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*e*Medical Prep

# Model Test Paper–10

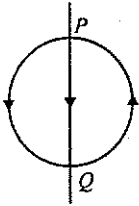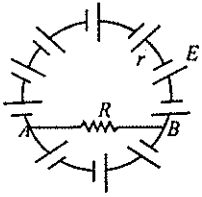*Time* : $3\frac{1}{2}$ *hours*.                                    *Maximum Marks* : 200

## PHYSICS

1.  Density of nuclear matter varies with $A$ as
    (a) $d \propto A^3$        (b) $d \propto A$
    (c) $d \propto A^2$        (d) $d \propto A^0$

2.  The unit of luminous intensity is
    (a) watt                (b) candle power
    (c) photon              (d) candela

3.  For a transistor, the current amplification factor is 0.8. The transistor is connected in C.E. configuration. The change in the collector current when the base current changes by 6 mA is
    (a) 4.8 m A             (b) 2.8 m A
    (c) 6.8 m A             (d) 5.8 m A

4.  If $I_1$ and $I_2$ be the currents in a diode under space charge limited conditions for the plate voltages of 400 volt and 200 volt respectively, then the ratio $\dfrac{I_1}{I_2}$ will be equal to
    (a) $2\sqrt{2}$          (b) $\sqrt{2}$
    (c) 2                   (d) $\dfrac{1}{2}$

5.  A double convex lens of focal length 20 cm is made of glass of refractive index $\dfrac{2}{3}$. When placed completely in water $\left( {}_a\mu_w, \dfrac{4}{3} \right)$, its focal length will be
    (a) 80 cm               (b) 17.7 cm
    (c) 15 cm               (d) 22.5 cm

6.  The K.E. of the electron is $E$ when the incident wavelength is $\lambda$. To increase the K.E. of the electron to $2\,E$, the incident wavelength must be
    (a) $\dfrac{h\lambda}{E\lambda - hc}$          (b) $\dfrac{h\lambda}{E\lambda + hc}$
    (c) $\dfrac{hc\lambda}{E\lambda + hc}$          (d) $\dfrac{hc\lambda}{E\lambda - hc}$

7.  The focal lengths of objective and the eye-piece of a compound microscope are $f_o$ and $f_e$ respectively. Then
    (a) $f_o > f_e$          (b) $f_o = f_e$
    (c) $f_o < f_e$          (d) None

8.  A plane mirror is approaching you at 10 cm per second. You can see your image in it. At what speed will your image approach you
    (a) 10 cm/sec           (b) 20 cm/sec
    (c) 5 cm/sec            (d) 15 cm/sec

9.  In Millikan's oil drop experiment an oil drop of radius $r$ and charge $q$ is held in equilibrium when the applied potential is $V$. If the radius of the drop is $2\,r$ for the same charge then the potential required to keep it in equilibrium will be
    (a) $V$                 (b) $4V$
    (c) $2V$                (d) $8V$

10. When two tuning forks $A$ and $B$ are sounded together $x$ beats/s are heard. Frequency of $A$ is $n$. Now when one prong of fork $B$ is loaded with a little wax, the number of beats/s decrease. The frequency of fork $B$ is:
    (a) $n + x$             (b) $n - x^2$
    (c) $n - x$             (d) $n - 2x$

11. A resistor $R$, an inductor $L$, a capacitor $C$ and ammeters $A_1, A_2, A_3$ and $A_4$ are connected to an oscillator in the circuit shown in the figure. When the frequency of the oscillator is increased, that at resonant frequency, the reading of ammeter $A_4$ is same as that of
    (a) $A_1$               (b) $A_3$
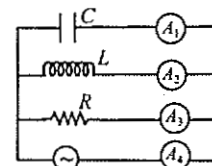
(c) $A_2$                          (d) $A_1$, $A_2$ and $A_3$

**12.** For maximum output power in D.C. motor, the induced back e.m.f. ($E$) should be
(a) applied voltage
(b) half of applied voltage
(c) double of applied voltage
(d) one third of applied voltage

**13.** A cylinder of radius $R$ made of a material of thermal conductivity $K_1$ is surrounded by a cylindrical shell of inner radius $R$ and outer radius $2R$ made of a material of thermal conductivity $K_2$. The two ends of the combined system are maintained at two different temperatures. There is no loss of heat across the cylindrical surface and the system is in steady state. The effective thermal conductivity of the system is:

(a) $K_1 + K_2$          (b) $\dfrac{K_1 K_2}{K_1 + K_2}$

(c) $\dfrac{K_1 + 3K_2}{4}$      (d) $\dfrac{3K_1 + K_2}{4}$

**14.** A step up transformer operates on a 230 volt line and supplies to a load 2 amp. The ratio of primary to secondary windings is 1 : 25. Determine the primary current.
(a) 12.5 amp          (b) 8.8 amp
(c) 50 amp            (d) 25 amp

**15.** Susceptibility has the unit of
(a) tesla            (b) $am^{-2}$
(c) $am^2$           (d) no units

**16.** When an ideal diatomic gas is heated at constant pressure, the fraction of the heat energy supplied which increases the internal energy of the gas is:
(a) (2/5)            (b) (3/7)
(c) (3/5)            (d) (5/7)

**17.** For a paramagnetic material, the dependence of the magnetic susceptibility $X$ on the absolute $T$ is given by

(a) $X \propto T$          (b) $X \propto \dfrac{1}{T}$

(c) $X \propto$ constant $\times T$   (d) $X =$ constant

**18.** The magnetic induction at the centre of a current carrying loop of radius $R$ is proportional to

(a) $R$              (b) $R^2$

(c) $\dfrac{1}{R}$          (d) $\dfrac{1}{R^2}$

**19.** The door of a working refrigerator inside a room is left open. The correct statement out of the following one is
(a) the room will be cooled slightly
(b) the room will be cooled to the temperature inside the refrigerator
(c) the room will be warmed up gradually
(d) the temperature of the room will remain unaffected

**20.** A circular coil of wire carries a current. $PQ$ is a part of very long wire carrying a current and passing close to the circular coil. If the directions of currents are those shown in figure. What is the direction of the force acting on $PQ$?



