

**104 Test in Physics Chemistry and Biology for Five year Integrated MSc**

1. Force between two charges is given by
  - (A)  $\frac{Qq}{4\pi\epsilon_0 r^2}$
  - (B)  $\frac{Qq}{4\pi\epsilon_0 r^3}$
  - (C)  $\frac{Qq}{4\pi\epsilon_0 r}$
  - (D) Zero
  
2. Which quantity is same when resistances are connected in parallel?
  - (A) Current
  - (B) Potential difference and Current
  - (C) Potential difference
  - (D) Capacitance
  
3. How much power is dissipated when 2 A current passes through a wire of 10 Ohm resistance?
  - (A) 40 watt
  - (B) 30 watt
  - (C) 20 watt
  - (D) 10 watt
  
4. Magnetic field is produced by
  - (A) rest charge alone
  - (B) moving charge alone
  - (C) moving charge with intrinsic magnetic moment
  - (D) intrinsic magnetic moment alone
  
5. Which magnetism shows Curie temperature?
  - (A) Diamagnetism
  - (B) Paramagnetism
  - (C) Ferromagnetism
  - (D) Ferrimagnetism
  
6. Inconsistency of Ampere's circuit law is due to

- (A) standard current
- (B) flow of current
- (C) displacement current
- (D) zero current

7. What are the components present in electromagnetic waves?

- (A) Electric field
- (B) Electric field and velocity
- (C) Magnetic field
- (D) Electric field and Magnetic field

8. Which radiation is having higher energy in electromagnetic spectrum?

- (A) X-ray
- (B) Gamma ray
- (C) Microwave
- (D) Radio wave

9. What is the frequency of LC circuit?

- (A)  $\frac{1}{2\pi\sqrt{LC}}$
- (B)  $\frac{1}{2\pi LC}$
- (C)  $2\pi\sqrt{LC}$
- (D)  $2\pi LC$

10. If the focal length of a lens is 2 cm, then its power is

- (A) 3 dioptre
- (B) 0.4 dioptre
- (C) 0.7 dioptre
- (D) 0.5 dioptre

11. The angle of incidence at which reflected light is totally polarised for reflection from air to glass (refractive index  $n$ ), is
- (A)  $\tan^{-1}(1/n)$
  - (B)  $\sin^{-1}(1/n)$
  - (C)  $\sin^{-1}(n)$
  - (D)  $\tan^{-1}(n)$
12. The number of electron in  $M$  shell is limited to
- (A) 2
  - (B) 10
  - (C) 18
  - (D) 32
13. Which of the following ray is emitted during the radioactive decay process?
- (A) Alpha ray
  - (B) Gamma Ray
  - (C) Beta ray
  - (D) All the above
14. Formation of shadows can be explained by
- (A) rectilinear propagation of light
  - (B) curvilinear propagation of light
  - (C) the total internal reflection
  - (D) refraction
15. When the temperature of the semiconductor is increased, its
- (A) resistivity increases
  - (B) charge carrier reduces
  - (C) conductivity increases
  - (D) temperature coefficient becomes zero
16. Which of the following is an active device?
- (A) Electric bulb
  - (B) Transformer
  - (C) Silicon controlled rectifier
  - (D) Loud speaker

17. The material suitable for making electromagnets should have
- (A) high retentivity and high coercivity
  - (B) low retentivity and low coercivity
  - (C) high retentivity and low coercivity
  - (D) low retentivity and high coercivity
18. A carbon resistor has color code as Brown, Black, Blue and Silver. The resistance and tolerance values are
- (A)  $10\text{ M}\Omega \pm 10\%$
  - (B)  $20\text{ M}\Omega \pm 5\%$
  - (C)  $10\text{ M}\Omega \pm 5\%$
  - (D)  $20\text{ k}\Omega \pm 10\%$
19. Which unit is appropriate for specifying magnetic induction?
- (A) Tesla
  - (B) V/m
  - (C)  $\text{A/m}^2$
  - (D) Henry
20. Two particles  $A$  and  $B$  initially at rest move towards each other by mutual forces of attraction. At an instant when the speed of  $A$  is  $V$  and the speed for  $B$  is  $2V$ , then the speed of centre of mass is
- (A)  $1V$
  - (B)  $2V$
  - (C)  $3V$
  - (D) Zero
21. The blue colour of the sky is due to
- (A) reflection of sunlight
  - (B) polarization of sunlight
  - (C) scattering of sunlight
  - (D) refraction of sunlight
22. Which of the following statements is wrong?
- (A) Sound travels in a straight line
  - (B) Sound travels as waves
  - (C) Sound is a form of energy
  - (D) Sound travels faster in vacuum than that in air

23. A proton and an electron are accelerated through the same accelerating potential. Which one of these two has the greater momentum?
- (A) Proton
  - (B) Electron
  - (C) Equal momentum
  - (D) Zero momentum
24. In a circuit containing inductor and resistor, as the frequency of the applied alternating current increases, the impedance
- (A) remain constant
  - (B) decreases
  - (C) first increases and then decreases
  - (D) increases
25. How many electron flow per second in 1 Ampere of current?
- (A)  $6.25 \times 10^{18}$
  - (B)  $6 \times 10^{18}$
  - (C)  $1.6 \times 10^{19}$
  - (D)  $1.6 \times 10^{23}$
26. If copper and silicon are heated, then their resistance will
- (A) increase and decrease respectively
  - (B) increase and increase respectively
  - (C) decrease and increase respectively
  - (D) decrease and decrease respectively
27. The unit of Universal Gravitational constant is
- (A)  $\text{Nm}^2/\text{kg}^2$
  - (B)  $\text{Nm}/\text{kg}^2$
  - (C) Unit less
  - (D)  $\text{m}/\text{s}^2$

