Dated : 30-04-2023

# M.L. Syal's Helix Institute

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Test Booklet Code

**A**

MM : 720

## Test Series [Option-1] for NEET-2023

Time : 3 hrs. 20 min.

## Mock Test

### PHYSICS : SECTION-A

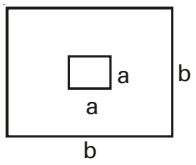
**All questions are compulsory in section A**

1. Let the angle $\theta$ at which the cyclist bends from the vertical while taking a curve of radius 'r' with a speed 'v' be obtained from the equation $\tan\theta = \frac{rg}{v^2}$. Then the equation is
   (1) both dimensionally and numerically correct
   (2) neither numerically nor dimensionally correct
   (3) dimensionally correct only
   (4) numerically correct only

2. A physical quantity P is related to three quantities a, b and c as $P = \frac{a^2b^3}{\sqrt{c}}$. The percentage errors of measurement in a, b and c are respectively 1%, 2% and 4% respectively. The maximum percentage error in P is
   (1) 10%
   (2) 8%
   (3) 6%
   (4) 7%

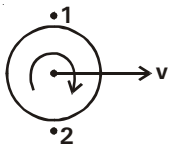
3. Internal energy of 1 mole of an ideal gas is $E = \frac{3}{2}RT$. Then $C_p$ for this gas will be
   (1) 0.5 R
   (2) 0.1 R
   (3) 1.5 R
   (4) 2.5 R

4. A particle does uniform circular motion in a horizontal plane. The radius of the circle is 20 cm. The centripetal force acting on the particle is 10 N. It's kinetic energy is
   (1) 0.1 J
   (2) 0.2 J
   (3) 2.0 J
   (4) 1.0 J

5. 

   Coefficient of mutual inductance between the two given coplanar coils is (assume b >> a and smaller coil is at the centre of bigger coil) will be proportional to
   (1) $\frac{a}{b}$
   (2) $\frac{a^2}{b}$
   (3) $\frac{a}{b^2}$
   (4) $\frac{a^2}{b^2}$

6. A ball of mass 'm' is thrown vertically upwards from the ground. Another ball of mass 2m is thrown from the ground at an angle $\theta$ with the vertical. Both of them stay in air for same period of time. The heights attained by the two balls are in the ratio of
   (1) 2 : 1
   (2) 1 : $\cos\theta$
   (3) 1 : 1
   (4) $\cos\theta$ : 1

7. A baseball having rough surface moving in air with a speed v and spinning clockwise at the same time is shown in figure. Pressures at points 1 and 2 are $P_1$ and $P_2$ respectively. Then
   

   (1) $P_1 > P_2$
   (2) $P_1 < P_2$
   (3) $P_1 = P_2$
   (4) None of these

8. A fish looking up through the water sees the outside world contained in a circular horizon. If the refractive index of water is $\mu$ and the fish is at a depth 'h' below the surface, the radius of circle is

(1) $\frac{h}{\mu}$

(2) $\frac{h}{\sqrt{\mu^2 - 1}}$

(3) $\frac{h}{\sqrt{\mu^2 + 1}}$

(4) $h\mu$

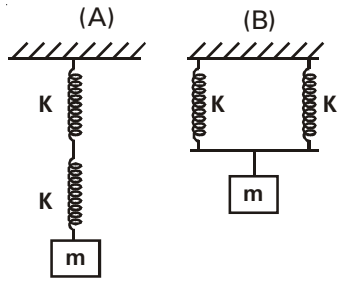
9. A steel wire can support a maximum load of 100 N. If we cut the wire into two equal parts, the maximum load that can be supported by either part of the wire is

(1) 100 N
(2) 50 N
(3) 200 N
(4) 250 N

10. A prism of refractive index $\mu_g$ deviates the incident ray towards its base. It is immersed in a transparent liquid of refractive index $\mu_l$ such that $\mu_l > \mu_g$. Then prism would

(1) deviate the ray towards its base
(2) deviate the ray away from its base
(3) not deviate the ray at all
(4) nothing can be said

11. Two spring-block arrangements A and B are shown in figure. The ratio of the frequency of vertical oscillation of block in A to that in B will be




(1) 1 : 2
(2) 2 : 1
(3) $\sqrt{2}$ : 1
(4) 1 : $\sqrt{2}$

12. The threshold frequency for a certain metal is $3.3 \times 10^{14}$ Hz. If light of frequency $8.2 \times 10^{14}$ Hz is incident on the metal, the cutoff voltage for the photoelectric emission will be about

(1) 4 V
(2) 2 V
(3) 6 V
(4) 1 V

13. A common emitter circuit is used as a amplifier, whose current gain is 50. If input resistance is $1\,k\Omega$ and input voltage is 5 volt then output current will be

(1) 250 mA
(2) 30 mA
(3) 50 mA
(4) 100 mA

14. A particle of mass 2 kg moving with velocity 10 m/s collide head on with another particle of mass 3 kg at rest. If coefficient of restitution e = 1 then the loss of kinetic energy in the collision is

(1) 30 J
(2) 20 J
(3) 15 J
(4) zero

15. The power factor of an ac circuit having resistance (R) and inductance (L) connected in series with an AC source of angular frequency $\omega$ is

(1) $\frac{R}{\omega L}$

(2) $\frac{R}{(R^2 + \omega^2 L^2)^{1/2}}$

(3) $\frac{\omega L}{R}$

(4) $\frac{R}{(R^2 - \omega^2 L^2)^{1/2}}$

16. What work is required to be done to shift a satellite of mass 'm' from a circular orbit of radius 3R to a circular orbit of radius 4R, where R represents the radius of the earth?

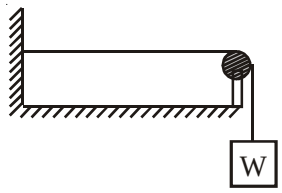
(1) $\frac{1}{6}\frac{GMm}{R}$

(2) $\frac{1}{7}\frac{GMm}{R}$

(3) $\frac{1}{24}\frac{GMm}{R}$

(4) $\frac{1}{12}\frac{GMm}{R}$

17. Figure shows a string under tension. The fundamental frequency of vibration is $\nu$. If this arrangement is kept in a lift moving upwards with acceleration 'a', the new fundamental frequency is




(1) $\nu$ only

(2) $\nu\left(\frac{a+g}{g}\right)$

(3) $\nu\left(\frac{g}{g+a}\right)$

(4) $\nu\sqrt{\frac{g+a}{g}}$

18. Beats are produced by two waves producing oscillations given by $y_1 = a\sin 2000\pi t$ and $y_2 = a \sin 2008\,\pi t$. The frequency of beats is

(1) zero

(2) 1

(3) 4

(4) 2

19. Two drops of the same radius are falling through air with a steady velocity of 5 cm/s. If the two drops coalesce, the terminal velocity would be

(1) 10 cm/s

(2) 2.5 cm/s

(3) $5 \times (4)^{1/3}$ cm/s

(4) $5 \times \sqrt{2}$ cm/s

20. **Assertion** : When two different liquids at different temperatures are mixed together, they reach a common temperature which is mean of their initial temperatures.

**Reason** : Heat gained by one liquid is equal to heat lost by the other liquid when these are mixed .

(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion

(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion

(3) Assertion is true statement but Reason is false

(4) Assertion is false

21. In semiconducting materials, the dopant has to be such that

a. it does not distort the original pure semiconductor lattice

b. it occupies all of original semiconductor atom sites in the crystal

c. sizes of the dopant and the semiconductor atoms should be nearly the same

(1) both a & c

(2) both b & c

(3) both a & b

(4) a, b & c

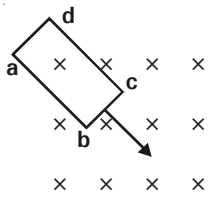
22. A given point on the extension of an ideal electric dipole has electric field $\vec{E}$. If the dipole is suddenly turned by $180^o$ about an equatorial line, electric field at the same point will be

(1) $-\vec{E}$

(2) $\frac{\vec{E}}{2}$

(3) $2\vec{E}$

(4) $-2\vec{E}$

23. 


