OJEE 2015 Question Paper

Odisha Joint Entrance Examination

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PHYSICS

1. Among the following what is the ratio of SI and CGS units of coefficient of viscosity

   a) 5:1   b) 7:1   c) 10:1   d) 15:1

2. Among the following the dimensional formula of impulse is

   a) MLT^{-1} b) MLT^{-2} c) $ML^{-1}T^{-2}$ d) ML^2T^{-2}

3. The random error which exist invariably in screw gauge is

   a) Least count error
   b) Zero error
   c) Gross error
   d) Backlash error

4. Which of the following statement is true

   a) Velocity, acceleration, displacement and force are vector quantities
   b) Weight, mass torque, energy, work are scalar quantities
   c) Angular velocity, time, momentum, electric field strength are vector quantities
   d) A vector quantity is one in which only magnitude is specified

5. In projectile motion, if air resistance is ignored, the horizontal motion has

   a) Constant acceleration
   b) Constant velocity
   c) Variable acceleration
   d) Constant retardation

6. A body is dropped freely from a height 'h'. It crosses a point P in its path, which is at a height of $\frac{3h}{4}$ from the ground in 't_1' seconds and from there it is reached ground in 't_2'seconds, then $t_1:t_2$ is

   a) 1:1   b) 1:3   c) 1:4   d) 3:4

7. The distance moved by a freely falling body (starting from the rest) during the 1st, 2nd, 3rd -----n^{th} second of its motion are proportional to

   a) $(n-1)$ b) $(2n-1)$

   b) c)(n^2-1) d) $\frac{2n-1}{n^2}$

8. If 'F' denotes force and 'T' denotes torque, then the condition for equilibrium is

   a) $F = 0, \Sigma T \neq 0$ b) $\Sigma F \neq 0, \Sigma T = 0$

   c). $\Sigma F = 0, \Sigma T = 0$ d). $\Sigma F \neq 0, \Sigma T \neq 0$

9. If the net force acting on a body is doubled, then acceleration of the body is

    a) Halved
    b) Doubled
    c) Unchanged
    d) Tripled

10. A scooter of mass 120 kg is moving with uniform velocity of 108 km/hr. The force required to stop the vehicle in 10 seconds is

    a) 180 N   b) 360 N   c) 720 N   d) 820 N

11. Chose correct statement from the following :

    a) When a conservative force does positive work on body, its potential energy increases
    b) When a body does work against the friction , its kinetic energy decreases
    c) The rate of change of total momentum of a many particle system is proportional to the net external force acting on the system
    d) The rate of change of total momentum of a many particle system is proportional to the net internal force acting on the system

12. Two bodies 'A' and 'B' having masses in the ratio of 1:2 fall from heights in the ratio 1:2 respectively . The ratio of their potential energy is

    a) 1:2   b) 2:1   c) 1:4   d) 4:1

13. Two springs have their force constants K_1 and K_2. Both are stretched till their elastic energies are equal. Then the ratio of stretching forces $\dfrac{F_1}{F_2}$

    equal to

    a) $\dfrac{K_1}{K_2}$ b) $\dfrac{K_2}{K_1}$ c) $\dfrac{\sqrt{K_1}}{\sqrt{K_2}}$ d) $\dfrac{K_1^2}{K_2^2}$

14. A body is moving with uniform acceleration 'a' on a horizontal surface which has coefficient of friction 'μ' as it is pulled with horizontal force. When the body moves on a horizontal surface of coefficient of friction of '2μ', its acceleration is halved under the same force. Then the acceleration 'a' is

    a) μg   b) 2μg   c) $\dfrac{\mu g}{2}$ d) $\dfrac{\mu g}{4}$

15. The moment of inertia of a body is independent of the following factor

    a) The angular speed
    b) Mass of the body
    c) Nature of the distribution of the mass
    d) Location of the axis of rotation

16. Which of the following has the highest moment of inertia when each of them has the same mass and same radius

    a) A solid sphere about one of its diameter
    b) A spherical shell about one of its diameter
    c) A disc about its axis perpendicular to the plane of disc
    d) A ring about its axis perpendicular to the plane of the disc

17. The gravitational force between two bodies is 'F'. When the mass of each body is doubled and the distance between them is halved, then the force between them will be

    a)   F   b) 4F   c) 8F   d) 16 F

18. The escape velocity of earth is 11.2 km/sec. If the earth is compressed to half of its radius, then the escape velocity

    a) Remains the same
    b) Increases
    c) Decreases
    d) Depends on the mass of the body

19. Two samples A and B of a gas initially of the same temperature and pressure are compressed from a volume V to a volume $\frac{V}{2}$ such that A is compressed isothermally and B adiabatically. Then the final pressure of

    a) A is greater than that of B
    b) A is equal to that of B
    c) A is less than that of B
    d) Relation between A and B can not be defined

20. Three liquids A, B, C of masses 200 g, 300 g, 400 g, are at 30 ºC, 40 ºC and 50 ºC respectively. When A and B are mixed the resultant temperature is 32 ºC. When B and C are mixed the resultant temperature is 45 ºC. The resultant temperature when A and C are mixed is :

    a)   34 ºC   b) 45 ºC   c) 40 ºC d) 42 ºC

21. A gas is compressed adiabatically and its temperature rises by T_1. If it is compressed isothermally and change in temperature is denoted by T_2. Then the valid statement among the following is

    a) $T_1 = T_2$ b) $T_2 = 0$ c) $T_1 = 0$ d) $T_1 < T_2$

22. First law of thermodynamics states that

    a) system can do work
    b) system has temperature
    c) system has pressure
    d) heat is form of energy

