : Option B

9. Which of the following molecule has the highest standard enthalphy change of fusion ($\Delta_{fus} H^{\Theta}$) (in kJ mol⁻¹) ? A) H_2O

- в) *CO* с) *C*₆*H*₆
- D) CCl_4
- E) NaCl

Correct Answer : Option E

At equilibrium, the concentration of $N_2 = 5 \times 10^{-3} M$, $O_2 = 2.8 \times 10^{-3}$ M and $NO = 1.4 \times 10^{-3}$ **10.** *M* in a sealed vessel at 800 K. What is the value of Kc for the reaction at same temperature?

$$N_{2(g)} + O_2 \rightleftharpoons 2NO$$

- **A**) 0.41
- **B)** 0.14
- **C**) 0.18
- **D)** 0.5
- E) 0.28

Correct Answer : Option B

11. $Cu_{(s)} + 2Ag_{(aq)}^+ \rightleftharpoons Cu_{(aq)}^{2+} + 2Ag_{(s)} (E_{cell}^\circ = 0.295 \text{ V}, 2.303 \text{ RT/F} = 0.059 \text{ V})$

- A) 10²⁰
- **B**) 10¹⁵
- c) 10¹⁰
- D) 10^{-10}
- E) 10^{-20}

Correct Answer:-Question Cancelled

- **12.** Which of the following compound is used to cover the surface of the metallic object to prevent corrosion?
- A) Phenol
- B) Benzene
- c) Acetone
- D) Bisphenol
- E) Nitrophenol

Correct Answer : Option D

- 13. Which of the following gas has the lowest solubility in water at 298 K?
- A) Argon
- B) Carbon dioxide
- c) Formaldehyde
- D) Methane
- E) Vinyl chloride

Correct Answer : Option A

- **14.** In a reaction, $3A \rightarrow$ Products, the concentration of 'A' decreases from 0.6 mol L^{-1} to 0.3 mol L^{-1} in 20 minutes. What is the rate of the reaction during this interval?
 - A) $0.05 \mod L^{-1} \min^{-1}$
 - **B**) $0.005 \text{ mol } L^{-1} min^{-1}$
 - c) $0.03 \mod L^{-1} \min^{-1}$
 - **D**) $0.6 \mod L^{-1} \min^{-1}$
 - **E**) $0.003 \mod L^{-1} \min^{-1}$

Correct Answer : Option B

The following data were obtained for the reaction , $2NO_{(g)} + O_{2(g)} \rightarrow 2N_2O_{(g)}$ at different concentrations,

Experiment	[NO]/ mol L ⁻¹ min ⁻¹	[O ₂]/ mol L ⁻¹ min ⁻¹	Initial rate of formation of [NO ₂]/ mol L ⁻¹ min ⁻¹
1	0.30	0.30	0.096
2	0.60	0.30	0.384
3	0.30	0.60	0.192
4	0.60	0.60	0.768

The rate law of this reaction is

A) Rate = $k[NO][O_2]$

15.

- **B**) Rate = $k[NO][O_2]^2$
- **c**) Rate = $k[NO]^2[O_2]^2$
- **D**) Rate = $k[NO]^2[O_2]$
- **E**) Rate = $k[NO]^2[O_2]^3$

Correct Answer : Option D

16. Which of the following transition element has both bcc and ccp structures at normal temperature?

- A) Titanium
- B) Vanadium
- c) Silver
- **D**) Chromium
- E) Manganese

Correct Answer : Option E

17. The most common oxidation states of chromium are

- A) +2 and +7
- **B**) +2 and +3
- **c**) +1 and +6
- **D**) +3 and +6
- E) +2 and +4

Correct Answer : Option D

18. What is the magnetic moment of divalent ion with three unpaired electrons?

- A) 2.84 BM
- **B)** 5.92 BM
- **c)** 3.87 BM
- **D**) 4.90 BM
- E) 1.73 BM

Correct Answer : Option C

19. The bond angle of Cr-O-Cr bond in dichromate ion is

- **A**) 90°
- **B**) 126°
- **c**) 109°
- D) 60°
- **E**) 120°

Correct Answer : Option B

20. Which of the following transition metal oxide is used in dry battery cells?

- a) ZnO
- в) ТіО
- **c**) $V_2 O_5$
- D) NiO
- E) MnO_2

Correct Answer : Option E

21. The first and second ionization enthalpies of lanthanoids are comparable with the element

- A) Chromium
- B) Calcium
- c) Germanium
- D) Cesium
- E) Cadmium

Correct Answer : Option B

- 22. The percentage of Cr(III) in Ruby is
 - A) 0.5 to 1 %
 - **B**) 1 to 2 %
 - **c**) 0.1 to 0.4 %
 - **D**) 2 to 3 %
 - **E)** 0.1 to 0.3 %