28. Adiabatic expansion of a gas results in
- (A) heating
  - (B) cooling
  - (C) no change in temperature
  - (D) initial cooling and then heating
29. The function of the moderator in the nuclear reactor is to
- (A) decrease the speed of neutron
  - (B) increase the speed of neutron
  - (C) fuel the reactor
  - (D) increase the temperature of the reactor
30.  $\int \frac{dx}{\sqrt{2ax - x^2}} = a^n \sin^{-1}\left(\frac{x}{a} - 1\right)$ , then the value of  $n$  is
- (A) 0
  - (B) -1
  - (C) 1
  - (D) -2
31. A raindrop falls near the surface of the earth with almost uniform velocity because
- (A) its weight is negligible
  - (B) the force of surface tension balances its weight
  - (C) the force of viscosity of air balances its weight
  - (D) the drops are charged and atmospheric electric field balances its weight
32. The susceptibility of magnesium at 300 K is  $1.2 \times 10^{-5}$ . At what temperature will the susceptibility increase to  $1.8 \times 10^{-5}$ ?
- (A) 400 K
  - (B) 300 K
  - (C) 600 K
  - (D) 200 K

33. A convex lens is placed 8 cm from a light source and it makes a sharp image on a screen, kept 8 cm from the lens. Now a glass block (refractive index 1.5) of 1.2 cm thickness is placed in contact with the light source. To get the sharp image again, the screen is shifted by a distance  $d$ . Then  $d$  is
- (A) 0.44 cm towards the lens
  - (B) 1.6 cm away from the lens
  - (C) 0.44 cm away from the lens
  - (D) 0
34. The resistance of  $3\ \Omega$  and  $6\ \Omega$  are joined in series are connected across a battery of emf 10 V and internal resistance  $1\ \Omega$ . The power dissipated by the battery is
- (A) 3 W
  - (B) 8 W
  - (C) 9 W
  - (D) 10 W
35. Consider two light sources of wavelength  $\lambda_1$  and  $\lambda_2$  ( $\lambda_2 > \lambda_1$ ) which are emitting  $n_1$  and  $n_2$  photons respectively, in a given time. Assume equal power for both sources, then
- (A)  $n_1 > n_2$
  - (B)  $n_1 < n_2$
  - (C)  $n_1 = n_2$
  - (D) None of the above
36. As the orbit number increases, the distance between two consecutive orbits in an atom
- (A) increases
  - (B) decreases
  - (C) remains the same
  - (D) first increases and then becomes constant
37. For audible sound, the time interval between two words should be
- (A) 0.1 s
  - (B) 3 s
  - (C) 0.4 s
  - (D) 2 s

38. If  $S$  is stress and  $Y$  is Young's modulus of material of a wire, the energy stored in the wire per unit volume is
- (A)  $2S^2Y$
  - (B)  $S^2/2Y$
  - (C)  $2Y/S^2$
  - (D)  $S/2Y$
39. If a charge  $Q$  is to be divided into two parts  $q$  and  $(Q - q)$ , such that the force between them is maximum at a certain distance, then the value of  $q$  must be
- (A)  $Q/3$
  - (B)  $Q/2$
  - (C)  $Q/4$
  - (D)  $3Q/4$
40. If the electric field in a region of space is given by  $5\mathbf{i} + 4\mathbf{j} + 9\mathbf{k}$ . The electric flux through a surface of area 20 units lying in the  $y$ - $z$  plane is
- (A) 100 units
  - (B) 4 units
  - (C) 500 units
  - (D) 44 units
41. A 25 Watt -220 V bulb and 100 Watt-220 V bulb are connected in series across 220 V line. Which bulb will glow more brightly?
- (A) 25 Watt bulb
  - (B) 100 Watt bulb
  - (C) Both will glow with equal brightness
  - (D) Each bulb will glow bright alternatively
42. A proton is projected horizontally eastward in a uniform magnetic field which is horizontal and southward in direction. The proton will be deflected
- (A) upward
  - (B) downward
  - (C) southward
  - (D) northward



43. Two long parallel wires separated by a distance 'r' have equal current 'I' flowing in each. The magnetic field of one exerts a force 'F' on the other. If the distance between them is doubled and the current in each wire is halved, the force between them will become
- (A) 4 F
  - (B) unchanged
  - (C) F / 4
  - (D) F / 8
44. The magnetic field energy in an inductor changes from maximum value to minimum value in 2.5 ms, when connected to an AC source. The frequency of the source is
- (A) 100 Hz
  - (B) 400 Hz
  - (C) 50 Hz
  - (D) 25 Hz
45. Alternating current / e.m.f measuring instrument measures its
- (A) peak value
  - (B) r.m.s value
  - (C) average value
  - (D) square of current and voltage
46. In vacuum, the speed of electromagnetic waves depend up on
- (A) wavelength
  - (B) frequency
  - (C) electric and magnetic field
  - (D) None of the above
47. A convex mirror has a focal length 'f'. A real object placed at a distance 'f' in front of it from the pole produces an image at
- (A) infinity
  - (B) f
  - (C) f/2
  - (D) 2f