23. A gas for which $\gamma = 1.5$ is suddenly compressed to $\frac{1}{4}$ th of its initial value, then the ratio of the final to initial pressure is

    a) 1: 16 b) 1: 8 c) 1: 4 d) 8:1

24. The internal energy of an ideal gas depends upon the following factor

    a) Temperature
    b) Pressure
    c) Specific volume
    d) Color

25. The ratio of emissive power and the absorptive power of all bodies is the same and is equal to the emissive power of a perfectly blackbody is known as

    a) Newton's law
    b) Kirchhoff's law
    c) Wien's law
    d) Stefan's law

26. If the difference between lengths of rods of steel and brass are to remain constant at 30 cm at all temperatures, then their lengths at 0 ºC should be respectively (given parameters $\alpha_s = 11 \times 10^{-6}$ /ºC; $\alpha_b = 19 \times 10^{-6}$ /ºC)

    a) 71.25 cm and 41,25 cm
    b) 82 cm and 52 cm
    c) 72 cm and 52 cm
    d) 61.25 cm and 31.25 cm

27. In a mercury thermo meter the lower fixed point and the upper fixed point are separated by 200 mm. When the length of the mercury column is 50 mm, then the temperature reading in Celsius is

    a) 50 ºC b) 75 ºC c) 25 ºC d) 10 ºC

28. Quickly changing temperatures are measured by the following instrument:

   a) Gas thermometers
   b) Vapor pressure thermometers
   c) Pyrometers
   d) Thermocouple thermometers

29. Young's modulus of the wire has the same units as

   a) Pressure
   b) Strain
   c) Compressibility
   d) Energy

30. Young's modulus of the steel is 2.0 x 10^{11} Pa and its Poisson's constant is 0.2, then its bulk modulus is

   a) 1.1 x 10^{11} Pa
   b) 1.1 x 10^{10} Pa
   c) 1.1 x 10^{9} Pa
   d) 1.1 x 10^{8} Pa

31. Two tooth pricks are floating very near and parallel to each other on the surface of the water. If a third prick is submerged in solution of detergent is touched with the water between the floating pricks, then the pricks are

   a) First touched and then repelled
   b) Come closer
   c) Remain in same position
   d) Moves further away

32. The surface tension of a soap solution is T. The work done in increasing the the diameter of soap bubble from D to 2D will be

   a) $8\pi D^2 t$
   b) $6\pi D^2 t$
   c) $4\pi D^2 t$
   d) $2\pi D^2 t$

33. Depth of the water at which air bubble of radius 0.4 mm remain in equilibrium is (given parameters surface tension of water = 72 x10^{-3} N/m and g =9.8 m/sec^2)

   a) 3.674 m
   b) 36.74 cm
   c) 3.674 cm
   d) 36.74 m

34. Which of the following statement is not correct

    a) Lines of force are parallel to the equi-potential surface
    b) Lines of force are perpendicular to the equi-potential surface
    c) On an equipotential surface, work done in moving a charge is zero
    d) Equipotential surfaces do not intersect

35. Charges of +100 µC and   -100 µC are placed at A and B of an equi-lateral triangle of side 10 cm. The intensity at the other corner 'C' is

    a) 3×10^7 NC^{-1}
    b) 4×10^7 NC^{-1}
    c) $5x\ 10^7$ NC^{-1}
    d) 9×10^7 NC^{-1}

36. A mica condenser has 51 plates. If the capacity between adjacent plates is 2 pF. Then its total capacity is

    a) 50 pF
    b) 100 pF
    c) 150 pF
    d) 200 pF

37. At any point on the right bisector of line joining two equal and opposite charges :

    a) The electric field is zero
    b) The electric potential is zero
    c) The electric potential decreases with increasing distance
        from the center
    d) The electric field is perpendicular to the line joining the charges

38. At 30 ºC the resistance of a conductor is 5 ohm. The temperature at which the resistance becomes 5.2 ohm is (given that temperature coefficient of resistance is = 0.001 ºC)

     a)   71 ºC b) 70 ºC c) 100 ºC d) 41 ºC

39. Two cells of emf 12 V and 2 V having internal resistances 2 ohm and 1 ohm respectively are connected in parallel with an external resistance 'R'. If the current through R is 0.5 A. Then the value of R is

    a)   10 ohm   b) 5 ohm c) 20 ohm d) 15 ohm

40. Which of the following two statements are true

   A: Thomson effect is due to non-uniform electron density in the metal
      due to temperature variation along it

   B: Peltier effect is due to non-uniform electron density of the metals at
      junction

   a) A only true
   b) B only true
   c) Both A and B true
   d) Neither A nor B true

41. Two identical short bar magnets each having a magnetic moment 'M' are
    placed at a distance of '2d' with their axes perpendicular to each other in
    horizontal plane. The magnetic field induction at a point mid way between
    them is

   a) $\frac{\mu_0}{4\pi}\left(\sqrt{2}\right)\frac{M}{d^3}$
   b) $\frac{\mu_0}{4\pi}\left(\sqrt{3}\right)\frac{M}{d^3}$
   c) $\frac{2\mu_0}{\pi}\frac{M}{d^3}$
   d) $\frac{\mu_0}{4\pi}\left(\sqrt{5}\right)\frac{M}{d^3}$

42. When a material is placed in a magnetic field B, then the magnetic moment
    proportional to 'B', but opposite in the direction is induced. The
    material is

   a) Diamagnetic
   b) Paramagnetic
   c) Ferromagnetic
   d) Antiferro

43. The magnet of a vibration magnetometer is heated so as to reduce its
    magnetic moment by 19%. By doing this the periodic time of the
    magneto meter will

   a) Increase by 19%
   b) Increase by 11%
   c) Decrease by 19%
   d) Decrease by 21%

44. If a long copper wire rod carries a direct current, then the magnetic field
    associated with the current will be

   a) Only inside the rod
   b) Only outside the rod
   c) Both inside and outside the rod
   d) Neither inside not outside the rod

45. A 10 turn circular coil of radius 2 cm carries a current of 0.5 amp. Then the magnetic induction at the center of the coil is

a) 1.57×10^{-6} tesla
b) 1.57×10^{-5} tesla
c) 1.57×10^{-4} tesla
d) 1.57×10^{-6} tesla