Correct Answer : Option A

23. Which of the following is an outer orbital complex?

- A) $[Co(NH_3)_6]^{3+}$
- **B**) $[Mn(CN)_6]^{3-}$
- c) $[Co(C_2O_4)_3]^{3-1}$
- D) $[MnCl_6]^{3-}$
- E) $[Fe(CN)_6]^{3-}$

Correct Answer : Option D

- **24.** What is the colour of the complex $[Ni(en)_3]^{2+}$ in water?
 - A) Pale blue
 - B) Purple
 - **c**) Violet
 - D) Green
 - E) Orange

Correct Answer : Option C

25. Hardness of water is estimated by titration with

- A) DMG
- B) cupron
- **c**) α -nitroso- β -napthol
- d) Na_2 EDTA
- E) ethylenediamine

Correct Answer : Option D

26. The formula of Ammonium phosphomolybdate is

- A) $(NH_4)_3 PO_4.12MoO_3$
- **B**) $(NH_4)_2.12MoO_4$
- c) $(NH_4)_2 PO_4.12MoO_3$
- D) $(NH_4)_3 PO_3.12MoO_3$

$(NH_4)_3 PO_4.2MoO_3$

Correct Answer : Option A

27. On complete combustion of 0.96 g of an organic compound gives 0.88 g of carbon dioxide and 0.1 g of water. What is the percentage composition of carbon in the compound?

- **A**) 22%
- **B)** 18%
- **C**) 16%
- **D**) 20%
- **E)** 25%

Correct Answer : Option E

28. Which of the following sodium salt of carboxylic acid is used for the preparation of n-hexane by Kolbe's electrolytic method?

- A) CH₃CH₂COONa
- **в**) *СН*₃*СООNa*
- c) HCOONa
- D) CH₃CH₂CH₃CH₂COONa
- E) CH₃CH₂CH₂COONa

Correct Answer : Option E

29. Which of the following oxidizing agent is used for the iodination of methane?

- A) HI
- в) KMnO₄
- **c**) $K_2 C r_2 O_7$
- D) HIO_3
- E) K_2CrO_4

Correct Answer : Option D

- 30. The product obtained on ozonolysis of 3-Ethylpen-2-ene are
 - A) Methanal and 3-Hexanone
 - B) Pentanal and Propanone
 - c) Ethanal and Pentan-3-one
 - **D**) Ethanal and 3-Hexanone
 - E) Ethanal and Butanone

Correct Answer : Option C

- **31.** The temperature and pressure required for reforming benzene from n-hexane is
 - A) 473K, 10-20 atm

- B) 773K, 10-20 atm
- c) 523K, 100 atm
- D) 973K , 1-2 atm
- E) 573K, 10-20 atm

Correct Answer : Option B

32. Methyl fluoride is prepared by heating methyl bromide in the presence of AgF. This reaction is known as

- A) Swarts reaction
- B) Finkelstein reaction
- c) Sandmeyer's reaction
- D) Wurtz reaction
- E) Kolbe's reaction

Correct Answer : Option A

33. Benzene diazonium chloride on treatment with reagent 'X' gives iodobenzene. The regeant 'X' is

- A) Cu_2I_2
- в) AgI
- c) I_2
- D) HI
- E) KI

Correct Answer : Option E

34. Which of the following is not a chiral molecule?

- A) 2-Chlorobutane
- B) 2,3-Dihydroxy propanal
- c) 2-Bromo propionic acid
- D) Butan-2-ol
- E) 2-Bromo-2-methoxypropane

Correct Answer : Option E

35. The product obtained on the reaction of propanone with CH_3MgBr followed by hydrolysis is

- A) 2-Methylpropan-2-ol
- B) Butan-1-ol
- c) Butan-2-ol
- D) 2-Methylpropan-1-ol
- E) 2-Methylpropane