Let a conducting planar loop be moving into a region of a magnetic field as shown above. Then the direction of induced current in the loop will be

(1) along path bcdab

(2) along path badcb

(3) no current flows

(4) either 1 or 2 depending upon size of the loop

24. The strength of electric field on the axis of a uniformly charged ring

(1) increases as we move away from the centre

(2) decreases as we move away from the centre

(3) first decreases then increases as we move away from its centre

(4) first increases then decreases as we move away from its centre

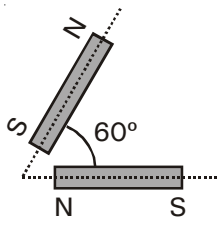
25. **Statement-I** : A diminished virtual image of a real object can be formed only by a concave mirror.
**Statement-II** : Spherical aberration of lens can be corrected by reducing its aperature.
(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

26. For a 0.1% increase in length of a conducting wire due to stretching, the percentage increase in its resistance will be
(1) 0.2%
(2) 0.05%
(3) 0.4%
(4) 0.1%

27. A Carnot engine absorbs an amount Q of heat from a reservoir at an abosolute temperature T and rejects heat to a sink at a temperature of T/3. The amount of heat rejected is
(1) Q / 4
(2) Q / 3
(3) Q / 2
(4) 2Q / 3

28. A circular coil 'A' has a radius R and the current flowing through it is I. Another circular coil 'B' has a radius 2R and if 2I is the current flowing through it, then the ratio of magnetic fields at the centre of the circular coils, $B_A/B_B$ =
(1) 4 : 1
(2) 2 : 1
(3) 3 : 1
(4) 1 : 1

29. Two bar magnets of equal magnetic moment M are combined as shown in the figure, then resultant magnetic moment of system is




(1) $\sqrt{3}M$
(2) Zero
(3) $\frac{M}{2}$
(4) M

30. If the velocity of a particle in one dimensional motion is $(10 + 2t^2)$ m/s, then the average acceleration of the particle in the first 4s is
(1) 10.5 m/s²
(2) 4 m/s²
(3) 16 m/s²
(4) 8 m/s²

31. A man of weight 'mg' on Earth is moving up in a rocket with acceleration '4g' in gravity-free space. The apparent weight of the man in the rocket is
(1) Zero
(2) 4 mg
(3) 5 mg
(4) mg

32. Length of a simple pendulum is increased by 44%. Percentage increase in its time period is
(1) 44%
(2) 22%
(3) 10%
(4) 20%

33. Consider earth to be a homogeneous sphere. Scientist A goes deep down in a mine and scientist B goes high up in a balloon. The value of g measured by
(1) A goes on decreasing and that by B goes on increasing
(2) B goes on decreasing and that by A goes on increasing
(3) Each decreases at the same rate
(4) Each decreases but at different rates

34. A particle of mass 'm' is thrown horizontally from the top of a tower and another particle of mass 2m is thrown vertically upward. The acceleration of centre of mass of two particle system is
(1) g
(2) $\frac{9g}{3}$
(3) $\frac{2g}{3}$
(4) $\frac{g}{2}$

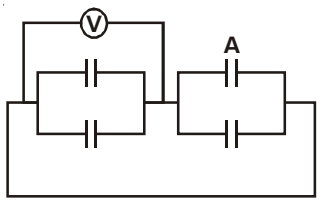
35. The part of electromagnetic spectrum absorbed by the ozone layer is
(1) infrared radiations
(2) ultraviolet radiations
(3) X-rays
(4) $\gamma$ -rays

## PHYSICS : SECTION-B

**This section has 15 questions, attempt any 10 questions of them.**

36. One end of a metal rod is kept in a furnace. Under steady state, the temperature of the rod
    (1) increases at every point of the rod
    (2) decreases at every point of the rod
    (3) remains constant and is same at every point of the rod
    (4) remains constant but is different at different points of the rod

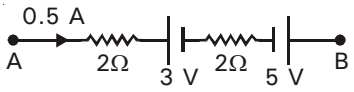
37. Four capacitors each of 25μF are connected in a circuit as shown in figure. The dc voltmeter V reads 200 V. The charge on capacitor 'A' is




    (1) $5 \times 10^{-3}$ C
    (2) $2 \times 10^{-2}$ C
    (3) $5 \times 10^{-2}$ C
    (4) zero

38. Two electric bulbs 40 W, 200 V and 100W, 200 V are connected in series. Then the maximum voltage that can be applied across the combination, without fusing either bulb is
    (1) 280 V
    (2) 400 V
    (3) 300 V
    (4) 200 V

39. In the figure, a part of circuit is shown. The potential difference between A and B is




    (1) 5 V
    (2) 8 V
    (3) 2 V
    (4) Zero

40. For a reactor to be in steady power operation, the ratio of number of fission produced by a given generation to the number of fission of the preceeding generation (K) is
    (1) equal to 1
    (2) greater than 1
    (3) less than 1
    (4) infinity

41. Let 3.4 eV energy is required to separate a hydrogen atom into a proton and an electron. Then orbital radius of electron in this particular case is
    (1) $5.3 \times 10^{-11}$m
    (2) $3.2 \times 10^{-12}$ m
    (3) $4.5 \times 10^{-11}$ m
    (4) $2.1 \times 10^{-10}$ m

42. The de-Broglie wavelength of an electron in the first Bohr orbit is
    (1) Equal to one fourth the circumference of the first orbit
    (2) Equal to half the circumference of the first orbit
    (3) Equal to twice the circumference of the first orbit
    (4) Equal to the circumference of the first orbit

43. If between wavelength $\lambda$ and $\lambda + d\lambda$, $e_\lambda$ and $a_\lambda$ be the emissive and absorptive powers of a body and $E_\lambda$ be the emissive power of a perfectly black body, then according to Kirchoff's law, which is true
    (1) $e_\lambda = a_\lambda = E_\lambda$
    (2) $e_\lambda E_\lambda = a_\lambda$
    (3) $e_\lambda = a_\lambda E_\lambda$
    (4) $e_\lambda a_\lambda E_\lambda = \text{const.}$

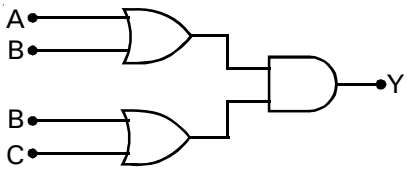
44. If the binding energy per nucleon in $Li^7$ and $HE^4$ nuclei are respectively 5.60 MeV and 7.06 MeV, then energy of reaction $Li^7 + p \rightarrow 2\ {}_2He^4$ is
    (1) 19.6 MeV
    (2) 2.4 MeV
    (3) 8.4 MeV
    (4) 17.3 MeV

45. What is the Brewster angle for air to glass transition? (Refractive index of glass = 1.5)
    (1) $\tan^{-1}\frac{3}{2}$
    (2) $\tan^{-1}\frac{2}{3}$
    (3) $\tan^{-1}\frac{1}{3}$
    (4) $\tan^{-1}\frac{1}{2}$

46. The moment of inertia of a body about a given axis is 1.2 kg/m$^2$. Initially the body is at rest. In order to produce a rotational kinetic energy of 1500 J, an angular acceleration of 25 rad/s$^2$ must be applied for a duration of
(1) 4 s
(2) 2 s
(3) 5 s
(4) 10 s

47. In a certain double slit experimental arrangement interference fringes of width 1 mm each are observed when light of wavelength 5000 Å is used. Keeping the set up unaltered, if the source is replaced by another source of wavelength 6000 Å, the fringe width will be
(1) 0.5 mm
(2) 1 mm
(3) 1.2 mm
(4) 1.5 mm

48. What is the distance for which ray optics is good approximation for an aperture of 3 mm and wavelength 900 nm.
(1) 80 m
(2) 20 m
(3) 40 m
(4) 10 m

49. 