46. Two SHMs are represented as $x = a\sin\omega t$ and $y = a\cos\omega t$, where x and y are perpendicular to each other. The resultant motion is

a) Circular
b) Parabola
c) Straight line
d) Hyperbola

47. A body moves between two points A and B which are distant 'a' and 'b' from the point O in the same straight line OAB. Then the amplitude is

a) $\frac{a+b}{2}$

b) $\sqrt{\frac{a^2+b^2}{2}}$

c) $\frac{b-a}{2}$

d) $(b-a)$

48. When an aero-plane attains a speed higher than the velocity of sound in air, a loud bang is heard. This is because

a) It explodes
b) It produces a shock wave which is received as the bang
c) Its wings vibrates so violently that bang is heard
d) The normal engine noises undergo a Doppler shift to generate bang

49. The velocity of progressive wave which produces the stationary wave $y = 2\sin\left(\frac{\pi x}{100}\cos(\pi t)\right)$ is

a) 100 ms^{-1} b) 50 ms^{-1} c) 1 ms^{-1} d) 1000 ms^{-1}

50. A plano-convex lens of refractive index 'µ' and radius of curvature 'R' is silvered on the plane surface. Then it behaves as

a) A concave mirror of focal length $\frac{R}{2\mu}$

b) A convex mirror of focal length $\frac{R}{2(\mu-1)}$

c) A concave mirror of focal length $\frac{R}{2(\mu-1)}$

d) A converging lens of focal length $\frac{R}{(\mu-1)}$

51. Consider the following two statements and identify the correct answer

A: Spherical mirrors of large aperture are free from chromatic aberration
B: Plane mirrors are free from both spherical and chromatic aberrations

a) A is true but B is false
b) A is false but B is true
c) Both A and B are true
d) Both A and B are false

52. The property of light waves are

a) Transverse mechanical waves
b) Longitudinal electromagnetic waves
c) Transverse electromagnetic waves
d) Longitudinal mechanical waves

53. When two coherent sources of amplitude 'a' interfere at a point with a phase difference 'φ', then the intensity at that point is proportional to

a) $a^2 \cos^2 \phi$
b) $\dfrac{a^2 \cos^2 \phi}{2}$
c) $a^2 \cos^2 \dfrac{\phi}{2}$
d) $a^2 \sin^2 \dfrac{\phi}{2}$

54. In a Young's double slit experiment green light (λ = 5461 Å) is used and 60 fringes were seen in the field of view. No sodium light is used (λ = 5890 Å), then the number of fringes observed are

a) 40   b) 60   c) 50   d) 55

55. Identify correct answer by checking the following statements

A: Mobility of electrons is greater than that of holes in Ge by two times
B: Mobility of electrons is greater than that of holes in Si by four times

a) Both A and B are correct
b) Both A and B are wrong
c) A is correct but B is wrong
d) A is wrong but B is correct

56. In a pn junction the thickness of the depletion layer is of the order of

a) Meter b) centimeter c) millimeter d) micrometer

57. The value indicated by Fermi energy level in an intrinsic semiconductor is

a) The average energy of electron and holes
b) The energy of electron in conduction band
c) The energy of holes in valence
d) The energy of forbidden region

58. The phenomena of nuclear fission can be understand on the basis of the following model

   a) Liquid drop
   b) Shell model
   c) α-particle model
   d) collective model

59. The amount of energy released during the nuclear fusion of four protons combining into He nucleus is

   a) 200 MeV   b) 26.7 MeV   c) 8.8 MeV   d) 8.0 MeV

60. Among the following which physical quantity is the same for all observers in uniform motion

   a) Speed of light
   b) Acceleration
   c) Time
   d) Velocity

61. The number of unpaired electrons present in the complex ion $[CoCl_4]^{2-}$ is

A. 3	B. 2
C. 4	D. 0

62. Amongst Na_2O, CaO, BaO and ZnO, the amphoteric oxide is

A. Na_2O	B. ZnO
C. CaO	D. BaO

63. The hybridization, geometry and magnetic moment of $Na_2[Cu(CN)_4]$ respectively, are

A. sp^3, tetrahedral, 1.73 B.M.	B. sp^3, tetrahedral, 2.84 B.M.
C. dsp^2, square planar, 1.73 B.M.	D. dsp^2, square planar, 2.84 B.M.

64. Reaction of water with aluminium carbide gives a colorless gas. The gas is

A. acetylene	B. propene
C. propane	D. methane

65. The number lone pairs on the central atom of the following molecules respectively, are

$XeCl_2$, XeF_4, SF_4, ClF_3

A. 3, 2, 1, 2	B. 2, 3, 1, 2
C. 3, 2, 2, 1	D. 1, 2, 1, 3

66. The most stable isotope of copper and the number of neutrons present in its nucleus are, respectively

A. ^{65}Cu, 36	B. ^{63}Cu, 34
C. ^{67}Cu, 34	D. ^{63}Cu, 32

67. Hemoglobin (MW 67200) contains 0.334% of iron (55.85) by weight. In one molecule of hemoglobin the number of iron atoms present is

| A. 6	B. 2
C. 4	D. 1

68. One mole of $Co(NH_3)_5Cl_3$ gives 3 moles of ions on dissolution in water. One mole of the complex reacts with two moles of $AgNO_3$ in solution to give 2 moles of AgCl (s). The correct formula of the complex is

A. $[Co(NH_3)_3Cl_3] \cdot 2NH_3$	B. $[Co(NH_3)_4Cl_2]Cl \cdot NH_3$
C. $[Co(NH_3)_4Cl]Cl_2 \cdot 2NH_3$	D. $[Co(NH_3)_5Cl]Cl_2$

69. A positron is emitted from $^{23}Na_{11}$. The ratio of the atomic mass and atomic number of the resulting nuclide is