48. The refracting angle of a prism is  $A$  and refractive index of the material of the prism is  $\cot A/2$ . Then, the angle of minimum deviation is
- (A)  $180 - 3A$
  - (B)  $180 + 2A$
  - (C)  $90 - A$
  - (D)  $180 - 2A$
49. Which one of the following cannot be polarised?
- (A) Radio waves
  - (B) Ultraviolet rays
  - (C) Infrared rays
  - (D) Ultrasonic waves
50. Threshold wavelength for a metal having work function  $\phi_0$  is  $\lambda$ . What is the threshold wavelength for the metal having work function  $\phi_0/2$ ?
- (A)  $4\lambda$
  - (B)  $2\lambda$
  - (C)  $\lambda$
  - (D)  $\lambda/2$
51. Bohr's atomic model cannot explain
- (A) quantization of the angular momentum of the orbiting electrons
  - (B) emission of photon due to the transition of electron from one orbit to other
  - (C) intensity of spectral lines
  - (D) spectral series of hydrogen like atom
52. The process underlying  $\beta$ -decay is the
- (A) conversion of neutron to proton
  - (B) conversion of proton to neutron
  - (C) emission of gamma rays
  - (D) emission of helium nucleus
53. A sample of radioactive element has a mass of 10 gm at an instant  $t = 0$ . The approximate mass of the element in the sample after two mean lives is
- (A) 2.5 gm
  - (B) 3.7 gm
  - (C) 6.30 gm
  - (D) 1.35 gm

54. A potential difference of  $V$  is applied at the ends of a copper wire of length ' $l$ ' and diameter ' $d$ '. On doubling the ' $d$ ' value, the drift velocity
- (A) becomes two times
  - (B) becomes half
  - (C) becomes one fourth
  - (D) does not change
55. If a resistance is introduced in series with the cell in the secondary circuit of a potentiometer, the balancing length
- (A) increases
  - (B) decreases
  - (C) remains the same
  - (D) cannot be found
56. A vernier calliper has its main scale of 10 cm equally divided into 200 equal parts. Its vernier scale of 25 divisions coincides with 12 mm on the main scale. The least count of the instrument is
- (A) 0.020 cm
  - (B) 0.002 cm
  - (C) 0.010 cm
  - (D) 0.001 cm
57. A body starts from rest and with a uniform acceleration of  $10 \text{ ms}^{-2}$  for 5 seconds. During the next 10 seconds, it moves with uniform velocity. The total distance traveled by the body is
- (A) 100 m
  - (B) 125 m
  - (C) 500 m
  - (D) 625 m
58. Two capacitors of equal capacity are first connected in parallel and then in series. The ratio of the total capacities in the two cases will be
- (A) 2 : 1
  - (B) 1 : 2
  - (C) 4 : 1
  - (D) 1 : 4

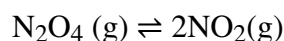
59. The strength of the magnetic field of a vibration magnetometer is increased to 4 times its original value. The frequency of oscillation of the magnet would then become

- (A) twice
- (B) four times
- (C) half
- (D) one-fourth

60. An endoscope is employed by a physician to view the internal parts of a body organ. It is based on the principle of

- (A) refraction
- (B) reflection
- (C) total internal reflection
- (D) dispersion

61. What will be the direction in the following reaction upon increasing pressure of the system?



- (A) Formation of  $\text{N}_2\text{O}_4$  favored
- (B) Formation of  $\text{NO}_2$  favored
- (C) No change in reaction
- (D) Increase in equilibrium constant

62. When solid  $\text{NH}_4\text{Cl}$  is added to  $\text{NH}_4\text{OH}$  solution, the equilibrium shifts to the left, due to

- (A) common ion effect
- (B) buffer formation
- (C) neutralization
- (D) keep pH constant

63. The obtained slope in the Arrhenius plot of  $\log k$  Vs  $\frac{1}{T}$  is equal to

- (A)  $\frac{E_a}{R}$
- (B)  $-\frac{E_a}{R}$
- (C)  $\frac{E_a}{(2.303)R}$

(D)  $-\frac{E_a}{(2.303)R}$

64. If the first order rate constant for a reaction is  $6.93 \times 10^{-4} \text{ s}^{-1}$ , calculate the half life for the reaction.

- (A) 100 s
- (B) 200 s
- (C) 500 s
- (D) 1000 s

65. The standard  $E_{\text{red}}^0$  values of A, B and C are 0 V, +0.68 V and -0.50 V, respectively. The order of their power as reducing agent is

- (A)  $B > A > C$
- (B)  $A > B > C$
- (C)  $C > A > B$
- (D)  $C > B > A$

66. If the ratio of composition of oxidised and reduced species in an electrochemical cell is given as  $\frac{[O]}{[R]} = e^2$ , the correct potential difference will be

- (A)  $E - E^0 = +\frac{2RT}{nF}$
- (B)  $E - E^0 = -\frac{2RT}{nF}$
- (C)  $E - E^0 = +\frac{RT}{nF}$
- (D)  $E - E^0 = -\frac{RT}{nF}$

67. If we pass 1 Coulomb of charge in an electrolytic cell, then 10 mg of substance will get deposited. Calculate the gram equivalent of the substance.

(1 Faraday = 96500 C)

- (A) 9.65
- (B) 96.5
- (C) 965
- (D) 9650

68. The packing fraction efficiency of a simple cubic lattice is close to

- (A) 34.0%
- (B) 52.4%
- (C) 68.0%
- (D) 74.0%

69. How many NaCl are in the unit cell of sodium chloride crystal?

- (A) 1
- (B) 2
- (C) 3
- (D) 4

70. Alkali halides do not show Frenkel defect because

- (A) cations and anions have high coordination number
- (B) cations and anions have low coordination number
- (C) anions cannot be accommodated in voids
- (D) cations and anions have almost equal size

71. Coordination number for body centered cubic is

- (A) 2
- (B) 4
- (C) 6
- (D) 8

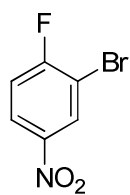
72. Which one of the following is **NOT** applicable to chemisorption?