(a) parallel to $PQ$, towards $P$.
(b) at right angles to $PQ$, to the right.
(c) parallel to $PQ$, towards $Q$.
(d) at right angles to $PQ$, to the left.

**21.** There are $n$ cells each of emf $E$ and internal resistance $R$ connected as shown in figure. A resistance $r$ divided these cells into $x$ and $(n-x)$ cells. The value of current through each cell and through the resistor $r$ is



(a) 0, 0            (b) $\dfrac{E}{R}, \dfrac{E}{r}$

(c) $\dfrac{E}{r}, \dfrac{E}{R}$        (d) $\dfrac{E}{R}, 0$

**22.** For an adiabatic expansion of a prefect gas the value of $\Delta P/P$ is equal to:

(a) $\dfrac{\Delta V}{V}$          (b) $-\gamma \dfrac{\Delta V}{V}$

(c) $\gamma \dfrac{\Delta V}{V}$          (d) $-\gamma^2 \dfrac{\Delta V}{V}$

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**23.** An ammeter has a resistance $G$ ohm and a range $i$ ampere. The value of resistance used in parallel, to convert it into an ammeter of range $nI$ ampere is

(a) $nG$

(b) $(n-1)\,G$

(c) $\dfrac{G}{n}$

(d) $\dfrac{G}{n-1}$

**24.** A wire of resistance $R$ is stretched so that its length increases by 10%. The resistance of the wire increases by

(a) 11%

(b) 21%

(c) 15%

(d) 28%

**25.** The freezing point on a thermometer is marked as 20° and the boiling point as 150°. A temperature of 60°C will be ready on this thermometer will be read as:

(a) 40°

(b) 65°

(c) 98°

(d) 110°

**26.** You are travelling in a car during a thunder storm. In order to protect yourself from lightning, you would prefer to

(a) remain in the car

(b) get out and lie flat on the ground

(c) take shelter under a tree

(d) touch the nearest electrical pole.

**27.** The capacitance between the points $A$, $B$ in the circuit shown is

(a) 20 μ F

(b) 16 μ F

(c) 4 μ F

(d) 18 μ F
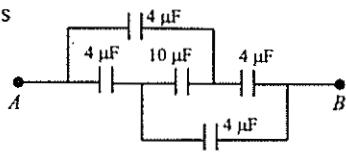
**28.** Which of the following expression does not represent SHM?

(a) $A\cos\omega t$

(b) $A\sin\omega t + B\cos\omega t$

(c) $A\sin 2\,\omega t$

(d) $A\sin^2\omega t$

**29.** In the given figure, the equivalent resistance between $A$ and $B$ is

(a) $29\,\Omega$

(b) $\dfrac{17}{24}\,\Omega$

(c) $\dfrac{4}{3}\,\Omega$

(d) $\dfrac{24}{17}\,\Omega$
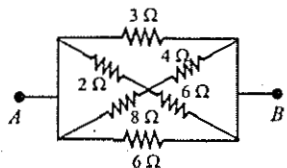
**30.** Two charges 1 μ C each of opposite polarity are separated by 0.2 m. The force acting on another 1 μ C charge placed at the midpoint on the line joining the two charges will be

(a) zero

(b) 1.8 N

(c) 0.9 N

(d) 2.7 N

**31.** Which of the following figures represents the motion of a body moving in straight line under constant acceleration:
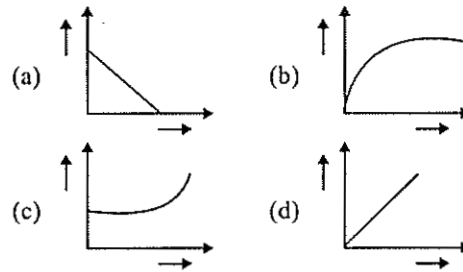
**32.** A shell is fired from a cannon with a velocity $v$ m/sec at an angle $\theta$ with the horizontal direction. At the highest point in its path, it explodes into two pieces of equal masses. One of the pieces retraces its path to the cannon and the speed in m/sec of the other piece immediately after the explosion is

(a) $\dfrac{\sqrt{3}}{2}v\cos\theta$

(b) $2v\cos\theta$

(c) $3v\cos\theta$

(d) $\dfrac{3}{2}\,v\cos\theta$

**33.** If the density of the earth becomes one half but the radius remains the same, then the value of $g$ on its surface will be

(a) $2g$

(b) $\dfrac{3g}{2}$

(c) $\dfrac{g}{2}$

(d) $\dfrac{g}{4}$

**34.** The earth's radius is $R$ and acceleration due to gravity at its surface is $g$. If a body of mass $m$ is sent to a height of $R/5$ from the earth's surface, the PE increases by:

(a) $mgh$

(b) $\dfrac{5}{6}\,mgh$

(c) $\dfrac{4}{5}\,mgh$

(d) $\dfrac{6}{7}\,mgh$

35. A ladder placed on a smooth floor slips. If at a given instant the velocity with which the ladder is slipping is $v_1$ and the velocity of that part of ladder which touching the wall is $v_2$, then the velocity of the centre of the ladder at the instant is

(a) $v_1$

(b) $\dfrac{(v_1 + v_2)}{2}$

(c) $v_2$

(d) $\dfrac{\sqrt{v_1^2 + v_2^2}}{2}$

36. If the momentum of a body increases by 50%, the K.E. will increase by

(a) 50%                     (b) 125%

(c) 100%                    (d) 150%

37. A body weighs 8 gm when placed in one pan and 18 gm when placed on the other pan of a false balance. If the beam is horizontal when both the pans are empty, the true weight of the body is

(a) 13 gm                   (b) 15.5 gm

(c) 12 gm                   (d) 15 gm

38. A stone is thrown at an angle $\theta$ with the horizontal such that the horizontal range is equal to the maximum height. The value of $\tan \theta$ will be

(a) 1                       (b) 3

(c) 2                       (d) 4

39. The displacement of particle as a function of time is shown in figure.
The figure indicates

(a) the particle starts with a certain velocity, but the motion is retarded and finally the particle stops.