For the combination of logic gates shown above, the boolean expression for output Y is
(1) $Y = A \cdot B \cdot C$
(2) $Y = B + (A \cdot C)$
(3) $Y = A + B + C$
(4) $Y = B \cdot (A + C)$

50. The equation of a transverse wave travelling in a rope is given by
$$y = 10 \sin \pi(0.01\ x - 2\ t)$$
where x and y are in cm and t in seconds. The maximum transverse speed of a particle in the rope is about
(1) 200 cm/s
(2) 75 cm/s
(3) 63 cm/s
(4) none of these

## CHEMISTRY : SECTION-A

**All questions are compulsory in section A**

51. Which of the following does not exist?
(1) $TiX_4$
(2) $VF_5$
(3) $CrF_6$
(4) $MnF_7$

52. Consider the given data

| | **Half-cell reaction** | **Standard reduction potential, E° (volts)** |
|---|---|---|
| 1. | $Cr^{3+} 3e \rightarrow Cr(s)$ | −0.74 |
| 2. | $Cu^{2+} + 2e \rightarrow Cu(s)$ | 0.34 |

Numerical value of standard cell potential for reaction $2Cr(s) + 3Cu^{2+}(aq) \rightarrow 2Cr^{3+}(aq) + 3Cu(s)$ is
(1) −1.08 V
(2) −0.40 V
(3) 1.08 V
(4) 0.34 V

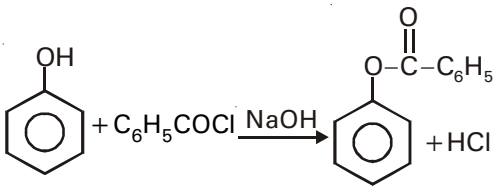
53. $XeF_6$ upon hydrolysis with 2 equivalents of water would form?
(1) $XeOF_4$
(2) $XeO_2F_2$
(3) $XeO_3$
(4) $XeO_4$

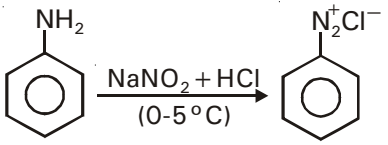
54. **Assertion** : In alkanes, rotation around a C-C single bond is not completely free.
**Reason** : This is due to weak repulsive interaction between the adjacent bonds. Such a type of repulsive interaction is called **torsional strain**.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

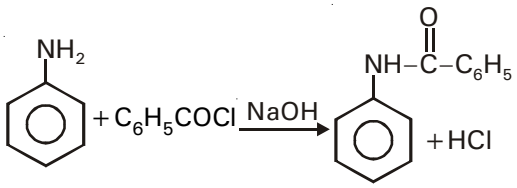
55. The oxidation state of oxygen atom(s) in caro's acid ($H_2SO_5$) is/are
(1) − 2 and −1
(2) + 6 and + 2
(3) + 8
(4) −2

56. $3.011 \times 10^{22}$ atoms of an element weight 1.15g. The atomic mass of the element is
(1) 10
(2) 2.3
(3) 35.5
(4) 23

57. Which of the following is called as Schotten Baumann reaction?

(1) 

(2) 

(3) 

(4) both (1) and (3)

58. Which of the following has highest bond angle?

(1) $NO_2^+$ (2) $NH_3$

(3) $NO_2^-$ (4) $NO_3^-$

59. Which of the following statement is not correct?

(1) $La(OH)_3$, is less basic than $Lu(OH)_3$

(2) In lanthanide series ionic radius of $Ln^{3+}$ ions decreases

(3) La is actually an element of transition series rather than lanthanide series

(4) Atomic radii of Zr and Hf are same because of lanthanide contraction

60. The correct order of stability of dihalides of Si,Ge, Sn and Pb is

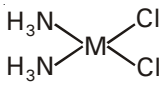
(1) $PbX_2 < SnX_2 < GeX_2 < SiX_2$

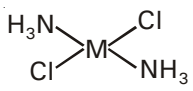
(2) $BeX_2 < SiX_2 < SnX_2 < PbX_2$

(3) $SiX_2 < GeX_2 < PbX_2 < SnX_2$

(4) $SiX_2 < GeX_2 < SnX_2 < PbX_2$

61. Which of the following isomers of $[M(NH_3)_2Cl_2]$ would react with silver oxalate ($Ag_2C_2O_4$)

(1) 

(2) 

(3) Both (1) and (2)

(4) None of these

62. $\Delta H - \Delta U$ for the formation of carbon monoxide (CO) from its elements at 298 K is
($R = 8.314\ JK^{-1}mol^{-1}$)

(1) $-1238.78\ Jmol^{-1}$

(2) $1238.78\ Jmol^{-1}$

(3) $-2477.57\ Jmol^{-1}$

(4) $2477.57\ Jmol^{-1}$

63. The maximum number of emission lines when the excited electrons of a sample of hydrogen in n = 5 drops to the ground state ?

(1) 15

(2) 10

(3) 20

(4) 5

64. The cell constant of a cell is 0.5 $cm^{-1}$. A 1N solution in this cell shows a resistance of 50 ohm. Then the equivalent conductance of this solution is

(1) 10 $ohm^{-1}\ cm^2\ gm\ eq^{-1}$

(2) 20 $ohm^{-1}\ cm^2\ gm\ eq^{-1}$

(3) 300 $ohm^{-1}\ cm^2\ gm\ eq^{-1}$

(4) 100 $ohm^{-1}\ cm^2\ gm\ eq^{-1}$

65. A silver iodide sol was prepared by mixing KI and $AgNO_3$ solutions with the $AgNO_3$ in slight excess. Which of the following descriptions is correct regarding the sol particles?

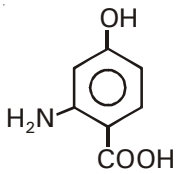
(1) Negatively charged because of the excess of $NO_3^-$ ions

(2) Positively charged because of the excess of $Ag^+$ ions in the AgI lattice

(3) Negatively charged because $I^-$ ions are adsorbed from the KI solution

(4) The sol. particles are neutral

66. IUPAC name of the following compound is



(1) 2–amino–4–hydroxy benzoic acid

(2) 3–amino–4–carboxyphenol

(3) 6 amino–4–hydroxy benzoic acid

(4) 2–carboxy–5–hydroxy aniline

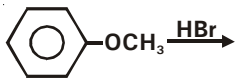
67. Which enzyme converts glucose and fructose both into ethanol

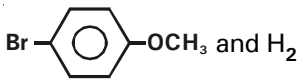
(1) Diastase

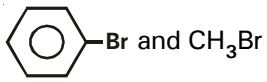
(2) Invertase

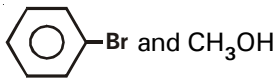
(3) Zymase

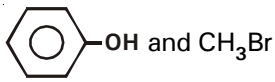
(4) Maltase

68. In the reaction  the products are

(1) 

(2) 

(3) 

(4) 

69. The ligands in anticancer drug 'cis–platin' are:
(1) $NH_3$,Cl
(2) $NH_3$,$H_2O$
(3) Cl, $H_2O$
(4) NO, Cl

70. Dissolution of a non-volatile solute into a liquid leads to the
(1) decrease of entropy
(2) increase in tendency of the liquid to freeze
(3) increase in tendency of the liquid to pass into the vapour phase
(4) decrease in tendency of the liquid to freeze