Correct Answer : Option A

36. The reagent used for the conversion of carboxylic acids to primary alcohols is

- A) PCC
- **в**) *LiAlH*₄ / *H*₂*O*
- c) $NaNO_2 / HCl$
- D) Pd / H_2
- E) Pt / H_2

Correct Answer : Option B

37. The order of acidity of the following compounds is
(i) *o*-Nitrophenol (ii) Phenol (iii) *o*-Cresol (iv) Ethanol
A) (i) < (iii) < (iv)

- **B**) (iii) < (i) < (ii) < (iv)
- **c**) (i) < (ii) < (iii) < (iv)
- **D**) (iv) < (iii) < (ii) < (i)
- **E**) (iii) < (ii) < (i) < (iv)

Correct Answer : Option D

- **38.** When benzene is treated with carbon monoxide and hydrogen chloride in the presence of anhydrous aluminium chloride, benzaldehyde is formed. The reaction is known as
 - A) Etard reaction
 - B) Stephen reaction
 - c) Hell-Volhard-Zelinsky reaction
 - D) Gatterman-Koch reaction
 - E) Aldol reaction.

Correct Answer : Option D

39. When C_6H_5CHO reacts with the mixture of HNO_3 and H_2SO_4 at 273-283K gives

- A) 0- Nitrobenzaldehyde
- **B**) *m*-Nitrobenzaldehyde
- c) p-Nitrobenzaldehyde
- D) Toluene
- E) Nitrobenzene

Correct Answer : Option B

Match the following

40.

Compound

use

- (i) food
- (b) Methanoic acid

(a) Benzaldehyde

- (c) Sodium benzoate
- (d) Hexanedioic acid
- (i) food preservative (ii) nylon 6,6
- (iii) perfumary
- (iv) Electroplating industry

A) a-(i), b-(ii), c-(iii), d-(iv)
B) a-(iii), b-(i), c-(iv), d-(ii)
C) a-(i), b-(iii), c-(ii), d-(iv)
D) a-(ii), b-(iv), c-(i), d-(iii)
E) a-(iii), b-(iv), c-(i), d-(ii)

Correct Answer : Option E

41. The number of moles of alkyl halides required to convert primary amine into quaternary ammonium salt is

- **A**) 1
- **B**) 2
- **C**) 3
- **D**) 4
- **E**) 5

Correct Answer : Option C

The order of boiling point of the following amines is

42.

(i) Butan-1-amine (ii) N-Ethylethanamine (iii) N,N-Dimethylethanamine

- **A**) (i)> (iii) > (ii)
- **B**) (i) > (ii) > (iii)
- **c**) (iii) > (ii)> (i)
- **D**) (iii) > (i) > (ii)
- E) (ii) > (i) >(iii)

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Correct Answer : Option B
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An aromatic compound (X) of molecular formula, C_7H_7Cl , on ammonolysis gives

- **43.** Y(Molecular formula, C_7H_9 N) . The compound 'Y' reacts with two moles of CH_3Cl gives N, N-Dimethylphenylmethanamine. The compounds 'X' and 'Y' are
 - A) Benzylchloride and Aniline
 - B) Chlorobenzene and Aniline
 - c) Benzylchloride and Benzylamine
 - **D**) Chlorobenzene and Benzylamine
 - E) Benzoylchloride and Benzylamine.

Correct Answer : Option C

- 44. Oxidation of gluconic acid with nitric acid gives
 - A) n-hexane
 - B) fructose
 - c) glucose
 - D) glyceraldehyde
 - E) saccharic acid

Correct Answer : Option E

45. The carbohydrates are stored in animal body as

- A) cellulose
- B) starch
- c) glycogen
- D) amylopectin
- E) amylase

Correct Answer : Option C

46. The dimensions of $\frac{B}{E}$ are (B- Magnetic induction, E-electric field intensity)

- A) $M^0 L^{-2} T^1$
- **B**) $M^0 L^{-1} T^2$
- c) $M^{0}L^{1}T^{1}$
- D) $M^0 L^{-1} T^1$
- E) $M^{0}L^{1}T^{-1}$

Correct Answer : Option D

47. A hockey player hits a ball with an impulse of 15 Ns. If time of hit is 0.2 s, the average force exerted by the player on the ball is