- (A) Its heat of adsorption is high
- (B) It takes place at high temperature
- (C) It is reversible
- (D) It forms mono-molecular layers

73. Lyophilic colloids are stable due to

- (A) small size of the particle
- (B) large size of the particle
- (C) layer of dispersion medium on the particle
- (D) high Tyndall effect

74. IUPAC name for the following compound is



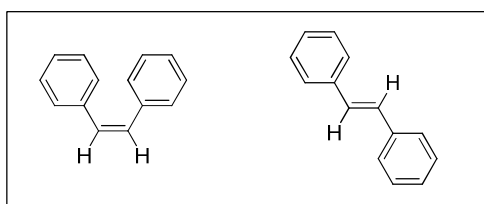
- (A) 2-bromo-1-fluoro-4-nitrobenzene
- (B) 3-bromo-4-fluoro-1-nitrobenzene
- (C) 2-fluoro-5-nitro-1-bromobenzene
- (D) 1-bromo-6-fluoro-3-nitrobenzene

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75. Dumas method is preferred over Kjeldahl's method for determining nitrogen quantitatively in

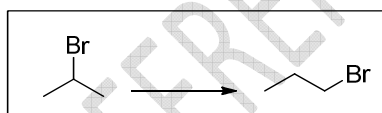
- (A) explosives such as trinitrotoluene
- (B) aminoacids
- (C) amides
- (D) compounds containing both sulfur and nitrogen

76. Pick the statement that is **NOT** true for a pair of cis and trans isomers such as 1,2-diphenylethene (stilbene).



- (A) trans isomer has a higher melting point
- (B) trans isomer has higher heat of combustion
- (C) trans isomer has a higher retardation factor ( $R_f$ ) in adsorption chromatography over silica gel
- (D) planarity is better maintained in the trans isomer

77. How will you selectively convert 2-bromopropane to 1-bromopropane?



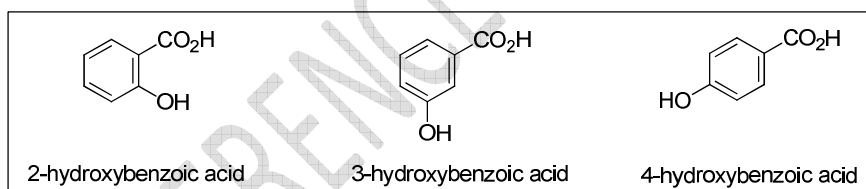
- (A) Treatment with alcoholic potassium chloride followed by reaction with HBr
- (B) Reaction with metallic sodium followed by reaction with bromine
- (C) Reaction with magnesium metal followed by treatment with HOBr
- (D) Reaction with alcoholic potassium hydroxide followed by heating with HBr in the presence of benzoyl peroxide.

78. Pick the **WRONG** statement about propyne.

- (A) Addition of excess HBr to propyne gives 1,2-dibromopropane
- (B) It is less acidic than acetylene
- (C) Upon reaction with dilute sulfuric acid in the presence of mercuric sulfate, it gives acetone as the major product
- (D) It reacts with sodamide ( $\text{NaNH}_2$ ) to give sodium propynide

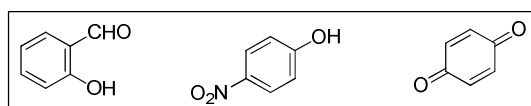


79. In aromatic electrophilic substitution reactions carried out under kinetically controlled conditions
- all activating groups are *meta* orienting
  - all deactivating groups are *ortho-para* orienting
  - all deactivating groups are *meta* orienting
  - deactivating groups possessing unshared pair of electrons on atoms directly attached to aromatic ring are *ortho-para* orienting
80. Compounds possessing certain distinct structural features give a yellow precipitate of iodoform on reacting with iodine in the presence of a base. This question is based on the ability of alcohols having no other functional groups to undergo iodoform reaction. Pick the **WRONG** statement.
- Ethanol is the only primary alcohol that gives a positive iodoform test
  - Several secondary alcohols give positive iodoform test
  - All tertiary alcohols test negative for iodoform reaction
  - All alcohols test negative for iodoform reaction
81. Acidity of compounds is decided by several factors including electrometric effects, *H*-bonding, aromaticity etc. for acids and their conjugate bases. Pick the correct statement.  $pK_a$  of

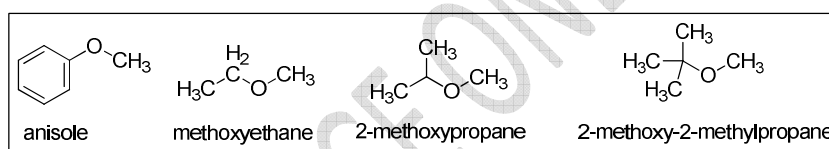


- 2-hydroxybenzoic acid > 3-hydroxybenzoic acid > 4-hydroxybenzoic acid
- 4-hydroxybenzoic acid > 3-hydroxybenzoic acid > 2-hydroxybenzoic acid
- 3-hydroxybenzoic acid > 2-hydroxybenzoic acid > 4-hydroxybenzoic acid
- 4-hydroxybenzoic acid  $\approx$  2-hydroxybenzoic acid > 3-hydroxybenzoic acid