71. Which carboxylic acid will show HVZ reaction?
(1) Propionic acid
(2) Trichloro ethanoic acid
(3) Triphenyl acetic acid
(4) 2,2-dimethyl propanoic acid

72. "$PH_3$ is a weaker base than $NH_3$". The correct reason for this is
(1) larger size of P leading to lower electron density
(2) larger size of P leading to larger H-P-H bond angle
(3) N–H bond in $NH_4^+$ is weaker than P–H bond in $PH_4^+$
(4) none of these

73. $\Delta G^\circ$ vs T plot in the ellingham diagram slopes downward for the reaction
(1) $Mg + 1/2\ O_2 \rightarrow MgO$
(2) $2Ag + 1/2\ O_2 \rightarrow Ag_2O$
(3) $C + 1/2\ O_2 \rightarrow CO$
(4) $CO + 1/2\ O_2 \rightarrow CO_2$

74. **Statement-I** : Both N and F have higher first ionisation energy than that of oxygen.
**Statement-II** : N has half filled configutration while F has higher nuclear charge.
(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

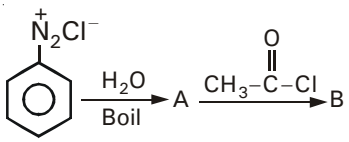
75. The ratio of rates of diffusion of $SO_2$, $O_2$ and $CH_4$ at constant T and P is
(1) $1 : \sqrt{2} : 2$
(2) $1 : \sqrt{2} : 4$
(3) $2 : \sqrt{2} : 1$
(4) $1 : 2 : \sqrt{2}$

76. Which has maximum bond energy among halogens
(1) $F_2$
(2) $Cl_2$
(3) $Br_2$
(4) $I_2$

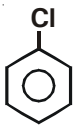
77. Which of the following can form dimers?
(1) Acetone
(2) Acrolein
(3) Acetic acid
(4) All of these

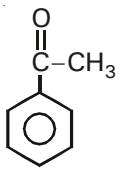
78. Which of the following oxy acids contain both P–H and P–P bond simultaneously?
(1) $H_4P_2O_5$
(2) $H_4P_2O_7$
(3) $H_4P_2O_6$
(4) none of these

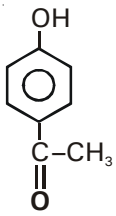
79. Iodoform can be prepared from all except
(1) ethyl methyl ketone
(2) isopropyl alcohol
(3) acetaldehyde
(4) isobutyl alcohol

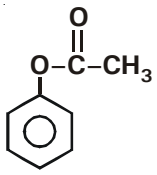
80. 

Which of the following is B?

(1) 

(2) 

(3) 

(4) 

81. 0.25 g of an organic compound at NTP gives 31 mL of $N_2$ gas by Duma's method. Find out the percentage of N in the compound.
   (1) 5.5
   (2) 11.5
   (3) 3.5
   (4) 15.5

82. Which oxide is amphoteric?
   (1) MgO
   (2) $K_2O$
   (3) BeO
   (4) $Fe_2O_3$

83. In Lucas test, immediate turbidity is given by
   (1) 1° alcohol
   (2) 2° alcohol
   (3) 3° alcohol
   (4) phenol

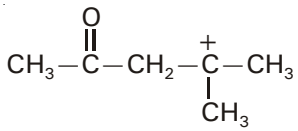
84. In a cube, A, B, C and D are arranged at corners face centres, octahedral voids and tetrahedral voids respectively, then the body diagonal contains
   (1) 2A, C, 2D
   (2) 2A, 2B, 2C
   (3) 2A, 2B, D
   (4) 2A, 2D

85. The solubility product of $Ni(OH)_2$ is $2.0 \times 10^{-15}$. The molar solubility of $Ni(OH)_2$ in 0.10 M NaOH is
   (1) $2 \times 10^{-13}$ M
   (2) $2 \times 10^{-15}$ M
   (3) $2.1 \times 10^{-18}$ M
   (4) $0.1 \times 10^{-13}$ M

## CHEMISTRY : SECTION-B

**This section has 15 questions, attempt any 10 questions of them.**

86. If NaCl is doped with $10^{-3}$ mol% of $SrCl_2$, the concentration of cation vacancies is
   (1) $6.02 \times 10^{18}$
   (2) $6.02 \times 10^{16}$
   (3) $6.02 \times 10^{20}$
   (4) $3.01 \times 10^{18}$

87. Which carbocation is the most stable?
   (1) $CH_3-CH=CH-\overset{+}{C}H_2$
   (2) $CH_3-CH=CH-\overset{+}{C}H-CH_3$
   (3) 
   (4) all have some stability

88. Amongst the following ions which one has the highest paramagnetism?
   (1) $[Cr(H_2O)_6]^{3+}$
   (2) $[Fe(H_2O)_6]^{2+}$
   (3) $[Cu(H_2O)_6]^{2+}$
   (4) $[Zn(H_2O)_6]^{2+}$

89. For the reversible system: $X_{(g)} \rightleftharpoons Y_{(g)} + Z_{(g)}$, a quantity of X was heated at a certain temperature. The equilibrium partial pressure of X was found to be P/7 and total pressure was P, what is the value of $K_P$ at given temperature

(1) $\frac{6P}{7}$

(2) $\frac{9P}{7}$

(3) $\frac{36P}{7}$

(4) 6P

90. Match the medicines given in Column-I with their use given in Column-II.

| | Column-I | | Column-II |
|---|---|---|---|
| i. | Ranitidine | a. | Tranquilizer |
| ii. | Furacine | b. | Antibiotic |
| iii | Phenelzine | c. | Antihistamine |
| iv | Chloramphenicol | d. | Antiseptic |

(1) i-c, ii-d, iii-b, iv-a

(2) i-c, ii-d, iii-a, iv-b

(3) i-c, ii-b, iii-a, iv-d

(4) i-a, ii-d, iii-c, iv-b

91. White phosphorous is kept under water to

(1) decrease its poisonous nature

(2) decrease its temperature as it is very hot

(3) prevent it from reacting with air

(4) increase its reactivity

92. **Assertion** : Dacron is prepared by condensation polymerisation.

**Reason** : Dacron is a polyester and also called terylene.

(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion

(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion

(3) Assertion is true statement but Reason is false

(4) Assertion is false

93. For the given reaction

$5Br^- + BrO_3^- + 6H^+ \rightarrow 3Br_2 + 3H_2O$

rate expression is $r = k[Br^-][BrO_3^-][H^+]^2$ order or reaction is

(1) 3

(2) 2

(3) 4

(4) 1

94. $E^\ominus$ values of some redox couples are given below. On the basis of these values choose the correct option.

$E^\ominus$ values : $Br_2/Br^- = +1.90$ ; $Ag^+/Ag(s) = +0.80$ $Cu^{2+}/Cu(s) = +0.34$ ; $I_2(s)/I^- = +0.54$

(1) Cu will reduce $Br^-$

(2) Cu will reduce Ag

(3) Cu will reduce $I^-$

(4) Cu will reduce $Br_2$

95. A $\xrightarrow[(II)NaOH]{(I)HNO_2}$ red colour, A is

(1) $CH_3CH_2NO_2$

(2) $(CH_3)_2CHNO_2$

(3) $(CH_3)_3CNO_2$

(4) 

96. Glycogen is a branched chain polymer of $\alpha$-D-glucose units in which chain is formed by C1—C4 glycosidic linkage whereas branching occurs by the formation of C1-C6 glycosidic linkage. Structure of glycogen is similar to _____.