(b) the acceleration of the particle is constant throughout

(c) the velocity of particle is constant throughout

(d) the particle starts with constant velocity, the motion is accelerated and finally the particle moves with constant velocity.
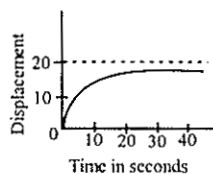
40. A block $A$ of mass 2 kg rests on another block $B$ of mass 8 kg which rests on a horizontal floor.

The coefficient of friction between $A$ and $B$ is 0.2 while that between $B$ and floor is 0.5. When a horizontal force of 25 N is applied on the block $B$, the force of friction between $A$ and $B$ is:

(a) Zero                    (b) 5.0 N

(c) 3.9 N                   (d) 49 N

**Instructions for Q. No. 41 to 60**
*Each of the questions given below consists of two statements, an assertion (A) and reason (R). Encircle the number corresponding to the appropriate response in the answer sheet as follows.*

(a) *If both assertion and reason are true and the reason is a correct explanation of the assertion.*

(b) *If both assertion and reason are true but the reason is not a correct explanation of the assertion.*

(c) *If the assertion is true, but the reason is false.*

(d) *If both assertion and reason are false.*

41. *Assertion :* Germanium is a very good conductor of electricity.
*Reason :* The number density of free electrons for germanium is $8 \times 10^{28}$ m$^{-3}$

42. *Assertion :* Semiconductors devices are easily damaged if they start to overheat.
*Reason :* At around $100 - 150°$ C breakdown in semiconductors occurs; there is a sudden fall in resistance, and a huge increase in current.

43. *Assertion :* A metal has resistance.
*Reason :* When free electrons drift through a metal, they make occasional collisions with the lattice. These collisions are inelastic and transfer energy to the lattice as internal energy.

44. *Assertion :* The conduction properties of a semiconductor can be kept unchanged by doping it with tiny amount of impurities.
*Reason :* A diode can be made by doping a piece of silicon so that a current in one direction increases its resistance while a current in the opposite direction decreases it.

45. *Assertion :* Heating engineers use $u$-values, rather than $k$-values when calculating heat losses through walls, windows and roofs.
*Reason :* The $u$-value of a single brick wall is $1.7$ Wm$^{-2}$ K$^{-1}$

46. *Assertion :* Reciprocal of resistivity is called the specific conductance.
   *Reason :* Reciprocal of resistance is called the thermal conductivity.

47. *Assertion :* When some metals are cooled towards absolute zero, a transition temperature is reached at which the resistance suddenly falls to zero.
   *Reason :* Some specially developed metal compounds have transition temperatures above 100 K.

48. *Assertion :* Total current out of a junction is equal to the total current into the junction.
   *Reason :* In a complete circuit, charge is never gained or lost.

49. *Assertion :* Many solids have a molar heat capacity close to 25 J mol$^{-1}$ K$^{-1}$
   *Reason (:* The molar heat capacity is the heat capacity per mole.

50. *Assertion :* Energy levels must have negative values.
   *Reason :* When detached from atom, an electron is at an energy level of zero. When attached, energy is given off and so the energy of electron is below zero and is, therefore, negative.

51. *Assertion :* A body can have acceleration even if its velocity is zero at a given instant of time
   *Reason :* A body is momentarily at rest when it reverses its direction of motion

52. *Assertion :* Frequency of a simple pendulum when taken to moon will be reduced to 1/6 of its value on earth
   *Reason :* The value of $g$ on the moon is 1/6 that on the earth

53. *Assertion :* The dimensions of angular momentum are ML$^2$T$^{-1}$
   *Reason :* Angular momentum is equal to the product of moment of inertia and angular velocity

54. *Assertion :* The accumulation of electrons between the anode and the cathode is called the space charge. In the absence of space charge, the potential gradient between cathode and the anode will be uniform
   *Reason :* The space charge, reduces the potential in the cathode and anode region non-uniformly

55. *Assertion :* In electrolysis, the quantity of electricity needed for depositing 1 mole of silver is different from that required for 1 mole of copper
   *Reason :* The molecular weight of silver and copper are different.

56. *Assertion :* An electron and a photon both travelling with same speed enter in a region containing a uniform magnetic field. They trace circles of equal radii but in opposite directions.
   *Reason :* The radii of the circular path traced by a charged particle is independent of the mass of the particle and depends only on the charge and the velocity of the particle.

57. *Assertion :* The phenomenon of pair production is not possible unless the energy of gamma ray photon is equal to or greater than 1.02 MeV.
   *Reason :* The rest mass of an electron is 0.51 MeV.

58. *Assertion :* When light passes from one medium to another of different density the only quantity which is unchanged is its wavelength.
   *Reason :* The wavelength is not related to the refractive index of the medium.

59. *Assertion :* A plane mirror forms a real image when a converging beam of light falls on it.
   *Reason :* When a converging beam is reflected, the angle of reflection is not equal to the angle of incidence.

60. *Assertion :* Light incident normally on the first face of an equilateral glass prism ($\mu = 1.5$) is certain to be totally internally reflected.
   *Reason :* The critical angle for the given glass is less than 60°.