82. The following statements are on the reactivity of phenols. Pick the **WRONG** statement.



- (A) Bubbling carbon dioxide through a solution of phenol in aqueous sodium hydroxide followed by acidification gives 2-hydroxybenzoic acid (salicylic acid)
- (B) Treatment of phenol with chloroform in the presence of sodium hydroxide followed by acidification of the reaction mixture gives 2-hydroxybenzaldehyde (salicylaldehyde)
- (C) Phenol on treatment with concentrated nitric acid gives 4-nitrophenol as the only product
- (D) Phenol on oxidation with sodium dichromate in the presence of concentrated sulfuric acid gives 1,4-benzoquinone
83. On refluxing with constant boiling hydroiodic acid (57% HI in water), most methyl ethers are cleaved to give methyl iodide and an alcohol as the products. Which among the following methyl ethers is most likely to give methanol instead of methyl iodide upon treatment with constant boiling HI?

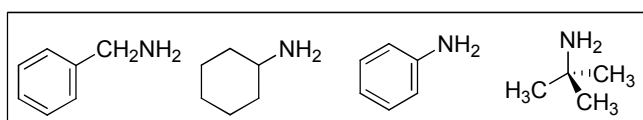


- (A) anisole
- (B) methoxyethane
- (C) 2-methoxypropane
- (D) 2-methoxy-2-methylpropane
84. Carbonyl compounds can be separated from aliphatic hydrocarbons by
- (A) extraction with acid
- (B) extraction with base
- (C) as bisulfite addition compounds by treating with sodium bisulfite
- (D) as picrates by treating with picric acid
85. Which among the following methods is **NOT** suitable for the preparation of hydrocarbons?
- (A) Meerwein-Verley-Ponndorf reduction of aldehydes
- (B) Clemmensen reduction of ketones
- (C) Wolff-Kishner reduction of aldehydes
- (D) Treatment of alkyl chlorides with metallic sodium in dry ether

86. An organic compound gave positive tests with 2,4-DNP reagent, Tollens reagent and Fehling solution. Upon treatment with iodine in the presence of sodium hydroxide it gave iodoform and methanoic acid. The compound most probably is

- (A) methanal
- (B) ethanal
- (C) ethanoic acid
- (D) acetone

87. Gabriel phthalimide synthesis is **NOT** a viable method for the direct synthesis of



- (A) benzylamine
- (B) cyclohexylamine
- (C) aniline
- (D) 2-methylpropan-2-amine

88. While  $\text{H}_2\text{S}$  and  $\text{H}_2\text{Se}$  are gases,  $\text{H}_2\text{O}$  is liquid due to

- (A) smaller size of oxygen
- (B) arrangement of molecules
- (C) presence of H-bonding
- (D) difference in bonding of their molecule

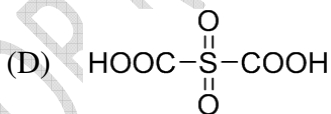
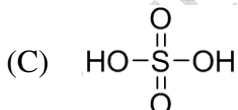
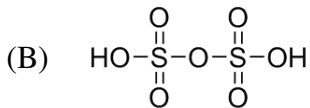
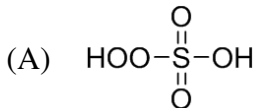
89. Cd and Cu can be separated and analyzed using

- (A) KCN
- (B)  $\text{H}_2\text{S}$
- (C)  $\text{NH}_4\text{OH}$
- (D)  $\text{H}_2\text{SO}_4$

90. What will be the product of the reaction  ${}_{26}\text{Fe}^{58}$  (d, p)?

- (A)  ${}_{25}\text{Mn}^{59}$
- (B)  ${}_{26}\text{Fe}^{60}$
- (C)  ${}_{26}\text{Fe}^{59}$
- (D)  ${}_{25}\text{Mn}^{60}$

91.  $[\text{Cu}(\text{NH}_3)_4]^{2+}$  ion has a ..... structure.
- (A) square planar  
(B) trigonal  
(C) pyramidal  
(D) tetrahedral
92. In Ellingham diagram, the slope obtained is equal to
- (A)  $\Delta G$   
(B)  $\Delta H$   
(C)  $\Delta S$   
(D)  $\Delta E$
93. How many 2c-2e centered bonds are present in diborane?
- (A) 5  
(B) 6  
(C) 4  
(D) 7
94. Choose the correct structure for Caro's acid.



95. Balmer lines are observed in
- (A) UV region  
(B) IR region  
(C) microwave region  
(D) visible region

96. Hybridization of Mn in  $\text{KMnO}_4$  is
- (A)  $sp^2$
  - (B)  $sp^2d$
  - (C)  $dsp^2$
  - (D)  $sp^3$
97. The magnetic moment for the complex  $[\text{CoF}_6]^{3-}$  is
- (A) 4.89 BM
  - (B) 1.73 BM
  - (C) 0 BM
  - (D) 5.90 BM
98. With respect to diamond and graphite, which of the following statement is **CORRECT**?
- (A) Graphite is lower thermal conductor than diamond
  - (B) Graphite is harder than diamond
  - (C) Graphite is lower bond order than diamond
  - (D) Graphite has higher electrical conductivity than diamond
99. The hybridisation and magnetic behavior of complexes  $[\text{Ni}(\text{CO})_4]$  and  $[\text{Ni}(\text{CN})_4]^{2-}$  is
- (A)  $dsp^2$  and  $sp^3$ , both are paramagnetic
  - (B)  $dsp^2$  and  $sp^3$ , both are diamagnetic
  - (C)  $sp^3$  and  $dsp^2$ , paramagnetic and diamagnetic
  - (D)  $sp^3$  and  $dsp^2$ , both are diamagnetic
100. Two electrons occupying the same orbital are distinguished by
- (A) Magnetic quantum number
  - (B) Azimuthal quantum number
  - (C) Spin quantum number
  - (D) Principal quantum number