A. 23/10	B. 22/10
C. 23/12	D. 22/11

70. For the following radioactive decay

$$^{232}Th_{90} \longrightarrow {}^{208}Pb_{82}$$
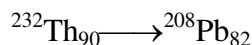
the correct disintegration series is

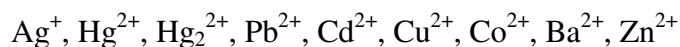| A. 4n+1	B. 4n
C. 4n+2	D. 4n+3

71. From the activity series of metals identify the correct set of metals which produce hydrogen from reaction with steam

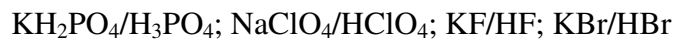Ba, Ca, Al, Zn, Cd, Sn, Ni, Co, Pb

A. Ba, Ca, Sn	B. Cd, Sn, Ni
C. Al, Zn, Cd	D. Ni, Co, Pb

72. The correct set of ions from the following

Ag^+, Hg^{2+}, Hg_2^{2+}, Pb^{2+}, Cd^{2+}, Cu^{2+}, Co^{2+}, Ba^{2+}, Zn^{2+}

gives insoluble precipitate by addition of dilute HCl solution is

A. Pb^{2+}, Cd^{2+}, Cu^{2+}	B. Co^{2+}, Ba^{2+}, Zn^{2+}
C. Ag^+, Cd^{2+}, Ba^{2+}	D. Ag^+, Hg_2^{2+}, Pb^{2+}

73. Identify the buffer system from the following pairs

KH_2PO_4/H_3PO_4; $NaClO_4/HClO_4$; KF/HF; KBr/HBr

A. KH_2PO_4/H_3PO_4	B. $NaClO_4/HClO_4$
C. KF/HF	D. KBr/HBr

74. In dry condition orange-yellow solid CsO_2 is quite stable. Upon dissolution in water it gives

A. O_2^{2-} and HO^-	B. O_2 and HO^-
C. O_2^{2-} and O^{2-}	D. O_2 and O^{2-}

75. The complex $Na_5[Ag(S_2O_3)_3]$ has

A. two Ag–S and one Ag–O bond	B. two Ag–S and one Ag–O bond
C. three Ag–S bonds	D. three Ag–O bonds

76. The magnetic moment of green $K_n[VF_6]$ is 2.79 μ_B at 300K. The value of value of 'n' in the formula is

A. 4	B. 2
C. 1	D. 3

77. Thermal decomposition of $(NH_4)_2[Cr_2O_7]$ gives

A. green pigment Cr_2O_3 and N_2	B. green pigment Cr_2O_3 and N_2O
C. red pigment CrO_3 and N_2	D. brown pigment CrO and NO_2

78. Extraction of silver metal from it sore argentite using NaCN and Zn produced species like

A. $Na_2[Ag(CN)_3]$ and $Na_2[Zn(CN)_4]$	B. $Na[Ag(CN)_2]$ and $Na_2[Zn(CN)_4]$
C. $Na[Ag(CN)_2]$ and $Na[Zn(CN)_3]$	D. $Na_2[Ag(CN)_4]$ and $Na_4[Zn(CN)_6]$

79. Identify the correct pair of amphoteric oxides from the following

Rb_2O, BeO, Al_2O_3, As_2O_5

A. Rb_2O, BeO	B. Rb_2O, As_2O_5
C. BeO, Al_2O_3	D. Al_2O_3, As_2O_5

80. The metal based effective drug for certain types of cancer is

A. facplatin	B. transplatin
C. merplatin	D. cisplatin

81. The following compound is popularly known as
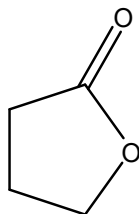
| A. a lactone	B. an aldehyde
C. a ketal	D. cyclic hemiacetal

82. Which of the following pair can be distinguished by iodoform test?

A. Acetone and acetophenone	B. Acetophenone and benzophenone
C. Acetone and 2-butanone	D. Acetone and 2-pentanone

83. Which of the following will not undergo aldol condensation reaction?

A. 2,2,4,4-tetramethylpentan-3-one	B. acetaldehyde
C. acetone	D. acetophenone

84. The correct order of the stability for the following carbocations is
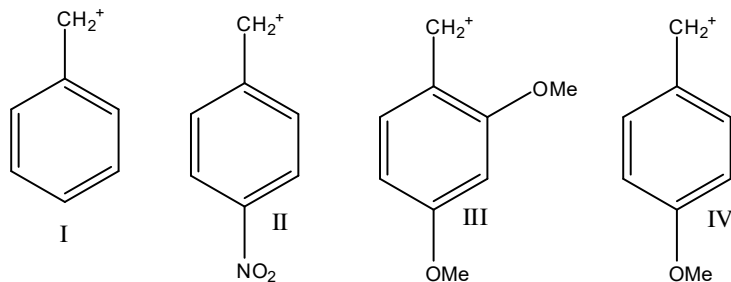
A. III>II>IV>I	B. III>IV>I>II
C. III>II>I>IV	D. III>I>II>IV

85. Which of the following exhibits aromaticity according to Huckel rule?

A.	B.
C.	D.

86. A positive carbylamine test is given by

A. N,N-dimethylaniline	B. N-methylaniline
C. 4-Methyl-aniline	D. N-Methyl-N-ethyl-aniline

87. Nitrogen is estimated in organic compounds by

A. Carius method	B. Duma's method
C. Kjeldahl's method	D. Both B & C

88. Which of the following statement is true about the following compounds?

$R = NO_2; CN; CF_3$
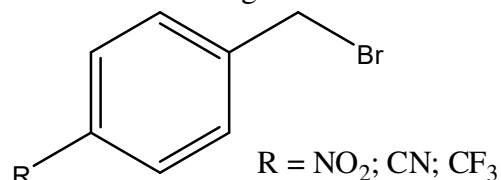
A. All the substrates react in S_N1 fashion	B. All the substrates react in S_N2 fashion
C. All the substrates can react in either S_N1 or S_N2 fashion depending on experimental condition	D. None of the above.