## CHEMISTRY

61. What is not true about $B_2H_6$?
   (a) there are two types of H-atoms in the molecule
   (b) it has different conformations like $C_2H_6$
   (c) the molecule is electron deficient
   (d) both the boron (B) atoms lie in one plane

62. A certain unsaturated hydrocarbon on reductive ozonolysis produces glyoxal and formaldehyde. The hydrocarbon can be

(a) 1, 3-butadiene
(b) mixture of ethyne and ethane
(c) 2-butene          (d) ethyne

63. If the solubility product of MOH is $1 \times 10^{-10}$ mol$^2$ dm$^{-6}$, then pH of its aqueous solution will be   .
(a) 12               (b) 6
(c) 9                (d) 3

64. Which of the following will produce toluene with Zn dust?
(a) picric acid      (b) p-cresol
(c) benzaldehyde
(d) benzene carbaldehyde

65. Which of the following statement about $H_2O_2$ is false?
(a) it can act as oxidant as well as reductant
(b) it is a pale blue liquid
(c) the two hydroxyl groups in $H_2O_2$ lie in same plane
(d) $H_2O_2$ can be oxidised by ozone

66. Cryoscopic constant is a characteristic feature of
(a) solvent          (b) solution
(c) solute           (d) none of these

67. The number of $\pi$ bonds present in acrylonitrile is
(a) 2                (b) 3
(c) 1                (d) 4

68. A substance on treatment with dilute $H_2SO_4$ gives out a colourless gas which produces turbidity with lime water and also turns potassium dichromate green. The anion present in the substance is
(a) $CO_3^{2-}$      (b) $SO_3^{2-}$
(c) $NO_2^-$         (d) $S^{2-}$

69. $CH_3CONH_2 + P_2O_5 \longrightarrow \ldots \ldots$
The organic compound formed in the above reaction is
(a) $CH_3COOH$       (b) $CH_3CN$
(c) $CH_3CHO$        (d) $CH_3NC$

70. 4.12 mg of a certain monohydric alcohol produces 1.12 cm$^3$ of methane at STP on treatment with Grignard's reagent. The molecular mass of the alcohol is
(a) 32               (b) 16
(c) 82.4             (d) 46

71. The reagent used for protection of amino group during the nitration of aniline is
(a) acetic acid      (b) $PCl_5$
(c) acetic anhydride (d) $SOCl_2$/pyridine

72. An organic halide is shaken with aqueous NaOH followed by the addition of dil. $HNO_3$ and silver nitrate solution gave white ppt. The substance can be
(a) $C_6H_5Cl$       (b) $C_6H_5CH_2Cl$
(c) $C_6H_4(CH_3)Br$ (d) p-$C_6H_4Cl_2$

73. $X \xrightarrow{-\alpha} Y \xrightarrow{-\beta} Z \xrightarrow{-\beta} W$
In the above sequence of reaction, the elements which are isotopes of each other are
(a) X and Z          (b) Y and Z
(c) X and W          (d) Z and W

74. The compound iso-octane has the formula
(a) $C_8H_{16}$
(b) $CH_3 \cdot C(CH_3)_2 \cdot (CH_2)_3 \cdot CH_3$
(c) $(CH_3)_2CH \cdot (CH_2)C(CH_3)_3$
(d) $C_6H_5(CH_3)_2$

75. Streptomycin is effective in the treatment of
(a) tuberculosis     (b) typhoid
(c) malaria          (d) cholera

76. The radius of $n^{th}$ orbit for hydrogen is given by the expression
(a) $0.529 \times n$ Å     (b) $5.29 \times n^2$ Å
(c) $52.9 \times n^2$ Å    (d) $0.529 \times n^2$ Å

77. Ra-226 belongs to distintegration series
(a) $4n$             (b) $4n + 2$
(c) $4n + 1$         (d) $4n + 3$

78. According to VSEPR theory
(a) electron pairs around the central atom in a molecule must remain as far apart as possible
(b) a non-bonding pair of electrons takes up more room on the surface of the atom than a bonding pair
(c) both (a) and (b) are correct
(d) none of these

79. Which of the following is antiseptic dye?
(a) indigo           (b) alizarin
(c) gentian violet   (d) none of these

80.. The difference between 5.0 g and 5.00 g is that
(a) 5.0 has one significant figure while 5.00 has three significant figures
(b) both represent the same quantity
(c) 5.0 has two significant figures while 5.00 has three significant figures
(d) none of these

81. Which one of the following does not contain oxygen?
(a) bauxite          (b) dolomite
(c) cryolite         (d) zincite

82. Which of the following is the main product of reaction between $RCONH_2$ and $Br_2/KOH$?
(a) $RCH_2NH_2$         (b) $RCOOH$
(c) $R - N = C = O$    (d) $RNH_2$

83. The name *Aquadag* is associated with
(a) some kind of polymer
(b) colloidal sol of graphite in oil
(c) colloidal sol of graphite in water
(d) none of these

84. Which of the following is expected to be optically active?
(a) $CH_3CH = CH \cdot CH_3$
(b) $C_2H_5CH(CH_3)C_3H_7$
(c) $(CH_3)_4C$
(d) $(C_2H_5)_2CH \cdot CH_3$

85. Consider the reactions
$C_{(s)} + 2H_{2(g)} \rightarrow CH_{4(g)}$,        $\Delta H = -x$ kcal
$C_{(g)} + 4H_{(g)} \rightarrow CH_{4(g)}$,        $\Delta H = -x_1$ kcal
$CH_{4(g)} \rightarrow CH_{3(g)} + H_{(g)}$,        $\Delta H = +y$ kcal
The bond energy of $C - H$ bond is
(a) $x/4$ kcal $mol^{-1}$
(b) $x_1/4$ kcal mol
(c) $y$ kcal $mol^{-1}$
(d) $x_1$ kcal mol

86. For which of the following reactions is the equilibrium constant independent of temperature
(a) $N_{2(g)} + O_{2(g)} \rightleftharpoons 2NO_{(g)}$
(b) $2NO_{2(g)} \rightleftharpoons N_2O_{4(g)}$
(c) $SO_{2(g)} + \frac{1}{2}O_{2(g)} \rightleftharpoons SO_{3(g)}$
(d) equilibrium constant is never independent of temperature