101. A plant virus which contains a double-stranded DNA genome is
- (A) Tobacco Mosaic Virus
  - (B) Cauliflower Mosaic Virus
  - (C) Gemini virus
  - (D) Tomato leaf curl virus
102. Which of the following carries deoxygenated blood from upper half of the body to the heart?
- (A) Right coronary artery
  - (B) Left coronary artery
  - (C) Superior vena cava
  - (D) Inferior vena cava
103. Insulin consists of polypeptide chains A and B. They are linked together by
- (A) Disulfide bond
  - (B) Phosphodiester bond
  - (C) Glycosidic linkage
  - (D) Peptide bond
104. During mitosis, the spindle fibres pull the chromosomes towards the opposite poles in
- (A) Prophase
  - (B) Metaphase
  - (C) Anaphase
  - (D) Telophase
105. The phenotypic ratio of a dihybrid cross is
- (A) 12 : 3 : 1
  - (B) 15 : 1
  - (C) 9 : 6 : 1
  - (D) 9 : 3 : 3 : 1
106. The ability of a single cell to develop into an entire organism is called
- (A) Totipotency
  - (B) Differentiation
  - (C) Dedifferentiation
  - (D) Redifferentiation
107. In nephrons, the blood plasma is filtered in the
- (A) Loop of Henle
  - (B) Renal column

- (C) Renal tubule  
(D) Glomerular capsule
108. A common *in situ* treatment involving the supply of air and nutrients through wells to contaminated soil for stimulating indigenous bacteria is called
- (A) Bioventing  
(B) Biopiles  
(C) Bioreactors  
(D) Bioaugmentation
109. The phytohormone which is involved in polar transport is
- (A) Auxin  
(B) Gibberellin  
(C) Cytokinin  
(D) Brassinosteroid
110. In animal cells, pentose phosphate pathway occurs in
- (A) Endoplasmic reticulum  
(B) Peroxisome  
(C) Mitochondria  
(D) Cytoplasm
111. The distance between each base pair in a DNA double helix is
- (A) 340 nm  
(B) 34 nm  
(C) 3.4 nm  
(D) 0.34 nm
112. The largest endocrine gland in human body is
- (A) Pituitary gland  
(B) Pineal gland  
(C) Thyroid gland  
(D) Thymus gland

113. The antibiotic chloramphenicol was first produced from
- (A) *Penicillium notatum*
  - (B) *Streptomyces venezuelae*
  - (C) *Bacillus subtilis*
  - (D) *Clostridium tetani*
114. In eukaryotes, the ribosomes are made up of
- (A) 40 S subunit and 50 S subunit
  - (B) 40 S subunit and 60 S subunit
  - (C) 30 S subunit and 50 S subunit
  - (D) 30 S subunit and 60 S subunit
115. The number of chromosomes in a child with Down's syndrome is
- (A) 45
  - (B) 46
  - (C) 47
  - (D) 48
116. .... consists of a nitrogenous base, one to three phosphate groups and a sugar moiety.
- (A) Nucleoside
  - (B) Nucleoplasm
  - (C) Nucleosome
  - (D) Nucleotide
117. Which of the following occurs in the cytoplasm of eukaryotic cell?
- i. Replication
  - ii. Transcription
  - iii. Translation
- (A) i only
  - (B) iii only
  - (C) ii and iii only
  - (D) i, ii and iii
118. The compound spike type of inflorescence is seen in
- (A) Paddy
  - (B) Caesalpinia
  - (C) Sunflower
  - (D) Coconut



119. Which of the following tissue is a type of loose connective tissue?
- (A) Bone tissue
  - (B) Adipose tissue
  - (C) Mucous connective tissue
  - (D) Elastic connective tissue
120. For a human cell, total cell cycle time is approximately 24 hours. The S phase in an eukaryotic cell cycle takes place for about
- (A) 11 hours
  - (B) 8 hours
  - (C) 4 hours
  - (D) 1 hour
121. The process of engulfment and destruction of solid particles by the formation of large endocytic vesicles is called
- (A) Phagocytosis
  - (B) Pinocytosis
  - (C) Macropinocytosis
  - (D) Clathrin mediated endocytosis
122. The crown gall of tomato is caused by
- (A) *Agrobacterium tumefaciens*
  - (B) *Xanthomonas campestris*
  - (C) *Erwinia carotovora*
  - (D) *Pseudomonas solanacearum*
123. In *Neurospora crassa*, the flask shaped ascocarps are called
- (A) Cleistothecium
  - (B) Apothecium
  - (C) Perithecium
  - (D) Megathecium
124. An enzyme that catalyses the addition of an inorganic phosphate to an acceptor is called
- (A) Phosphatase
  - (B) Phosphodiesterase
  - (C) Kinase
  - (D) Phosphorylase