- **A**) 75 N
- **B**) 50 N
- **C**) 15 N
- **D**) 20 N
- E) 25 N

Correct Answer : Option A

- **48.** If the position of the particle as a function of time t is $\vec{r} = 8t\hat{i} + 3t^2\hat{j} + 3\hat{k}$ m, then the acceleration of the particle is (in ms^{-2})
 - **A**) 6
 - **B**) 3
 - **C**) 8
 - D) 4
 - E) 5

Correct Answer : Option A

49. The force acting on the particle of 0.2 kg mass whose displacement is described by the equation $x = 3t + 7t^2$ m is

- **A**) 1.0 N
- в) 3.2 N
- **c)** 6.4 N
- **D**) 8.6 N
- E) 2.8 N

Correct Answer : Option E

50. A bullet of 10 g mass is fired at a speed of 50 ms^{-1} by a gun of 2 kg mass. The recoil speed of the gun (in ms^{-1}) is

- **A**) 0.3
- в) 0.25
- **c**) 0.5
- **D**) 0.75
- **E**) 1.25

Correct Answer : Option B

51. The work done to lift a 60 kg mass to a height of 5 m from the ground is (g = 10 ms^{-2})

- **A**) 3000 J
- **B**) 750 J
- **c**) 1250 J
- **D**) 6000 J
- **E**) 4500 J

Correct Answer : Option A

52. Energy equivalent of mass 0.5 kg is

- **A)** $9 \times 10^{16} J$
- **B**) $3 \times 10^{16} I$
- c) $2.5 \times 10^{16} I$
- **D**) $6 \times 10^{16} I$
- E) $4.5 \times 10^{16} J$

Correct Answer : Option E

53. Three particles of equal mass lie at distances of 1 cm, 2 cm and 3 cm from the origin. The distance of their centre of mass from the origin is

- **A**) 2 *CT*
- в) 1 ст
- **c**) 2.5 *cm*
- **D**) 3 *CT*
- **E**) 6*CT*

Correct Answer : Option A

54. Angular momentum of a particle will not be zero, if the

- A) angle between position vector and linear momentum is 0°
- B) particle is at the origin
- ${\bf c}\,)\,$ angle between position vector and linear momentum is 90°
- D) linear momentum vanishes
- E) angle between position vector and linear momentum is 180°

Correct Answer : Option C

- **55.** An astronaut experiences weightlessness in space satellite because
 - A) the gravitational force is small at that location
 - B) both the astronaut and the satellite are in free fall towards earth
 - c) of the small gravity in the horizontal direction
 - D) of the small gravity in the vertical direction
 - E) of the gravitational pull of the moon

Correct Answer : Option B

56. For smaller deformations, stress is directly proportional to the strain for any material. Then the constant of proportionality is called as its

- A) modulus of elasticity
- B) Poisson's ratio
- c) compressibility
- D) coefficient of deformation
- E) mechanical strength

Correct Answer : Option A

57. Which one of the following principles helps to explain the flow of blood in artery?

- A) Magnus effect
- B) Boyle's law
- c) Pascal's law
- D) Bernoulli's principle
- E) Archimedes' principle

Correct Answer : Option D

58. An ideal Carnot engine has an efficiency of 40%. The ratio of the temperature of the sink to that of the source is

- **A**) 0.4
- **B)** 0.6
- **c**) 0.5
- **D**) 0.2

E) 0.3

Correct Answer : Option B

If Q1 and Q2 are respectively, the heat supplied and expelled by a system at a constant 59. temperature, then the work done by the system is

A)
$$Q_1 - Q_2$$

B) $Q_1 + Q_2$
C) $\frac{Q_1 - Q_2}{2}$
D) $\frac{Q_2 - Q_1}{2}$

E)
$$\frac{Q_1 + Q_2}{2}$$

Correct Answer : Option A

60. For the oscillations of a spring with spring constant k, the false statement is

- A) Stiff springs have high value of k
- B) Soft springs have small value of k
- c) The spring constant is independent of the elastic properties of the spring
- D) For smaller oscillations the spring executes simple harmonic motion
- E) The period of oscillations of the spring depends upon the value of k