89. Which of the following amino acid is having a phenolic-OH group in its structure?

| A. Tyrosine	B. Phenylalanine
C. Histidine	D. Tryptophan

90. Which of the following hydrocarbon cannot be synthesized by Kolbe's electrolytic method?

A. Ethane	B. n-Butane
C. n-Hexane	D. n-Propane

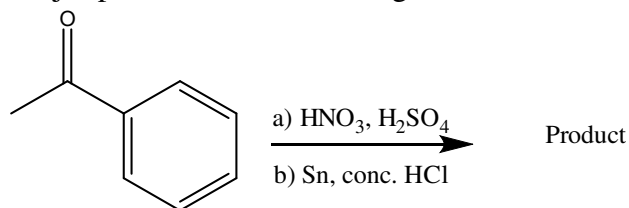91. The pyrimidine nucleobase "Uracil" is found only in

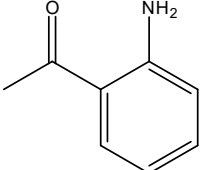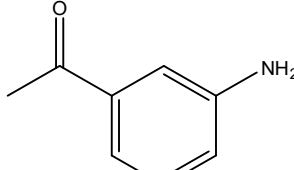| A. DNA	B. RNA
C. Both in DNA & RNA	D. PNA
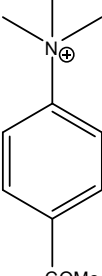
92. One of the carbon atom in the following molecule is nucleophilic in nature and will be attacked by some electrophilic species under certain reaction condition, identify the nucleophilic carbon atom?
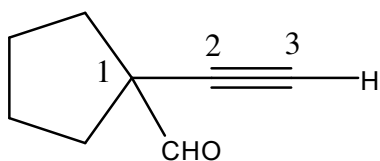
A. C-1	B. C-2
C. C-3	D. None
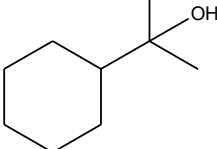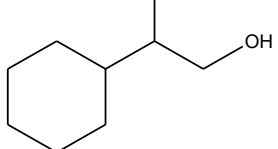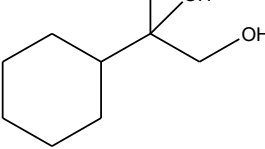
93. The major product in the following reaction will be?

a) HNO₃, H₂SO₄

b) Sn, conc. HCl

$$\text{a) HNO}_3, \text{H}_2\text{SO}_4$$
$$\text{b) Sn, conc. HCl}$$

Product

A.	B.
	D. None
C.	

94. Which will be the main product in the following reaction?

a) mCPBA

b) LiAlH₄

product
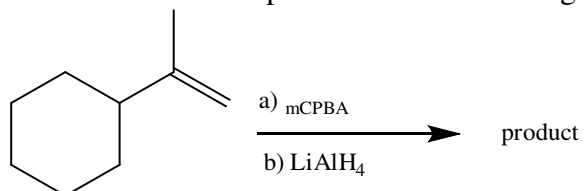
A.	B.
C.	D. None

95. Which will be the selective reagent in the following transformation?
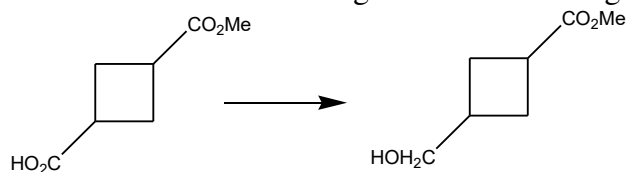
A. LiAlH₄	B. NaBH₄
C. BH₃	D. Ni-H₂

96. The monomer used to produce **orlon** is

A. Acrylo nitrile	B. Vinyl bromide
C. Vinyl chloride	D. Vinyl fluoride

97. The IUPAC name of the following compound is
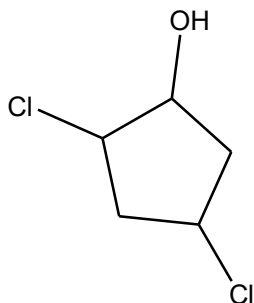
A. 3,5-dichlorocyclopentan-1-ol	B. 2,4- dichlorocyclopentan-1-ol
C. 1,4- dichlorocyclopentan-2-ol	D. 1,3- dichlorocyclopentan-4-ol

98. Which of the following compound is chiral
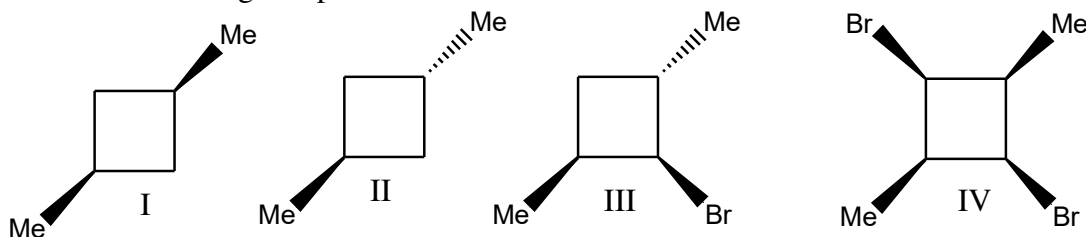
A. I	B. II
C. III	D. IV

99. Increasing order of acidic strength among phenol, *para*-cresol, *para*-nitrophenol and 2,4-dinitro phenol is

A. *para*-cresol<phenol<2,4-dinitrophenol<*para*-nitrophenol	B. *para*-cresol<phenol<*para*-nitrophenol<2,4-dinitrophenol
C. phenol<*para*-cresol<*para*-nitrophenol<2,4-dinitrophenol	D. *para*-nitrophenol<2,4-dinitrophenol<*para*-cresol<phenol

100. The reaction of sodium ethoxide with *tert*-butyl bromide gives

A. tert-butyl methyl ethyl ether	B. 1-butene
C. 2-methyl propene	D. None

101. Above critical temperature

A. a gas behaves ideally	B. no distinct vapor and liquid phase exist
C. the vapor liquifies	D. the liquid vaporizes

102. If the density of an ideal gas is given by 'd', then which of the following expressions is equal to molecular weight?