87. The second ionisation potential of an element M is the energy required to
(a) remove 2 moles of electron from one mole of gaseous atoms
(b) remove one mole of electrons from one mole of any gaseous cation of the element
(c) remove one mole of electron from one mole of gaseous anion
(d) remove one mole of electrons from one mole of unipositive gaseous ion of the element

88. The co-ordination and oxidation number of $X$ in the compound $[X(SO_4)(NH_3)_5]Cl$ will be
(a) 10 and 3          (b) 6 and 3
(c) 2 and 6           (d) 6 and 4

89. If bond energies $N \equiv N$, $H - H$ and $N - H$ bonds are 945, 437 and 389 kJ respectively, $\Delta H$ for the following gaseous reaction is
$N_2 + 3H_2 \rightarrow 2NH_3$
(a) +1478 kJ          (b) -156 kJ
(c) -1478 kJ          (d) -78 kJ

90. Which of the following gaseous atoms has highest value of $IE_1$?
(a) Al                (b) Mg
(c) Si                (d) P

91. Which of the following is weakest base?
(a) $NH_3$            (b) $C_6H_5NH_2$
(c) $C_2H_5NH_2$      (d) $(C_2H_5)_2NH$

92. Isopropyl alcohol on oxidation gives
(a) acetone           (b) propanoic acid
(c) propene           (d) propane

93. Which of the following acids will be able to give silver mirror test?
(a) acetic acid       (b) carboxylic acids
(c) butyric acid      (d) formic acid

94. Identify the product $B$ in the reaction
$CH_3CHO \xrightarrow{CH_3MgI} A \xrightarrow{Hydrolysis} B$
(a) $CH_3OH$          (b) $(CH_3)_2CHOH$
(c) $CH_3CH_2OH$      (d) $(CH_3)_3COH$

95. The conductivity of an aqueous solution of strong electrolyte
(a) bears no relationship with concentration
(b) remains constant at all concentration

(c) decreases with increases dilution

(d) increases slightly with dilution

96. Which of the following has the highest protective power on lyophobic colloids?
(a) gum arabic     (b) albumin
(c) starch     (d) gelatin

97. Out of the following hydrogen halides, which one has the highest boiling point?
(a) HI     (b) HCl
(c) HBr     (d) HF

98. When formaldehyde is heated with ammonia, the compound formed is
(a) methylamine
(b) hexamethylenetetramine
(c) amino formaldehyde
(d) formalin

99. For the transformation $^{14}_{7}N + ? \rightarrow ^{14}_{6}C + ^{1}_{1}H$ bombarding particle is
(a) proton     (b) deutron
(c) neutron     (d) electron

100. The hybrid state of positively charged carbon in vinyl ($CH_2 = CH^+$) cation is
(a) $sp^2$     (b) $sp^3$
(c) $sp$     (d) unpredictable

**Instructions for Q. No. 101 to 120**
*Each of the questions given below consists of two statements, an assertion (A) and reason (R). Encircle the number corresponding to the appropriate response in the answer sheet as follows.*
(a) *If both assertion and reason are true and the reason is a correct explanation of the assertion.*
(b) *If both assertion and reason are true but the reason is not a correct explanation of the assertion.*
(c) *If the assertion is true, but the reason is false.*
(d) *If both assertion and reason are false.*

101. *Assertion* : The dipolemoment of $CH_3F$ is greater than that of $CHCl_3$.
*Reason :* Fluorine has greater electron affinity than that of chlorine.

102. *Assertion* : Stanous chloride ($SnCl_2$) is a non-linear molecule.

*Reason :* In $SnCl_2$ molecule Sn atom is present in *sp* hybridised state.

103. *Assertion* : The bond angle H—C—H in the methane is the same as the bond angle Cl—C—Cl in the carbon tetrachloride.
*Reason :* H—C—H bonds in methane are almost non-polar while Cl—C—Cl bonds in carbon tetrachloride are highly polar.

104. *Assertion* : Xenon difluoride is a linear molecule having F—Xe—F bond angle of 180°.
*Reason :* Formation of $XeF_2$ molecule takes place by $sp^3d$ hybridization of Xe orbitals.

105. *Assertion* : Molecule which gives rise to fluorescence is referred to as a fluorophore.
*Reason :* Aromatic amino acids, flavins and vitamin-A are important fluorophores.

106. *Assertion* : When two or more empty orbitals of equal energy are available, one electron must be placed in each until they are all half filled.
*Reason :* The pairing of electrons is an unfavourable phenomenon.

107. *Assertion* : The combining of atomic orbitals from two atoms is termed as hybridisation.
*Reason :* The process of hybridisation involves the combination of orbitals of different energies.

108. *Assertion* : The elements belonging to alkali metal group are most electropositive in their respective periods of periodic table.
*Reason :* The positive charge density on their positive ions is highest in the respective periods.

109. *Assertion* : The atomic mass actually is expressed in terms of atomic mass unit (amu).
*Reason :* The actual mass of an atom in gms is very small

110. *Assertion* : The atomic mass of carbon atom is expressed as 12.011 amu.
*Reason :* All carbon atoms have six protons and six neutrons in their nuclei.

111. *Assertion* : The enthalpy of formation of gaseous oxygen molecules at 298 K and under a pressure of one atmosphere is zero.

*Reason* : The entropy of formation of gaseous oxygen molecules under the same conditions is zero.

112. *Assertion* : A tri-ester of glycerol and palmitic acid on boiling with aqueous NaOH gives a solid cake having soapy touch
*Reason* : Free glycerol is liberated, which is a greasy solid.

113. *Assertion* : Amongst the halogens, fluorine can oxidise the elements to highest oxidation states
*Reason* : Due to small size of fluoride ion, it is difficult to oxidise fluoride ion to fluorine. Hence, reverse reaction takes place more easily.