Correct Answer : Option C

61. If the amplitude of the wave y = 3sin(3x - 5t) + Acos(3x - 5t)) m is 5 m, the value of A is

- **A**) 3 m
- **B**) 2 m
- **c**) 1 m
- **D**) 5 m
- E) 4 m

Correct Answer : Option E

62. In dielectrics, polarization is the dipole moment per unit

- A) area
- B) lectric field
- c) volume
- D) length
- E) charge

Correct Answer : Option C

63. The energy density of the electric field $2Vm^{-1}$ in a capacitor C is (ϵ_{\circ} is the permittivity of free space)

- A) $3\epsilon_{\circ}$
- B) $\frac{\varepsilon_{\circ}}{2}$
- **c**) 4 ε.
- D) $\frac{\varepsilon_{\circ}}{4}$
- **b**) 4
- ε) 2ε。

Correct Answer : Option E

64. A carbon resistor has a tolerance of 20%. As per the colour codes of resistors, the last band in that resistor is

- A) silver
- B) absent
- c) red
- D) gold
- E) blue

Correct Answer : Option B

65. When a current of 2 A flows through a wire for 2.5 s, the amount of heat liberated is 20 J.The resistance of the wire is

- **A**) 4 Ω
- **B**) 3Ω
- **c**) 1 Ω
- **D**) 2Ω
- **E**) 5Ω

Correct Answer : Option D

66. The magnetic moment of an electron revolving in an orbit of 0.5 m radius with a velocity of $8 \times 10^7 m s^{-1} is(in Am^2)$

- A) 3.2×10^{-1}
- **B**) 0.4×10^{-12}
- c) 6.4×10^{-1}
- D) 1.6×10^{-12}
- **E**) 0.8×10^{-12}

Correct Answer : Option A

67. If an electron moves with a velocity v in a magnetic field B, the magnetic force on the electron is maximum when the angle between v and B is

A) 30°

- **B**) 180°
- **C**) 60°
- **D**) 90°
- E) 0^{o}

Correct Answer : Option D

68. The flux linked with a coil at any instant is given by $\phi = 5t^2 - 25t - 150$ (in SI unit). The emf induced in the coil at t = 2s is

- **A**) +5 V
- в) +3V
- **c**) -1 V
- **D)** -5 V
- **E)** -3 V

Correct Answer : Option A

69. If the frequency of an electromagnetic wave is 2 MHz, then the time period of oscillation of the accelerated charge is

- A) $2.5 \times 10^{-7} s$
- **B**) $1 \times 10^{-7} s$
- c) $5 \times 10^{-7} s$
- **D**) $6 \times 10^{-7} s$
- E) $2 \times 10^{-7} s$

Correct Answer : Option C

70. The eye defect astigmatism can be corrected by using a

- A) convex lens
- B) spherical lens
- c) plano-convex lens
- D) concave lens
- E) cylindrical lens

Correct Answer : Option E

71. The intensity of a polarized light can be controlled by a second polarizer from

- A) 100% to 0%
- **B)** 50% to 0%
- **c**) 25% to 0%
- **D**) 10% to 0%
- **E)** 75% to 0%

Correct Answer : Option B

72. If a particle is moving with a momentum of (2×10^{10}) h $kgms^{-1}$ then the de Broglie wavelength associated with it (in angstrom) is (where h is Planck's constant)

- **A**) 1.5
- **B)** 2.5
- **C)** 1.0
- **D)** 0.5
- **E)** 0.75

Correct Answer : Option D

73. The angular momentum of the electron revolving in 2^{nd} orbit is

A) $\frac{h}{\pi}$ B) $\frac{h}{2\pi}$ C) $\frac{2h}{\pi}$ D) $\frac{3h}{2\pi}$ E) $\frac{h}{3\pi}$

Correct Answer : Option A

74. In the nuclear process, ${}^{22}_{11}Na \rightarrow {}^{22}_{10}Ne + e^+ + X$, then X is

- A) neutrino
- B) anti-neutrino
- \mathbf{c}) electron
- D) positron
- E) neutron

Correct Answer : Option A

In a semiconductor crystal, the total number of electrons in the outer shell is 4N. At **75.** absolute zero, the number of energy states of valence and conduction band are

- respectively
- **A**) 0 and 4N
- ${\bf B}\,)\,\,4N$ and 4N
- **c**) 4N and 0
- **D**) 8N and 0
- E) 0 and 8N

Correct Answer : Option B