A. dRT/P	B. nRTP/d
C. Pd/RT	D. RTP/d

103. The root mean square velocity of an ideal gas at constant pressure varies with density (d) as

A. $\sqrt{d}$	B. $\sqrt{1/d}$
C. d^2	D. d

104. Which of the following gas has maximum rate of diffusion at a given temperature

A. O_2	B. H_2
C. CO_2	D. NH_3

105. Which of the following are extensive properties of a system?
    i) Boiling point   ii) Viscosity   iii) pH   iv) Standard Emf of a cell ($E°$)

A. i, ii & iii	B. iv
C. iii & iv	D. None

106. The boiling point of an azeotropic mixture of water and ethanol is less than that of water and ethanol. The mixture shows

A. positive deviation from Raoult's Law	B. negative deviation from Raoult's Law
C. no deviation from Raoult's Law	D. deviations which cannot be predicted from the given information

107. Temperature of one mole of neon (Ne) gas is increased by 1°C, hence, increase in internal energy is

A. 5 cal	B. 3 cal
C. 9 cal	D. 2 cal

108. Consider the following gas-phase reaction: $O_3 + 2NO_2 \rightarrow N_2O_5 + O_2$; The value of the rate constant at 35 °C is 3.0×10^4 dm^3 mol^{-1} s^{-1}. What is the order of this reaction at 35 °C.

A. 0	B. 1
C. 2	D. 3

109. Consider the following reaction: $N_2 + 3H_2 \rightarrow 2NH_3$; the rate of change of concentration of N₂, $\dfrac{d[N_2]}{dt}$ at any instant is -0.002 mol L^{-1} s^{-1}. What is the value of $\dfrac{d[H_2]}{dt}$ at that particular instant?

A. -0.002 mol L^{-1} s^{-1}	B. -0.004 mol L^{-1} s^{-1}
C. -0.006 mol L^{-1} s^{-1}.	D. -0.008 mol L^{-1} s^{-1}

110. The plot of log k vs. 1/T of a reaction is linear with a

A. negative slope and non-zero intercept	B. positive slope and non-zero intercept
C. negative slope and zero intercept	D. positive slope and zero intercept

111. In the reaction

$$N_2 + 3H_2 \rightleftarrows 2 NH_3 \qquad \Delta H = -22 \text{ kcal}$$
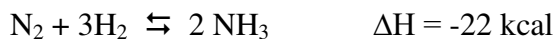
the favorable condition for formation of NH₃ in good yield is

A. High Temperature and Low Pressure	B. Low Temperature and High Pressure
C. Low Temperature and Low Pressure	D. High Temperature and High Pressure

112. The equilibrium constant for the following reaction at 25 °C is K.

N_2 (g) + 3 H_2 (g) ⇆ 2 NH_3(g)   ΔH = -22 kcal
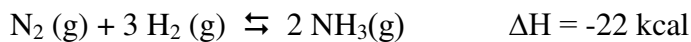
What is the value of equlibrium constant for the following reaction at 25 °C

2 N_2 (g) + 6 H_2 (g) ⇆ 4 NH_3(g)
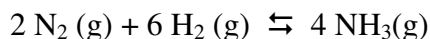
A. $\sqrt{K}$	B. K^2
C. K^{-1}	D. K

113. For the following reaction Na(s) + HCl(g) → NaCl(s) + 1/2 H_2(g), standard enthalpy of reaction ($\Delta_r H^0$) at 25 °C is -319 kJ mol^{-1}.

The $\Delta_r H^0$ for the following reaction is

2NaCl(s) + H_2(g) → 2Na(s) + 2HCl(g)
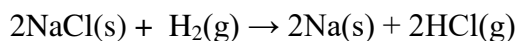
A. 319 kJ mol^{-1}	B. -319 kJ mol^{-1}
C. -638 kJ mol^{-1}	D. 638 kJ mol^{-1}

114. Which one of the following is not an electrolyte

A. NaCl	B. HNO_3
C. KOH	D. CO_2

115. At 80 °C the vapour pressure of pure liquid A is 560 mm of Hg and that of pure liquid B is 960 mm of Hg. If a mixture solution of A and B boils at 80 °C and 1 atm pressure, the amount of A in the mixture is

A. 34 mol percent	B. 34 mol percent
C. 50 mol percent	D. 52 mol percent

116. Specific conductance of 0.2 M nitric acid is 0.13 ohm^{-1} cm^{-1}. The molar conductance of the solution is

A. 315 ohm^{-1} cm^2 mol^{-1}	B. 6.3 ohm^{-1} cm^2 mol^{-1}
C. 63.0 ohm^{-1} cm^2 mol^{-1}	D. 650 ohm^{-1} cm^2 mol^{-1}

117. Given the following values of standard electrode potentials at 25 °C.

$Cl_2 + 2e^- \rightarrow 2\ Cl^-$ 1.36 V
$I_2 + 2e^- \rightarrow 2\ I^-$ 0.54 V
$Ag^+ + e^- \rightarrow Ag$ 0.799 V
$Au^+ + e^- \rightarrow Au$ 1.69 V
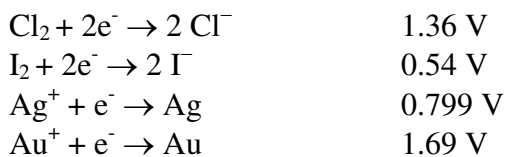
Identify the correct statement.