114. *Assertion* : Nitrogen is unreactive at room temperature but becomes reactive at elevated temperatures (on heating) in presence of catalysts
*Reason* : In nitrogen molecules, there is extensive delocalization of electrons.

115. *Assertion* : Fluorescein is an adsorption indicator
*Reason* : The indicator fluorescein is a dye

116. *Assertion* : White precipitate of lead chloride (PbCl$_2$) is soluble in concentrated solution of potassium chloride.
*Reason* : Tetrachloroplumbate (II) ion is formed when chloride ions attacks the lead (II) chloride.

117. *Assertion* : In a given electrical field β-particles are deflected more than α-particles
*Reason* : β-particles have very low *e/m* value as compared to α-particles.

118. *Assertion* : Neutrons are better projectiles for nuclear reactions than protons or α-particles.
*Reason* : Neutrons are neutral particles and hence, their penetration in nucleus is rather difficult.

119. *Assertion* : The solubility of n-alcohols in water decreases with increase in molecular weight.
*Reason* : The relative proportion of the hydrocarbon part in alcohols increases with the increase in molecular weight which permits enhanced hydrogen bonding with water.

120. *Assertion* : The nitro group, if present in ortho or para positions, would stabilise the phenoxide ion by dispersal of negative charge through mesomeric effect.

*Reason* : The electron releasing substituents would intensity the negative charge. As a result electron releasing groups in phenol should be acid-weakening.

## BIOLOGY

121. The umbilical cord in the mammals contain
(a) placenta          (b) allantoic artery
(c) umbilicus         (d) both (b) and (c)

122. Fraternal twins are
(a) monozygotic       (b) siamese
(c) dizygotic         (d) both (b) and (c)

123. Which of the following technique is used to measure cerebral blood volume?
(a) PET-scanning      (b) E C G
(c) CT-scanning       (d) E E G

124. Mark the incorrect statement about immunisation schedule:
(a) one booster dose of tetanus toxoid is given preferably 4 weeks before the expected date of delivery to the female who is immunised previously
(b) two doses of tetanus toxoid, the first dose between 16 and 24 weeks and the second dose between 24 and 32 to non-immunised females.
(c) one dose of tetanus toxoid is given 6 weeks before pregnancy to non immunised females
(d) first DPT dose is given between age of 3-12 months.

125. Following autosomal dominant disease is characterised by very long extremeties, spider like fingers and dislocation of eye lens
(a) Von willebrand's disease
(b) Huntington chorea
(c) Marfan syndrome
(d) Cat-cry syndrome

126. Match the commercial names of following:
(a) propoxur as furadan, carbofuran as temik and aldicarb as baygon
(b) propoxur as baygon, carbofuran as furadan and aldicarb as temik
(c) propoxur as temik, carbofuran as furadan and aldicarb as baygon

(d) propoxur is simazine, carbofuran as furadan and aldicarb as baygon

127. Monoclonal antibodies are effective as
(a) immuno suppressants in renal grafting
(b) immuno repressants in renal grafting
(c) immuno suppressants in cornea transplantation
(d) both (a) and (c)

128. The proper formation of collagen in a healing wound requires
(a) high levels of adrenocortical hormones
(b) cholesterol          (c) vitamin C
(d) vitamin D.

129. Diversification of placental mammals took place in:
(a) paleocene          (b) eocene
(c) miocene            (d) pleistocene

130. Marine life can be classified into three main categories:
(a) plankton, nekton, benthonic
(b) phytoplankton. zooplankton and benthonic
(c) phytoplankton zooplankton and benthonic
(d) plankton, nektons and phytoplankton

131. Amensalism is
(a) an interaction between two living individuals of same species in which one organism does not allow other organism to grow or live near it.
(b) an interaction between two living individuals of different species which allow the growth of both organisms simultaneously.
(c) an interaction between two living individuals of different species in which one orga r; n does not allow other organism to grow or live near it.
(d) it is the relationship between two living individuals of different species in which one is benefitted while the other is neither harmed nor benefitted except to a negligible extent.

132. International Union of Conservation of Nature and Natural Resources (IUCN) describes endangered species as:-
(a) the species which are in danger of extinction and whose survival is unlikely if the causal factors continue to be operating

(b) which are vulnerable and rare
(c) the species with very small populations in the world
(d) all of these

133. Which human chromosome contains the HLA complex?
(a) chromosome 11      (b) chromosome 23
(c) chromosome 48      (d) chromosome 6

134. Tobacco smoke contains radioactive
(a) polonium-210       (b) cesium-138
(c) polonium-220       (d) carbon-14

135. *Neopilina* a living fossil was
(a) discovered in 1952, a connecting link between annelida and mollusc
(b) discovered in 1957, a connecting link between annelida and arthropoda
(c) discovered in 1954, a connecting link between annelida and mollusc
(d) none of these

136. Which of the following is correct about cockroach?
(a) nocturnal, omnivorous, fussorial, protandrous
(b) fossorial, carnivorous, protandrous hermaphrodite
(c) diurnal, omnivorous, fussorial, protandrous
(d) monoecious, omnivorous, diurnal, formation ootheca

137. Amphetamines have been used to treat all of the following disorders except
(a) attention-deficit hyperactivity disorder
(b) mild depression
(c) anorexia nervosa    (d) obesity.

138. Which is true about gemmule formation?
(a) it is shown by fresh water sponges under favourable conditions
(b) it is shown by marine and fresh water sponges under favourable conditions
(c) it is shown by marine sponges under unfavourable conditions
(d) it is a feature of fresh water and marine sponges under unfavourable conditions

139. Myocardial infarction is
(a) inadequate flow of blood to a part of the heart caused by obstruction to its blood supply.

(b) death of a part of heart muscle following cessation of blood supply to it.