(1) Amylose

(2) Amylopectin

(3) Cellulose

(4) Glucose

97. If two liquids A and B form minimum boiling azeotrope at some specific composition then

(1) A–B interactions are stronger than those between A–A or B–B

(2) vapour pressure of solution decreases because more number of molecules of liquids A and B can escape from the solution

(3) vapour pressure of solution decreases because less number of molecules of only one of the liquids escape from the solution

(4) A–B interactions are weaker than those between A–A or B–B

98. What is true about $H_2S_2O_7$?

(1) It is obtained by dissolution of $SO_3$ in water

(2) it is obtained by dissolution of $SO_3$ in concentrated $H_2SO_4$

(3) It is called peroxydisulphuric acid

(4) It contains one O–O bond in its molecule

99. The reaction of 2-hydroxyacetaldehyde in presence of $Et^{-}$ $Na^{+}$ is
(1) Aldol reaction
(2) Nucleophilic acyl substitution
(3) Acid-base reaction
(4) Cannizaro reaction

100. **Statement-I** : $S_N1$ reaction follows first order kinetics.
**Statement-II** : Protic polar solvent like $H_2O$, $CH_3COOH$ favours $S_N1$ mechanism.
(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

## ZOOLOGY : SECTION-A

**All questions are compulsory in section A**

101. Androgens produced by cells of Leydig
a. regulate development, maturation and functions of male accessory sex organs
b. produce anabolic effects on protein and carbohydrate metabolism
c. influence male libido
d. stimulate muscular growth
(1) a, b and d
(2) a, b and c
(3) b, c and d
(4) a, b, c and d

102. Which of the following is an incorrect statement?
(1) IUDs increase phagocytosis of sperms within the uterus
(2) $Cu^{2+}$ ions released from IUDs suppress sperm motility and fertilising capacity of sperms
(3) After vasectomy, spermatogenesis is not affected
(4) Tubectomy interferes with transport of ovarian hormones

103. Match the entities under column-I with those under column-II

| **Column-I** | | **Column-II** | |
|---|---|---|---|
| a. | Saliva | p. | Enterokinase |
| b. | Gastric juice | q. | Trypsin |
| c. | Pancreatic juice | r. | Ptyalin |
| d. | Intestinal juice | s. | Pepsin |

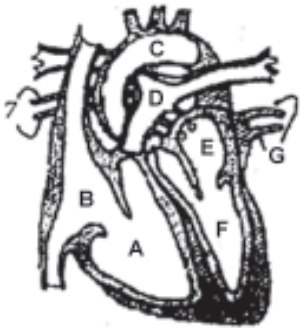
(1) a-p, b-s, c-q, d-r
(2) a-r, b-q, c-s, d-p
(3) a-r, b-s, c-q, d-p
(4) a-p, b-r, c-q, d-s

104. Which of these correctly describes periodic abstinence ?
(1) Couples abstain from coitus other than day 10 to 17 of menstruation cycle
(2) Couples abstain from coitus from day 14 to 28 of menstruation cycle
(3) Couples abstain from coitus from day 10 to 17 of menstruation phase
(4) Couples abstain from coitus from day 10 to 17 of menstruation cycle

105. How many of the following can be considered as carcinogens?
**Chewing beetle, nicotine, X-rays, gamma rays, oncovirus, tobacco smoke, biological response modifiers**
(1) 6 (2) 3
(3) 5 (4) 4

106. Which of the following is an incorrect statement?
(1) SCID can occur due to the absence of enzyme adenosine deaminase (ADA)
(2) Adrenaline, steroids and histamines quickly reduce the symptoms of allergy
(3) Active immunity is slow and takes time to give its full effective response
(4) Lymph nodes are small solid structures located at different points along lymphatic system

107. The given diagram is of the adult human heart. Correct sequence of blood flow beginning at pulmonary artery and passing through the lungs and systemic circulation is




(1) D - Lungs - G - E - F - C
(2) G - E - F - D - Lungs
(3) C - Lungs - G - E - F - D
(4) D - Lungs - C - B - A

108. Identify the wrong statement with reference to transport of oxygen.
(1) Partial pressure of $CO_2$ can interfere with $O_2$ binding with haemoglobin
(2) Higher $H^{+}$ concentration in alveoli favours the formation of oxyhaemoglobin
(3) Low $pCO_2$ in alveoli favours the formation of oxyhaemoglobin
(4) Binding of oxygen with haemoglobin is mainly related to partial pressure of $O_2$

109. Find out incorrect match w.r.t. cranial capacity

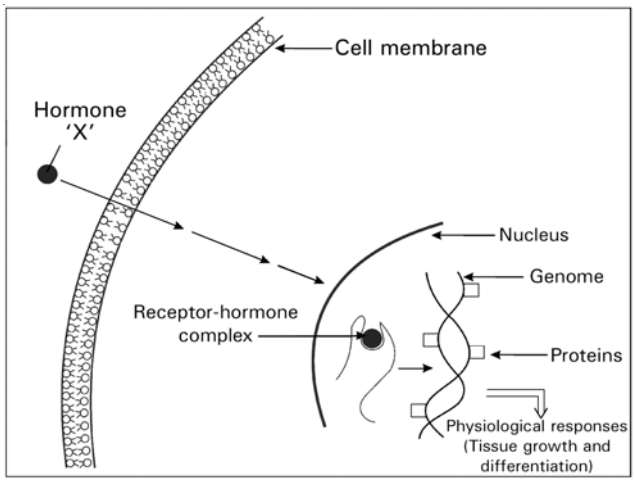
a. *Homo habilis* – 650-800 cc
b. *Homo* erectus – 900 cc
c. Neanderthal man – 1600 cc

(1) both a and b (2) both b and c
(3) c only (4) a only

110. Aschelminthes are

(1) free-living, aquatic & terrestrial parasites
(2) with complete alimentary canal with muscular pharynx
(3) are dioecious & show sexual dimorphism
(4) all of the above

111. In the following diagram, hormone 'X', most likely is




(1) cortisol
(2) insulin
(3) aldosterone
(4) both (1) and (3)

112. Which of the given statement is incorrect?

(1) Chorionic villi are surrounded by uterine tissue and maternal blood
(2) In humans , placenta is structural and functional unit between mother and developing foetus
(3) Blood flowing through umbilical cord is 100% maternal blood
(4) Chorionic villi and uterine tissue become interdigited with each other and jointly form placenta

113. Select the correct option w.r.t. mitosis?

(1) Chromosomes move to spindle equator and get aligned along equatorial plate in metaphase
(2) Chromatids separate but remain in the centre of cell in anaphase
(3) Chromatids starts moving towards opposite poles in telophase
(4) Golgi complex and endoplasmic reticulum are still visible at the end of prophase

114. Choose the correctly matched pair

(1) Tendon - Specialized connective tissue
(2) Adipose tissue - Dense connective tissue
(3) Areolar tissue - Loose connective tissue
(4) Cartilage - Vascular connective tissue

115. Acidic, basic and neutral amino acids are respectively

(1) Glutamic acid, Serine, Lysine
(2) Tyrosine, Phenylalanine, Glycine
(3) Tryptophan, Valine, Serine
(4) Glutamic acid, Lysine, Valine

116. **Assertion :** Biochemical oxygen demand is a value that indicates polluting potential of water.