125. Centrioles are
- (A) Absent in plant cell
  - (B) Absent in animal cell
  - (C) Absent in both plant cell and animal cell
  - (D) Present in both plant cell and animal cell
126. The DNA fragments which are separated by gel electrophoresis are stained for visualization. The stain used for visualizing DNA fragments is
- (A) Methylene Blue
  - (B) Safranin
  - (C) Malachite green
  - (D) Ethidium bromide
127. Epinephrine is synthesized from the amino acid
- (A) Methionine
  - (B) Phenylalanine
  - (C) Tyrosine
  - (D) Tryptophan
128. The smallest, self-reproducing, gram negative bacteria, that lack cell wall are called
- (A) Actinomycetes
  - (B) Spirochetes
  - (C) Mycoplasma
  - (D) Cyanobacteria
129. In nucleus, euchromatin is a region where the chromatin is
- (A) Transcriptionally inactive
  - (B) Darkly stained
  - (C) Loosely packed
  - (D) Found in eukaryotes only
130. An enzyme which moves along the DNA helix and separates the double strand is called
- (A) DNA polymerase
  - (B) DNA ligase
  - (C) RNA polymerase
  - (D) DNA helicase

131. A quantitative technique which allows us to analyse how much DNA or RNA template is present in a given sample is
- (A) PCR
  - (B) RT-PCR
  - (C) Northern blotting
  - (D) Southern blotting
132. Stobilus is present in
- (A) *Ophioglossum*
  - (B) *Marsilea*
  - (C) *Fern*
  - (D) *Equisetum*
133. The antibody present in the colostrum is
- (A) IgA
  - (B) IgM
  - (C) IgE
  - (D) IgG
134. The karyotype of Klinefelter's syndrome is
- (A) XYY
  - (B) XO
  - (C) XXX
  - (D) XXY
135. Which of the following biologists pioneered the currently accepted definition of a biological species?
- (A) Ernst Mayr
  - (B) Charles Darwin
  - (C) Carolus Linnaeus
  - (D) R.H. Whittaker
136. Dikaryon condition is a characteristic feature of the members of
- (A) Ascomycetes and Basidiomycetes
  - (B) Ascomycetes and Phycomycetes
  - (C) Phycomycetes and Basidiomycetes
  - (D) Deuteromycetes and Phycomycetes

137. The presence of a gelatinous coating of algin outside of the vegetative cells is a characteristic feature of the alga

- (A) *Ulothrix*
- (B) *Laminaria*
- (C) *Polysiphonia*
- (D) *Chara*

138. Choose the correct answer:

Assertion : A virus is a nucleoprotein, and its genetic material is infectious.

Reason : The protein coat of viruses, made up of capsomeres, protects the nucleic acid from host nucleases and thus is critical to successful infection.

- (A) The Assertion is true and the Reason is false
- (B) The Assertion is false and the Reason is true
- (C) Both Assertion and Reason are true and the Reason is the correct explanation of the Assertion
- (D) Both Assertion and Reason are true but the Reason is not the correct explanation of the Assertion

139. Segmentation in the body is first observed in which of the following organisms?

- (A) Platyhelminthes
- (B) Aschelminthes
- (C) Arthropoda
- (D) Annelida

140. Water vascular system is the characteristic of which group of the following?

- (A) Porifera
- (B) Ctenophora
- (C) Echinodermata
- (D) Chordata

141. Which of the following is **NOT** a modified stem?

- (A) Ginger
- (B) Tendril
- (C) Zaminkand
- (D) Sweet potatoes

142. Dr. G.N. Ramachandran is famous for his outstanding scientific contribution to solving the protein structure of
- (A) Collagen
  - (B) Actin
  - (C) Albumin
  - (D) Tubulin
143. In terms of % weight, which of the following elements is present in greater amount in the human body?
- (A) Carbon
  - (B) Hydrogen
  - (C) Oxygen
  - (D) Nitrogen
144. Inhibition of succinic dehydrogenase of the Krebs' cycle by fumarate is an example of
- (A) Competitive inhibition as fumarate resembles the substrate succinate in structure
  - (B) Non-competitive inhibition as fumarate does not resemble the substrate succinate in structure
  - (C) Succinic dehydrogenase activity is not affected by any inhibitor
  - (D) Fumarate does not inhibit succinic dehydrogenase activity
145. The maximum volume of air a person can breathe in after a forced expiration is called as
- (A) Inspiratory Capacity
  - (B) Functional Residual Capacity
  - (C) Total Lung Capacity
  - (D) Vital Capacity
146. If the length of *E. coli* DNA is 1.36 mm, what will be the number of base pairs in *E.coli* genome?
- (A)  $4.0 \times 10^6$
  - (B)  $4.6 \times 10^6$
  - (C)  $4.8 \times 10^6$
  - (D)  $5.0 \times 10^6$

147. Which of the following traits in the pea plant was **NOT** studied by Gregor Mendel?
- (A) Flower position
  - (B) Pod colour
  - (C) Seed colour
  - (D) Pod number
148. Considering a dihybrid cross, what is the probability of the progeny being heterozygous at both the alleles?
- (A) 1/16
  - (B) 4/16
  - (C) 7/16
  - (D) 9/16
149. Choose the correct statements on biofertilizers.
1. *Rhizobium* forms a symbiotic association with the roots of *Medicago* plants.
  2. *Azospirillum* is free-living soil cyanobacteria that can fix atmospheric nitrogen.
  3. In paddy fields, *Nostoc* serves as a critical algal biofertilizer.
  4. Many members of the genus *Glomus* form mycorrhiza.
- (A) 1 and 3
  - (B) 2 and 4
  - (C) 1 and 4
  - (D) 2 and 3
150. Which organism has the lifespan of 100-150 years?
- (A) Crocodile
  - (B) Elephant
  - (C) Tortoise
  - (D) Parrot
151. Fruits developed only from ovary are called
- (A) False fruits
  - (B) True fruits
  - (C) Parthenocarpic fruits
  - (D) Pseudocarp