(c) heart pain of short duration usualy located in front of the chest

(d) hardening of blood vessels.

**140.** Vitamin $B_{12}$ (cyanocobalamine) deficiency may be produced by

(1) pernicious anemia (2) Crohn's disease

(3) ileal resection (4) chronic pancreatitis

(a) 1 and 2 (b) 2 and 4

(c) 1, 2, 3, 4 (d) none of these.

**141.** The free part of the soft palate which hangs down freely as a small flap is called

(a) rugae (b) uvula

(c) frenulum (d) sulcus terminalis

**142.** Stroke volume is increased by

(a) sympathetic stimulation

(b) decreased systematic blood pressure

(c) increased preload

(d) increased heart rate.

**143.** Mark the correct statement:

(a) *Petromyzon* is marine, unisexual with 8 pairs of cranial nerves

(b) *Petromyzon* is marine and fresh water form unisexual with 12 pairs of cranial nerves

(c) *Myxine* is marine, unisexual

(d) *Petromyzon* is marine and fresh water form, unisexual with 10 pairs of cranial nerves

**144.** Negative symptoms of Schizophrenia include

(a) hallucination

(b) cognitive deficits

(c) loose associations

(d) strong behaviour.

**145.** First instar larva of house fly is:

(a) limbless and has one pair of posterior abdominal spiracles

(b) limbless and has one pair of anterior prothoracic and one pair of posterior abdominal spiracles

(c) limbless and has one pair of anterior prothoracic spiracles

(d) having 3 pairs of legs and one pair of posterior abdominal spiracles

**146.** DNA banking is particularly useful when

(a) a specific disease mutation is known to exist within a family

(b) a child has been shown to have a genetic disease due to a new dominant mutation

(c) the gene for a particular disease in a family has not yet been identified, but its pattern of inheritancen is clear

(d) a family is known to be segregating a balanced robertsonian translocation.

**147.** Gynandromorphs develop in *Drosophila* when the two cells in the two-celled proembryo will have one of the following chromosomal sets

(a) 2A + XX in one cell and 2A + X in the other

(b) 2A + XXX in both the cells

(c) 2A + X in both the cells

(d) all of these

**148.** The organism used for alcohol fermentation is

(a) *Pseudomonas* (b) *Aspergillus*

(c) *Penicillium* (d) *Saccharomyces*

**149.** The twining of tendrils around a support is a good example of

(a) nastic movements (b) phototropism

(c) thigmotropism (d) chemotropism

**150.** The sexual reproduction is absent in

(a) *Ulothrix* (b) *Spirogyra*

(c) *Volvox* (d) *Nostoc*

**151.** Which of the following has a cup shaped chloroplast?

(a) *Chlamydomonas* (b) *Spirogyra*

(c) *Pinus* (d) *Funaria*

**152.** Clinostat is used in studies on

(a) growth movements

(b) respiration

(c) osmosis

(d) photosynthesis

**153.** The female gametophyte of a typical dicot at the time of fertilization is

(a) 6-celled (b) 7-celled

(c) 8-celled (d) 4-celled

154. Haploid plants (or cells in culture) derived from microspore culture are preferred over diploids for mutation studies, because in haploids
    (a) haploid cells can be easily cultured
    (b) dominant mutations express immediately
    (c) recessive mutations express immediately
    (d) mutations are readily induced

155. Mendel studied inheritance for seven pairs of characters in pea. For a study of independent assortment seven characters can be arranged in 21 possible pairs. If you are told that in one of these 21 pairs, independent assortment was not observed in repeated later studies, what would be your reaction?
    (a) all the later workers must have committed mistakes
    (b) it is impossible
    (c) Mendel's principle of independent assortment is not universal
    (d) Mendel might not have studies all the 21 combinations

156. When the hilum, chalaza and micropyle of the ovule lie in the same longitudinal axis, it is known as
    (a) orthotropous ovule
    (b) amphitropous ovule
    (c) anatropous ovule
    (d) camphylotropous ovule

157. The maximum formation of $m$-RNA occurs in
    (a) cytoplasm          (b) ribosome
    (c) nucleolus          (d) nucleoplasm

158. Pyrenoids are the centre of the formation of
    (a) starch             (b) enzyme
    (c) protein            (d) fat

159. Haploid plants can be obtained by culturing
    (a) young leaves       (b) pollen grains
    (c) endosperm          (d) root lips

160. The floral formula $\oplus \, \male\female \, K_{2+2} \, C_{x4}, \, A_{2+4}, \, G_{(2)}$ is representative of

(a) *Brassica nigra*       (b) *Solanum nigrum*
(c) *Allium cepa*          (d) *Helianthus annuus*

**Instructions for Q.No. 161 to 180**
*Each of the questions given below consists of two statements, an assertions (A) and reason (R). Encircle the number corresponding to the appropriate response in the answer sheet as follows.*
    (a) *If both assertion and reason are true and the reason is a correct explanation of the assertion*
    (b) *If both assertion and reason are true but the reason is not a correct explanation of the assertion*
    (c) *If the assertion is true, but the reason is false*
    (d) *If both assertion and reason are false*

161. *Assertion :* Prophase I is the longest phase in meiosis.
    *Reason :* It is divisible into five sub phases.

162. *Assertion :* Ribosomes occur in both eukaryotes and prokaryotes.
    *Reason :* Organelle ribosomes do not occur in prokaryotes.

163. *Assertion :* Herkogamy promotes self pollination.
    *Reason :* Prepotency is a self sterility technique.

164. *Assertion :* Root cap has no role in water absorption.
    *Reason :* It has no direct relation with vascular system.

165. *Assertion :* Pollination in *Pinus* is anemophilous.
    *Reason :* The pollen grains germinates *in situ.*

166. *Assertion :* DDT is found to be in body water.
    *Reason :* DDT is soluble in water.

167. *Assertion :* The bones of middle ear are primarily responsible for locating the source.
    *Reason :* Middle ear bones are two in number.