**Reason :** Biochemical oxygen demand is direct measure of organic matter present in water

(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

117. Select the correct option describing gonadotropin activity in a normal pregnant female

(1) high level of gonadotropins stimulate thickening of endometrium
(2) high level of hCG stimulate thickening of endometrium
(3) high level of hCG stimulate synthesis of estrogen and progesterone
(4) high level of FSH and LH facilitate implantation of embryo

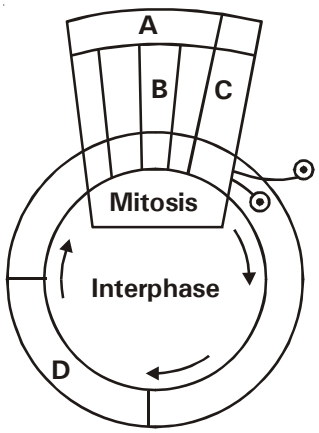
118. Select the correct matching of a hormone, its source and function

| | Hormone | Source | Functions |
|---|---|---|---|
| (1) | Vasopressin | Posterior Pituitary | Increase loss of water through urine |
| (2) | Norepinephrine | Adrenal medulla | Increases heart beat, rate of respiration & alertness |
| (3) | Glucagon | Beta-cells of islets of langerhans | Stimulates glycogenolysis |
| (4) | Prolactin | Posterior pituitary | Regulates growth of mammary glands and milk formation in females |

119. Symptoms like fever, inflammation, deformities and enlargement of limbs occur in
(1) amoebiasis
(2) elephantiasis
(3) ascariasis
(4) entritis

120. What is common in Whale, Bat and Rat?
(1) Absence of neck
(2) Muscular diaphragm between thorax and abdomen
(3) Ectothermy or Poikilothermy
(4) Presence of hair

121. Given below is a schematic break-up of the phases of cell cycle




Which one of the following is the correct indication of the stage/phase in the cell cycle ?
(1) C-Karyokinesis
(2) D-Synthetic phase
(3) A-Cytokinesis
(4) B-Metaphase

122. Increased serum osmolarity stimulates
a. release of ADH from neurohypophysis
b. increased excretion of water in urine
c. increased uptake of $H_2O$ by inducing thirst
d. increased tubular reabsorption of water
(1) b, c & d
(2) a, b & c
(3) a, b & d
(4) a, c & d

123. Which of the following is an incorrect statement?
(1) Evolution of life shows that life forms had a trend of moving from land to water
(2) Small sized reptiles of the era in which dinosaurs became extinct still exist today
(3) Geological history of earth corelates with biological history of organism
(4) The most successful story is the evolution of man with language skills and self-consciousness

124. Which of the following will not be seen in male cockroach?
(1) Seminal vesicle
(2) Mushroom gland
(3) Collaterial glands
(4) Phallic gland

125. Which of these is not an important component of initiation of parturition in humans ?
(1) Increase in oestrogen and progesterone ratio
(2) Synthesis of prostaglandins
(3) Release of oxytocin
(4) Release of prolactin

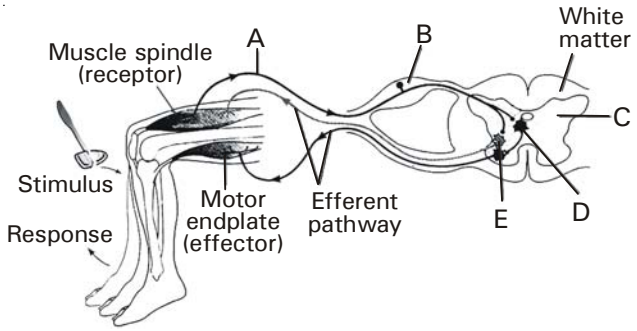
126. Foreign gene that codes for enzyme which can convert the substrate into orange colour was introduced in a plasmid. After introduction of plasmid in bacteria present in the petridish containing substrate.
(1) recombinants will give orange colour and non-recombinants will give white colour
(2) recombinants and non-recombinants both produced white colour
(3) recombinants and non-recombinants both produced orange colour
(4) recombinants will give white colour and non-recombinants will give orange colour

127. An elaborate network of filamentous proteinaceous structures present in the cytoplasm which helps in the maintenance of cell shape is called
(1) thylakoid
(2) endoplasmic reticulum
(3) plasmalemma
(4) cytoskeleton

128. When the inhibitor closely resembles the_____ in its molecular structure and inhibits the activity of the enzyme, it is known as_____ .
(1) Product, competitive inhibitor
(2) Substrate, competitive inhibitor
(3) Substrate, non-competitive inhibitor
(4) Product, non-competitive inhibitor

129. **Statement- I** : Keeping beehives in crop fields during flowering period increases pollination efficiency.
**Statement- II** : Bees are the pollinators of many crop species such as sunflower, *Brassica*, apple and pear.
(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

130. An incorrect statement about the labelled parts is




(1) C– contain interneurons
(2) B–contain pseudounipolar neurons
(3) A– contain sensory fibres
(4) none of these

131. Which is the important site of the formation of glycoproteins and glycolipids in eukaryotic cells?
(1) Endoplasmic Reticulum
(2) Peroxisomes
(3) Golgi Bodies
(4) Polysomes

132. After electrophoresis the separated DNA fragments can be visualised in ethidium bromide when gel is exposed to UV light. The DNA fragments appear as _____ coloured bands. Process of their extraction from gel is known as _____
(1) Orange, spooling
(2) Blue, spooling
(3) Orange, elution
(4) Blue, elution

133. Match the following list of bioactive substances and their roles

| Bioactive Substance | Role |
|---|---|
| i. Statin | (a) Removal of oil stains |
| ii. Cyclosporin A | (b) Removal of clots from blood vessels |
| iii. Streptokinase | (c) Lowering of blood cholesterol |
| iv. Lipase | (d) Immuno-suppressive agent |

Choose the correct match:
(1) i-b, ii-c, iii-a, iv-d
(2) i-d, ii-b, iii-a, iv-c
(3) i-d, ii-a, iii-d, iv-c
(4) i-c, ii-d, iii-b, iv-a

134. The junctions which allow the cells to communicate with each other for rapid transfer of ions, small molecules etc. are
(1) tight junctions
(2) gap junctions
(3) adhering junctions
(4) all of these

135. Identify the articulating bones correctly matched to the material between these
(1) occipital and parietal – white cartilage
(2) pubis and pubis – white fibrous tissue
(3) glenoid cavity and humerus – synovial joint
(4) all are correctly matched

## ZOOLOGY : SECTION-B

**This section has 15 questions, attempt any 10 questions of them.**

136. When more than one adaptive radiation appreared to have occured in an isolated geographical area representing different habitat it is called
(1) convergent evolution
(2) adaptive radiation
(3) natural selection
(4) saltation

137. Use of an artificial kidney during hemodialysis may result in
(a) Nitrogenous waste build-up in the body
(b) Non-elimination of excess potassium ions
(c) Reduced absorption of calcium ions from gastro-intestinal tract
(d) Reduced RBC production
Which of the following options is the most appropriate?
(1) (a) and (b) are correct
(2) (b) and (c) are correct
(3) (c) and (d) are correct
(4) (a) and (d) are correct

138. If number of cycles in PCR are 30 then how many times amplification of DNA will take place
(1) 1 million times
(2) 1 billion times
(3) 2 million times
(4) 2 billion times

139. The protein Hirudin prevents blood clotting and its gene was introduced into a plant. The source of Hirudin gene was
(1) *Hirudinaria* (common leech)
(2) *Brassica napus*
(3) Retrovirus
(4) Artificially synthesized

140. Choose the correct matching
(1) systolic pressure-resting pressure-120 mm Hg
(2) diastolic pressure-pumping pressure-80 mm Hg
(3) diastolic pressure-resting pressure-80 mm Hg
(4) pulse pressure - resting pressure - 40 mm Hg

141. The blood of cockroach contains no respiratory pigment. It means that
(1) Respiration is anaerobic
(2) Cockroach has no respiration
(3) Oxygen goes directly into tissues through tracheal system
(4) Respiration in cockroach is indirect and aerobic