152. Hormone involved in induction of parturition
- (A) Progesterone
  - (B) Oxytocin
  - (C) Estrogen
  - (D) Androgen
153. The milk produced during the initial few days of lactation is called
- (A) Parturition
  - (B) Menopause
  - (C) Colostrum
  - (D) Ovulation
154. Analysis of traits in several generation of a family is called
- (A) Pedigree analysis
  - (B) Pleiotropy analysis
  - (C) Co-dominance analysis
  - (D) Inheritance analysis
155. Biological membrane is a
- (A) Phospholipid monolayer
  - (B) Phospholipid bilayer
  - (C) Galactolipid monolayer
  - (D) Sphingolipid monolayer
156. How many hydrogen bonds are required to form bonding between adenine and thymine?
- (A) 3
  - (B) 1
  - (C) 2
  - (D) 5
157. Chemical evolution is demonstrated by the experiment of
- (A) Charles Darwin
  - (B) Millers
  - (C) Ernest Heckel
  - (D) Hardy-Weinberg

158. Which mosquito is the transmitting agent for malaria?
- (A) *Culex*
  - (B) Female *Anopheles*
  - (C) *Aedes aegypti*
  - (D) All the above
159. Ascariasis is caused by
- (A) Round worm
  - (B) Hook worm
  - (C) Ringworm
  - (D) Filarial worm
160. The diagnostic test for AIDS is
- (A) Tissue matching
  - (B) Blood group matching
  - (C) Enzyme linked Immo-sorbent assay (ELISA)
  - (D) Widal test
161. In which method, superior males of one breed are mated with superior female of another breed?
- (A) Out-breeding
  - (B) Out-crossing
  - (C) Cross-breeding
  - (D) In-breeding
162. Sewage Primary treatment method is
- (A) Sedimentation
  - (B) Trickling filter
  - (C) Activated sludge
  - (D) Anaerobic sludge digestion
163. Biogas contains large amount of
- (A) O<sub>2</sub>
  - (B) H<sub>2</sub>
  - (C) CH<sub>4</sub>
  - (D) N<sub>2</sub>



164. The number of individuals of the population who left the habitat and gone elsewhere during the time period under consideration is called
- (A) Natality
  - (B) Mortality
  - (C) Immigration
  - (D) Emigration
165. *Agaricus* mushroom belongs to
- (A) Phycomycetes
  - (B) Ascomycetes
  - (C) Basidiomycetes
  - (D) Deuteromycetes
166. Osteocytes are present in
- (A) Heart
  - (B) Liver
  - (C) Bone
  - (D) Kidney
167. Age related disorder characterized by decreasing bone mass, increased chances of fracture and decreased level of estrogen is
- (A) Muscular dystrophy
  - (B) Arthritis
  - (C) Osteoporosis
  - (D) Gout
168. The organisms that can tolerate and thrive in a wide range of temperature are called
- (A) Eurythermal
  - (B) Steonothermal
  - (C) Euryhaline
  - (D) Stenohaline
169. Archaeobacteria which live in extreme habitat of hot springs are called
- (A) Halophiles
  - (B) Acidophiles
  - (C) Thermophiles
  - (D) Methanogens

170. Transport of molecules across the membrane in the same direction is called

- (A) Active transport
- (B) Symport
- (C) Antiport
- (D) Uniport

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**FINAL ANSWER KEY**

SI No.	Key	SI No.	Key	SI No.	Key	SI No.	Key	SI No.	Key	SI No.	Key
1	A	31	C	61	A	91	A	121	A	151	B
2	C	32	D	62	A	92	C	122	A	152	B
3	A	33	C	63	D	93	C	123	C	153	C
4	C	34	D	64	D	94	A	124	D	154	A
5	C	35	A	65	C	95	D	125	A	155	B
6	C	36	A	66	A	96	D	126	D	156	C
7	D	37	A	67	C	97	A	127	C	157	B
8	B	38	B	68	B	98	D	128	C	158	B
9	A	39	B	69	D	99	D	129	C	159	A
10	D	40	A	70	D	100	C	130	D	160	C
11	D	41	A	71	D	101	B	131	B	161	C
12	C	42	B	72	C	102	C	132	D	162	A
13	D	43	D	73	C	103	A	133	A	163	C
14	A	44	A	74	A	104	C	134	D	164	D
15	C	45	B	75	A	105	D	135	A	165	C
16	C	46	D	76	B	106	A	136	A	166	C
17	C	47	C	77	D	107	D	137	B	167	C
18	A	48	D	78	A	108	A	138	C	168	A
19	A	49	D	79	D	109	A	139	D	169	C
20	D	50	B	80	D	110	D	140	C	170	B
21	C	51	C	81	B	111	D	141	D		
22	D	52	A	82	C	112	C	142	A		
23	A	53	D	83	D	113	B	143	C		
24	D	54	D	84	C	114	B	144	D		
25	A	55	C	85	A	115	C	145	D		
26	A	56	B	86	B	116	D	146	A		
27	A	57	D	87	C	117	B	147	D		
28	B	58	C	88	C	118	A	148	B		
29	A	59	A	89	A	119	B	149	C		
30	A	60	C	90	C	120	B	150	C		

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