168. *Assertion :* Arboviruses are transmitted by animals.
    *Reason :* They have single stranded DNA genome.

169. *Assertion :* Glucose has the lowest renal clearance.
    *Reason :* It is completely reabsorbed.

170. *Assertion :* Notochord is present in protochordate vertebrates.
    *Reason :* Notochord is always formed of bones.

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171. *Assertion* : Phaeochromocytoma is a tumour of adernal cortex
     *Reason* : Phaeochromocytoma leads to secondary hypertension

172. *Assertion* : Unit membrane of Robertson's model has a thickness of 75 Å
     *Reason* : Membrane thickness could be 50-100 Å.

173. *Assertion* : Boring of pinna and nose of Indian women is inherited to next generation
     *Reason* : When an individual acquires characters in its life time, they are transmitted to next generation

174. *Assertion* : *Pila* is asymmetrical
     *Reason* : *Pila* shows torsion

175. *Assertion* : Rupture of a cerebral blood vessel may lead to sudden interruption of a blood flow to a portion of brain. This is called cerebrovascular accident.
     *Reason* : Hypertension may cause vasodilation of cerebral blood vessels

176. *Assertion* : Cells of quiscent centre have low DNA, RNA & protein
     *Reason* : It could be the site of hormone synthesis.

177. *Assertion* : Maximum evolution of oxygen of *Spirogyra* is observed in red & blue region
     *Reason* : Blue & red region shows minimum photosynthetic activity

178. *Assertion* : Bacteriochlorophyll-*b* is found in *Rhodopseudomonas*
     *Reason* : It's structure is not yet known.

179. *Assertion* : The bark is economically useful
     *Reason* : The bark of Juglans is used for cleaning and shining teeth

180. *Assertion* : The first link in any food chain is a green plant
     *Reason* : Because they alone have the capacity to fix the $CO_2$ in presence of sun light.

## GENERAL KNOWLEDGE

181. The guardian of the constitution of India is
     (a) Indian Parliament
     (b) Supreme Court of India
     (c) Prime Minister of India
     (d) High Court of India.

182. Who is the new Director-General of UNESCO?
     (a) Koichiro Matsuura
     (b) Fiederico Mayor Zaragoza
     (c) Ms. Gro Harlem Brundtland
     (d) Thabo Mbeki.

183. With which of the following countries has India recently signed an extradition treaty?
     (a) Israel          (b) Russia
     (c) France          (d) UAE.

184. Nasir Hussain is cricket captain of which country?
     (a) Bangladesh      (b) Kenya
     (c) England         (d) Scotland.

185. The amount of money (in rupees) allegedly paid as kickbacks in the Bofors case in
     (a) Rs. 102 crore   (b) Rs. 56 crore
     (c) Rs. 64 crore    (d) Rs. 75 crore.

186. *Mr. Editor, How Close are You to the PM* is a book authored by
     (a) Vinod Mehta     (b) N. Ram
     (c) Dileep Padgaonkar (d) Prabhu Chawla.

187. According to the Reserve Bank of India's New Credit Policy for the second half of 1999-2000, the Cash Reserve Ratio (CRR) has been reduced from 10 per cent to
     (a) 9 per cent      (b) 8 per cent
     (c) 7 per cent      (d) 6 per cent.

188. Name the country where people have voted against a republican form of Government
     (a) Britain         (b) Australia
     (c) Jordan          (d) Thailand.

189. WHO's Vision 2020 visualises to eliminate
     (a) AIDS            (b) hepatitis-C
     (c) avoidable blindness
     (d) none of these.

190. In which of the following places a baby boy was born as the world's six billionth inhabitant?
     (a) Kosovo          (b) Vienna
     (c) Tokyo           (d) Islamabad.

191. Which of the following is/are the Sydney 2000 Olympic mascot(s)?
     (a) Millie (the *Echidna*)

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(b) Olly (the *Kookaburra*)

(c) Syd (the *Platypus*) (d) all of these.

192. Who among the following is currently the Chairperson of the National Commission for Women?
    (a) Hema Malini          (b) Vibha Parthasarthy
    (c) Abha Sharma          (d) Mohini Giri.

193. Which one of the following films was named as the Best feature Film for the 47th National Film Awards announced on July 6, 2000?
    (a) Vaanaprastham (Malayalam)
    (b) Uttara (Bengali)
    (c) Hey Ram (Hindi)
    (d) Shaheed Udham Singh (Punjabi).

194. Who among the following won the Wimbledon 2000 Women's Singles title held in July
    (a) Serena Williams      (b) Venus Williams
    (c) Lindsay Davenport    (d) Martina Hingis.

195. National Waterway Number 1 will be linking which of the following two cities?
    (a) Allahabad - Haldia
    (b) Agra - Patna
    (c) Cochin - Salem
    (d) Dibrugarh - Haldia.

196. Who among the following is the President of International Court of Justice?
    (a) Al-Khasawnch         (b) Syed Pirzaba
    (c) Gilbert Guillaume    (d) Don Mckinnon.

197. Who among the following becomes the first and the only star from the Indian Cinema to be waxed at the famous Madame Tussaud's Wax Museum in London?
    (a) Dilip Kumar
    (b) Shatrughan Sinha
    (c) Amitabh Bachchan
    (d) Shah Rukh Khan.

198. Who among the following heads the research team on the Human Genome Project in Britain?
    (a) Dr. Michael Dexter   (b) Dr. John Sulston
    (c) Dr. Andrew Hynes     (d) Dr. John Dexter.

199. Sonal Mansingh is the exponent of which of the following dance forms?
    (a) odissi               (b) yakshagana
    (c) manipuri             (d) kuchipudi.

200. The booker prize winner for 2000 Margret Atwood has written which of the following book?
    (a) The blind assassin   (b) Survival
    (c) Life before man      (d) all of these.