142. If A is medulla, B is pons, C is corpus callosum and D is cerebellum, mark the correct statement out of the following :
(1) 'A' has centre for gastric secretions, cardiac and respiratory activity
(2) 'D' contain pneumotaxic centre
(3) 'B' control rapid muscular movements
(4) 'C' connect two cerebellar hemispheres

143. Select the correct statement from the following regarding cell membrane
(1) Fluid mosaic model of cell membrane was proposed by Singer and Nicolson
(2) $Na^+$ and $K^+$ ions move across cell membrane by passive transport
(3) Proteins make up 40% of the cell membrane of RBC
(4) Lipids are arranged in a bilayer with polar heads towards the inner part

144. **Statement-I** : Addition of exonuclease after the formation of recombinant DNA,by ligating desired gene to plasmid vector will not likely to affect the experiment.
**Statement-II** : All recombinant DNA are closed and have no free ends which can be acted upon by exonuclease.
(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

145. In a muscle fibre, actin and myosin are arranged as rod like structures parallel to each other and
(1) to the longitudinal axis of myofibrils
(2) to the transverse axis of myofibrils
(3) diagonally in myofibrils
(4) randomly in myofibrils

146. Which one is correct?
(1) Notochord is ectodermal in origin present in all chordates
(2) Notochord is replaced by vertebral column in all chordates
(3) Protochordates do not show a notochord in their entire life cycle
(4) Notochord is mesodermally derived rod like, formed on dorsal surface in chordates

147. When you hold your breath, which of the following gas changes in blood would first lead to the urge to breathe?
(1) Rising $CO_2$ and falling $O_2$ concentration
(2) Falling $O_2$ concentration
(3) Rising $CO_2$ concentration
(4) Falling $CO_2$ concentration

148. The correct surgical procedure as a contraceptive method is
(1) Ovariectomy
(2) Hysterectomy
(3) Vasectomy
(4) Castration

149. Which of the following is an incorrect match w.r.t. secondary metabolites?
(1) Alkaloids – Nicotine
(2) Lectin – Ricin
(3) Toxin – Abrin
(4) Drug – Curcumin

150. **Assertion :** Secondary immune response is quick and heightened as compared to the primary immune response.
**Reason :** Memory of the first encounter with the antigen is retained in the body.
(1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(3) Assertion is true statement but Reason is false
(4) Assertion is false

## BOTANY : SECTION-A

**All questions are compulsory in section A**

151. Second order consumers
(1) prey on herbivores
(2) convert solar energy into chemical energy
(3) feed on producers
(4) cannot be eaten by others

152. Percentage of recombination between AB = 10% BC = 13% CD = 20% AD = 17%. Arrange the gene in proper order making a chromosomal map
(1) DBAC
(2) ACBD
(3) ADCB
(4) CBAD

153. The remains of second cotyledon occur in some grasses. It is called
(1) scutellum
(2) hypocotyl
(3) epicotyl
(4) epiblast

154. We can calculate the net gain of ATP for every glucose molecule oxidised if we assume that
(1) acetyl CoA enters the pathway from fat oxidation also
(2) $\alpha$-ketoglutarate produced is utilised to synthesise glutamate
(3) NADH synthesised in glycolysis is undergoing oxidative phosphorylatiion
(4) all intermediate are utilised to synthesis any other compound

155. **Statement-I** : The inheritance of flower colour in *Antirrhinum* (snapdragon) is a good example to understand incomplete dominance.
**Statement-II** : Theoretically, the modified allele could be responsible for production of the normal / less efficient enzyme, a non functional enzyme or no enzyme at all.
(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

156. Parietal placentation is found in
(1) Pea
(2) *Dianthus*
(3) Marigold
(4) Mustard

157. Match the column I and II and select the correct option

| | **Column-I** | | **Column-II** |
|---|---|---|---|
| a. | Two nuclei per cell | i. | Karygamy |
| b. | Fusion of two nuclei | ii. | Dikaryon |
| c. | Fusion of protoplasm | iii. | Fruiting bodies |
| d. | Distinct structure for spores | iv. | Plasmogamy |

(1) a–ii, b–i, c–iv, d–iii
(2) a–ii, b–iv, c–i, d–iii
(3) a–iv, b–ii, c–i, d–iii
(4) a–i, b–ii, c–iii, d–iv

158. What would be the number of chromosomes in aleurone layer if nucellus has 12 chromosomes in a self pollinated plant?
(1) 12
(2) 8
(3) 6
(4) 18

159. Which one of the following is a modification of stem into the flat green and succulent structure?
(1) *Opuntia*, hydrophytic plant
(2) *Acacia*, mesophytic plant
(3) *Opuntia*, xerophytic plant
(4) *Acacia*, xerophytic plant

160. What is not true about **Bryophytes**?
(1) They commonly grow in moist shaded areas in the hills
(2) They play an important role in plant succession on bare rocks/soil
(3) Sporophyte is free living
(4) The bryophytes include the various mosses and liverworts

161. Gregor Mendel, conducted hybridisation experiments on garden pea for seven years between
(1) 1854 – 1861
(2) 1856 – 1863
(3) 1846 – 1853
(4) 1866 – 1873

162. In the absence of a preferred carbon source such as glucose, lactose is provided in the growth medium of the bacteria, the lactose is transported into the cell through the action of
(1) transacetylase
(2) galactosidase
(3) permease
(4) inducer

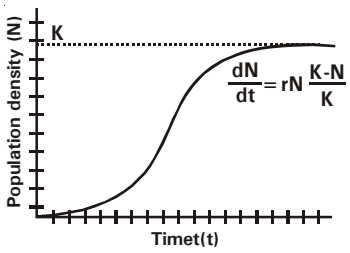
163. While planning for an artificial hybridisation programme involving dioecious plants, which of the following steps would not be relevant?
(1) Bagging of female flower
(2) Dusting of pollen on the stigma
(3) Emasculation
(4) Collection of pollen

164. The colonies of BGA are generally suurrounded by
(1) gelatinous sheath
(2) chitin
(3) cellulose
(4) non cellulosic polysaccharides

165. Nodules on the roots of *Alnus* are produced by
(1) *Frankia*
(2) *Rhizobium*
(3) *Nitrobacter*
(4) *Nitrocystis*

166. How many statements are true ?
   a. Unlike bryophytes and pteridophytes, in gymnosperms the male and female gametophytes do not have an independent free living existence
   b. Membrane bound enzyme of Krebs cycle is succinate dehydrogenase
   c. Copper is essential for overall metabolism in plants
   d. Number of mitochondria per cell is variable depending on physiological activity of cell
   (1) One
   (2) Two
   (3) Three
   (4) Four

167. Which is incorrect w.r.t. growth curve given below?




   (1) It is found in stable type of population
   (2) An equilibrium is reached when size of population approaches carrying capacity of area
   (3) Environmental resistance does not operate to slow down exponential phase
   (4) A phase of deceleration occurs before equilibrium is reached

168. Disease resistance is obtained through
   (1) colchicine treatment
   (2) crossing with wild relatives
   (3) X-ray treatment
   (4) hormone treatment

169. Which is not a physiological function of abscisic acid (ABA)?
   (1) Inhibits seed germination
   (2) Stimulates stomatal closure
   (3) Increases the tolerance of plants
   (4) Thinning of cotton, cherry, walnut

170. Pyramids of number may be spindle shaped in case of
   (1) pond ecosystem
   (2) sugarcane ecosystem
   (3) tree dominated ecosystem
   (4) grass land ecosystem

171. **Assertion** : Viruses having RNA genome, show shorter life span, mutate and evolve faster.
   **Reason** : RNA is chemically more reactive and structurally less stable.
   (1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
   (2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
   (3) Assertion is true statement but Reason is false
   (4) Assertion is false

172. 'Red tides' in coastal water developed due to super abundance of
   (1) dinoflagellates
   (2) diatoms
   (3) chrysophytes
   (4) euglenoids