A. Ag^+ is oxidized by I_2	B. Iodide ion is oxidized by Cl_2
C. Au^+ is oxidized by Cl_2	D. Chloride ion is oxidized by I_2

118. Ionic solids with Schottky defects contain in their structure

A. Anion vacancies and interstitial anions	B. Cation vacancies only
C. Cation vacancies and interstitial cations	D. Equal number of cation and anion vacancies

119. A certain heat engine operates between 727 °C and 227 °C. What is the maximum efficiency of the engine?

A. 0.31	B. 0.25
C. 0.69	D. 0.50

120. The factor which changes equilibrium constant of the reaction

    $A(g) + 3\ B(g) \leftrightarrows 4\ C(g) + Heat$
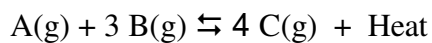
A. Total pressure	B. Amounts of A and B
C. Temperature	D. Catalyst

PHARMACY-Diploma, Lateral Entry, 2015

1. Acetazolamide inhibits the enzyme carbonic anhydrase. The inhibition is
   (A) Non-competetive
   (B) Un-competetive
   (C) Competetive
   (D) None of the above.

2. Among the purine alkaloids, which compound has the highest diuretic activity:
   (A) 1, 3-Dimethyl Xanthine
   (B) 1, 7-Dimethyl Xanthine
   (C) 3, 7-Dimethyl Xanthine
   (D) 1, 3, 7-Trimethyl Xanthine.

3. Most alkaloids occur in nature as
   (A) Free bases
   (B) Water soluble salts
   (C) Alcohol soluble salts of organic acids
   (D) Insoluble salts of organic acids.

4. Diazepam acts by
   (A) Interfering with gamma amino butyric acid
   (B) Inhibiting monoamine oxidase
   (C) Interacting with serotonin
   (D) Interacting with adrenaline.

5. Tranyl cypromine has the following characteristic(s)
   (A) It is MAO inhibitor
   (B) It is a phenyl amine derivative
   (C) It is trans-isomer
   (D) All the above.

6. Amino glycoside antibiotics exert their action primarily by inhibiting
   (A) Mitochondrial oxygen transport
   (B) Protein synthesis at ribosome level
   (C) Protein transport across membranes
   (D) Biogenesis of membranes.

7. The chill observed in malaria is due to
   (A) Increase in erythrocyte count
   (B) Bursting of erythrocyte releasing merozoites
   (C) Increase in tissue primary schizonts
   (C) None of the above

8. According to Stokes law, creaming is indirectly proportional to
   (A) Gravity
   (B) Viscosity of the medium
   (C) Radius of dispersed phase
   (D) Density of dispersed phase.

9. Transdermal applications are popular for the administration of
   (A) Antidiabetic drugs
   (B) Cardiac stimulants
   (C) Tranquilisers
   (D) Coronary vasodialators.

10. Fluidised bed drier is well adopted in the pharmaceutical industry for the drying of
    (A) Powders before filling capsules
    (B) Granules before compression into tablets
    (C) Empty capsules before filling
    (D) Powders before mixing and granulation

11. A type of flow in which viscosity increases when the substance is agitated is
    (A) Dilatant
    (B) Newtonian
    (C) Plastic
    (D) Pseudoplastic.

12. While dispensing Pyrantal pamoate, a pharmacist should warn the patient that
    (A) It causes drowsiness
    (B) It should be taken with food
    (C) It colours urine blue
    (D) It colours faces red.

13. In combination with dapsone the drug chosen to be administered for the treatment of leprosy is
    (A) Clofazimine
    (B) Streptomycin
    (C) Penicillin
    (D) Chloromycetin.

14. To understand the drug receptor interactions it is necessary to quantify the relationship between
    (A) Drug and its toxicity
    (B) Drug and its absorption
    (C) Drug and its biological effect
    (D) Drug and its metabolic product.

15. Penicillinase resistant penicillin is
    (A) Amoxycillin
    (B) Ampicillin
    (C) Penicillin
    (D) Methicillin.

16. Morphine is present in
    (A) Atropa belladona   (B) Papaver somniferum
    (C) Ricinus communis   (D) Solanum nigrum.
17. Ranitidine inhibits gastric secretion as a result of
    (A) Inhibition of H_1 receptors   (B) Inhibition of H_2 receptors
    (C) Inhibition of nicotinic receptors   (D) Inhibition of muscarinic receptors.
18. For film coating, the following ingredients are commonly used except
    (A) Povidone   (B) Polyethylene glycol
    (C) Carnauba wax   (D) Hydroxy propyl methyl cellulose.
19. Tyndallisation means
    (A) Successive autoclaving with a bactericide (B) Successive heating with a bactericide
    (C) Successive heating at low temperature   (D) Successive autoclaving at low
    temperature and incubation.
20. Morphine and heroin differ from each other in respect of
    (A) Methyl group on Nitrogen   (B) Acetyl groups at C_3 and C_6
    (C) Absence of double bond between C_5 and C_6 (D) Absence of D ring.
21. Gray baby syndrome is due to the indiscriminate use of
    (A) Streptomycin   (B) Chloramphenicol
    (C) Penicillin   (D) Tetracycline.
22. In the preparation of tablets, powdered medications are mixed by moistening
    (A) To reduce the total volume   (B) To increase absorption
    (C) To increase adhesiveness   (D) To reduce inter particulate friction.
23. One nanometer (nm) is equal to
    (A) 10^{-5} cm   (B) 10^{-6} cm
    (C) 10^{-7} cm   (D) 10^{-8} cm
24. Cholinergic receptor present on intestinal muscle is
    (A) H_2 receptor   (B) Muscarinic receptor
    (C) Nicotinic receptor   (D) Beta receptor.
25. Injection of Insulin I.P. should be kept at pH between
    (A) 5 and 5.5   (B) 3 and 3.5
    (C) 7 and 7.5   (D) 9 and 9.5
26. Metronidazole inhibits anaerobic bacteria and protozoa by
    (A) Affecting the structure of DNA molecule of organism (B) Destroying the ribosomes
    (C) Inhibiting the cytochrome system   (D) Inhibiting protein systhesis.
27. Papaverine is an alkaloid which is used for
    (A) Cough suppression   (B) Analgesia
    (C) Skeletal muscle contraction   (D) Vasodilation.
28. The concentration of sucrose in simple syrup B.P. is
    (A) 85%$_{W/W}$ (B) 60.70%$_{W/W}$
    (C) 66.70%$_{W/W}$ (D) 40.74%$_{W/W.}$
29. The HLB value of sodium lauryl sulphate is
    (A) 6.5   (B) 13.8
    (C) 25.0   (D) 40.0
30. The disintegrating time for sugar coated tablet is
    (A) 30 Minutes   (B) 45 Minutes
    (C) 60 Minutes   (D) 75 Minutes.
31. Anti hypertensive drug which inhibits the rennin angiotensin system is
    (A) Reserpine   (B) Captopril
    (C) Methyl dopa   (D) Propranalol.

32. The various penicillins which are available differ chemically
    (A) In the nature of the acyl side chain   (B) In substituents on the fused ring nucleus
    (C) In spatial arrangements of atoms around an asymmetric carbon (D) In the nature of
    the original (naturally occuring) nucleus.
33. At ovulation there will be the highest hormonal levels of
    (A) Follicle-stimulating hormone (FSH)   (B) Luteinizing hormone (FH)
     (C) Both FSH and LH   (D) Progesterone.
34. Which of the following antagonizes the action of sulfonamides?
    (A) Streptomycin   (B) Penicillin G
    (C) Morphine   (D) p-Aminobenzoic acid.
35. Which of the following tetracycline has the longest duration of action?
    (A) Tetracycline   (B) Doxycycline
    (C) Demeclocycline   (D) Methacycline.
36. Gluconeogenesis occurs primarily in the
    (A) Adrenal cortex   (B) Liver
     (C) Kidney   (D) Skeletal muscle.
37. Which of the following drugs is most useful in the relief of acute attacks of gout?
    (A) Probenecid   (B) Aspirin
     (C) Meperidine   (D) Colchicine .
38. After oral administration, the greatest amount of iron absorption occurs in the
    (A) Duodenum   (B) Stomach
     (C) Sigmoid portion of the large intestine (D) Transverse portion of the large intestine
39. "Devil's dung" is the synonym of
    (A) Datura   (B) Cannabis
    (C) Nux-vomica   (D) Asafoetida.
40. Measles vaccination is given at
    (A) Birth   (B) 3-5 Months
    (C) 9-12 Months   (D) Before 9 months
41. Do not drive vehicles when on therapy
    (A) Aspirin   (B) Diphenhydramine
    (C) Tetracycline   (D) Amoxycillin.
42. Bisacodyl should be taken at
    (A) Morning   (B) Evening
     (C) Thrice daily   (D) Night.
43. Tablet hardness range is normally
    (A) 0.2-0.5 kg/sq.cm   (B) 0.5-1.0 kg/sq.cm
     (C) 1.0-2.0 kg/sq.cm   (D) 3.5-7.0 kg/sq.cm
44. The plague is caused by
    (A) Bacteria   (B) Virus
     (C) Parasite   (D) Fungus.
45. Central drug research institute is situated in
    (A) Kasauli   (B) Izatnagar
     (C) Lucknow   (D) Kolkata.
46. One fl.ounce is equal to
    (A) 15 ml   (B) 30 ml
    (C) 60 ml   (D) 120 ml.
47. 1 grain is equal to
    (A) 15 mg   (B) 30 mg
     (C) 60 mg   (D) 120 mg.

48. Which of the following steroid shows predominant mineralo-corticoid action?
    (A) Hydrocortisone   (B) Spiranolactone
    (C) Dexamethasone   (D) Fludrocortisone.

49. Chemically oils and fats are
    (A) Glyceryl esters of higher fatty acid   (B) Acetyl esters of higher fatty acid
    (C) Ethyl esters of higher fatty acid   (D) Methyl esters of higher fatty acid.

50. Before washing the ampoules the mouth of each ampoule is rotated in Bunsen flame to melt down the round edges. This process is called
    (A) Flamming   (B) Charging
    (C) Annacaling   (D) Grounding.

51. Peripheral neurotransmitter is
    (A) Histamine   (B) Nor adrenaline
    (C) Hydroxy tryptamine   (D) Prostagladin.

52. Liquid Paraffin exhibits
    (A) Plastic flow   (B) Newtonian flow
    (C) Pseudoplastic flow   (D) Dilatant flow.

53. Powdered digitalis is dried at a temperature
    (A) Not exceeding 60^0 C   (B) 65^0 C
    (C) 75^0 C   (D) 100^0 C.

54. Indian (Tinnevelly) and African senna leaves differ from other with respect to
    (A) Stomatal number   (B) Vein-islet number
    (C) Colour   (D) All of the above.

55. Ellipsoidal schizolysigenous oil glands are important diagnostic characteristics of
    (A) Ergot   (B) Ginseng
    (C) Cinnamon   (D) Clove.

56. In osteoporosis, which of the following occur
    (A) amount of Ca^{2+} is decreased   (B) amount of bone is decreased
    (C) bone formation exceeds bone resorption (D) none of the above.

57. Haemolytic anaemia due to erythrocyte deficiency of glucose-6-phosphate dehydrogenase(G6PD) would most likely be precipitated by
    (A) Primaquin   (B) Ascorbic Acid
    (C) Isoniazid   (D) Phenytoin

58. For general anesthesia, Thiopentone sodium is administered
    (A) Orally   (B) Intramuscularly
    (C) Intravenously   (D) Topically

59. Antibiotic that acts on 30S subunit of bacterial ribosome
    (A) Erythromycin   (B) Chloramphenicol
    (C) Tetracycline   (D) Penicillin

60. Antihistaminic drug with highly sedative action is
    (A) Diphenhydramine   (B) Pheniramine
    (C) Cyclizine   (D) Terfenadine