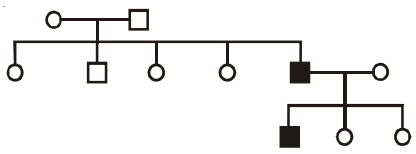
173. During glycolysis, a molecule that receives two redox equivalents is
   (1) PGAL
   (2) BPGA
   (3) $NAD^+$
   (4) PEP

174. Extract of Tobacco with mosaic disease was called *Contagium vivum fluidum* by
   (1) Ivanowski
   (2) Beijerinck
   (3) Pasteur
   (4) Stanley

175. Root pressure is maximum when
   (1) transpiration is high, absorption is low
   (2) transpiration is low, absorption is high
   (3) both transpiration and absorption are low
   (4) both transpiration and absorption are high

176. Biodiversity loss is due to all except
   (1) habitat loss and fragmentation
   (2) alien species invasion
   (3) over exploitation
   (4) variability in plant produces

177. In the following pedigree chart, the trait understudy is shaded black. Gene responsible for the trait is



   (1) dominant and sex–linked
   (2) dominant and autosomal
   (3) recessive and sex–linked
   (4) recessive and autosomal

178. Which of the following helps bacteria in adhesion to substratum?
(1) flagella
(2) pili
(3) fimbriae
(4) mesosome

179. Two, unequal and laterally attached flagella is found in the spores of
(1) Green algae
(2) Brown algae
(3) Red algae
(4) Blue green algae

180. DNA sequence on coding strand is 'ACCTTGACG'. After transcription, sequence on RNA strand will be____
(1) 'AGGUUCAGC'
(2) 'UGGAACUGC'
(3) 'UCCAAGUCG'
(4) 'ACCUUGACG'

181. br $\oplus$ $K_5$ _____ $A_{(9)+1}G_1$
In floral formula of fabaceae, missing floral organ is
(1) $C_{2+(2)}$
(2) $C_{1+2}$
(3) $C_{1+2+(2)}$
(4) $C_5$

182. Which is incorrect about $C_4$ plants?
(1) They have a special type of leaf anatomy
(2) They show a response to highlight intensities
(3) They do not tolerate high temperature
(4) They lack photorespiration process and have greater productivity of biomass

183. **Statement-I** : Each ovary bears one or more ovules attached to a flattened, cushion-like placenta.
**Statement-II** : Ovary is the enlarged basal part of carpel.
(1) Both statement-I and statement-II are correct
(2) Both statement-I and statement-II are incorrect
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

184. Which of the following statements is true about spring wood?
a. It is called early wood
b. This is darker in colour
c. It has low density
(1) a, b, c
(2) b and c
(3) only b
(4) a and c

185. Single base substitution at the sixth codon of beta globin gene from GAG to GUG result in
(1) presence of valine instead of glutamic acid in the beta globin chain
(2) abrupt termination of translation
(3) non-transcription of corresponding gene
(4) non-synthesis of beta globin chain of haemoglobin

## BOTANY : SECTION-B

**This section has 15 questions, attempt any 10 questions of them.**

186. Which two families have been put in order polymoniales?
(1) Solanaceae, Convolvulaceae
(2) Solanaceae, Poaceae
(3) Convolvulaceae, Poaceae
(4) Convolvulaceae, Anacardiaceae

187. Match the modifications of stem in column I with their actions in column II.

| **Column I** | | **Column II** | |
|---|---|---|---|
| a. | Storage | i. | contain chlorophyll |
| b. | Support | ii. | are spirally coiled and help plants to climb |
| c. | Protection | iii. | act as organs of perenna tion to tide over conditions unfavourable for growth |
| d. | Photosynthesis | iv. | woody & pointed thorns |

(1) a–iii, b–ii, c–iv, d–i
(2) a–iii, b–i, c–ii, d–iv
(3) a–iv, b–i, c–iii, d–ii
(4) a–iv, b–iii, c–i, d–ii

188. Read the following statements and select the incorrect statements
   a. Micropyle remains as a small pore in seed coat
   b. Micropyle facilitates entry of oxygen and water into seed during germination
   c. As seed matures, its water content increases
   d. General metabolism of embryo slows down when it enters a state of dormancy
   e. During unfavourable conditions seed germinates
   (1) b, c
   (2) a, c
   (3) d, e
   (4) c, e

189. Identify the incorrect statement
   (1) The main enzyme of DNA replication is referred to as DNA-dependent DNA polymerase
   (2) *E. coli* completes the process of replication within 18 minutes
   (3) Any mistake during replication would result into mutation
   (4) Taylor and colleagues proved that the DNA in *E.coli* also replicate semi conservately

190. The membrane of granas have both __(i)__ and __(ii)__, the stromal lamellae lack PS-II as well as __(iii)__
   (1) i–PS-I, ii–PS-II, iii–PS-I
   (2) i–NADP reductase, ii–PS-II, iii–PS-I
   (3) i–PS-I, ii–NADP reductase, iii–PS-I
   (4) i–PS-I, ii–PS-II, iii–NADP reductase

191. **Assertion** : Mass flow is movement of substances in bulk as a result of pressure gradient between two points.
   **Reason** : Bulk flow can be achieved only through negative hydrostatic pressure gradient.
   (1) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
   (2) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
   (3) Assertion is true statement but Reason is false
   (4) Assertion is false

192. Which statement is correct?
   a. Pollen grains are rich in nutrients
   b. Pollen tablets can be used as food supplements
   c. Pollen consumption has been claimed to increase performance of athletes & race horses
   (1) Both a & b
   (2) Both b & c
   (3) Both a & c
   (4) a, b & c

193. In which one of the following option, all the individuals do not produce only one type of gamete?
   (1) AA, aa, YYrr
   (2) aaBB, AABB, aabb
   (3) TTrrYY, ttrryy, AAbbcc
   (4) TtRrYY, ttrryy, AAbbcc

194. A plant organ under microscope shows conjoint, open vascular bundles arranged in a ring. This organ must be having
   (1) casparian strip
   (2) collenchymatous hypodermis
   (3) sclerenchymatous bundle sheath
   (4) water containing cavities in vascular bundle

195. Select the incorrect statement w.r.t competition
   (1) Resources need not to be limiting for competition to occur
   (2) Totally unrelated species could also compete for the same resource
   (3) Carnivores appear to be more adversely effected by competiton than herbivores and plants
   (4) Abingdon tortoise became extinct due to greater browsing efficiency of the goats

196. What were the measures taken by the government under the Supreme Court directives to control air pollution in Delhi?
   a. Switching over the entire fleet of public transport from diesel to petrol by 2002
   b. Phasing out of old vehicles
   c. Use of leaded petrol
   d. Use of catalytic converters in vehicles
   e. Compulsory regular check up of pollution emission of vehicles
   (1) a, b, d, e
   (2) a, b, c, d, e
   (3) b, c, d, e
   (4) b, c, d

197. Amino acid binding site in t-RNA is
(1) CCA 3′ end
(2) DHU loop
(3) 5′ end
(4) Anticodon loop

198. **Statement-I** : In monosporic development, embryosac formation takes place from a single megaspore.
**Statement-II** : It is most common type and is found in 80% of seed plants.
(1) Both statement-I and statement-II are incorrect
(2) Both statement-I and statement-II are correct
(3) Statement-I is correct but statement-II is incorrect
(4) Statement-I is incorrect but statement-II is correct

199. At begining of 20th century, forests covered about 30% of land of India. By end of century it shrunk to
(1) 9.5%
(2) 24.4%
(3) 21.54%
(4) 12.6%

200. Identify the following diagram

(1) *Salvinia*
(2) *Selagenella*
(3) *Ginkgo*
(4) *Equisetum*