Aakash BYJU'S

CODE-A

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**MM : 720** Mock Test - 01 **Time : 3 Hrs. 20 Mins.**

***Complete Syllabus of Class-XI & XII***

**Instructions:**

(i) There are two sections in each subject, i.e. Section-A & Section-B. You have to attempt all 35 questions from Section-A & only 10 questions from Section-B out of 15.

(ii) Each question carries 4 marks. For every wrong response 1 mark shall be deducted from the total score. Unanswered / unattempted questions will be given no marks.

(iii) Use blue/black ballpoint pen only to darken the appropriate circle.

(iv) Mark should be dark and completely fill the circle.

(v) Dark only one circle for each entry.

(vi) Dark the circle in the space provided only.

(vii) Rough work must not be done on the Answer sheet and do not use white-fluid or any other rubbing material on the Answer sheet.

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# PHYSICS

**Choose the correct answer :**

## SECTION-A

1. A solid sphere rolling on a smooth horizontal surface with constant velocity $v$ enters into rough horizontal surface with same speed $v$. Choose the correct statement.

   (1) Speed of sphere will decrease to $\frac{5v}{7}$

   (2) Speed of sphere will decrease to $\frac{2v}{7}$

   (3) Speed of sphere will increase to $\frac{7v}{5}$

   (4) Speed of sphere will not change

2. A simple pendulum is oscillating in a lift moving against gravitational pull of earth with acceleration $3g$. The time period of pendulum will be

   ($g$ is acceleration due to gravity)

   (1) $2\pi\sqrt{\frac{l}{g}}$ (2) $\pi\sqrt{\frac{l}{g}}$

   (3) $2\pi\sqrt{\frac{l}{3g}}$ (4) $\pi\sqrt{\frac{l}{3g}}$

3. From a uniform disc of mass $M$ and radius $R$ centred at origin, a concentric disc of radius $R/3$ is removed. Centre of mass of remaining portion is at

   (1) $\left(\frac{R}{3}, 0\right)$

   (2) $\left(\frac{R}{12}, 0\right)$

   (3) $(R, 0)$

   (4) $(0, 0)$

4. Two coaxial solenoids are brought closer till they completely overlap. Their mutual inductance will

   (1) Keep on decreasing

   (2) Keep on increasing

   (3) First decease and then increase

   (4) First increase and then decrease

5. A biconvex lens, kept in air, when silvered on one side will act as

   (1) Converging lens

   (2) Diverging lens

   (3) Converging mirror

   (4) Diverging mirror

6. Choose the correct statement about order of colours in primary and secondary rainbow.
   (1) Violet is innermost colour in primary rainbow whereas violet is outermost colour in secondary rainbow
   (2) Violet is outermost colour in primary rainbow whereas it is innermost in secondary rainbow
   (3) Violet is outermost colour in both primary and secondary rainbow
   (4) Violet is innermost colour in both primary and secondary rainbow

7. The phenomenon of the red shift is due to
   (1) Increase in wavelength due to doppler effect
   (2) Decrease in wavelength due to doppler effect
   (3) Increase in frequency due to doppler effect
   (4) Both (2) and (3)

8. The intensity of the electric field produced by the radiation coming from a 200 W bulb at a distance of 3 m is
   (1) 0.022 W/m$^2$ (2) 0.88 W/m$^2$
   (3) 0.046 W/m$^2$ (4) 0.059 W/m$^2$

9. The dimensional formula for thermal resistance is
   (1) $M^{-1}L^{-2}T^{3}$ K (2) $ML^2T^{-2}K^{-1}$
   (3) $ML^2T^{-3}K$ (4) $ML^2T^{-2}K^{-2}$

10. A wall has two layers *A* and *B* made of different materials. The thickness of both the layers is same. The thermal conductivity of *A* and *B* are $K_A$ and $K_B$ such that $K_A = 3K_B$. The temperature across wall is 20°C. In thermal equilibrium
    (1) Temperature difference across *A* = 15°C
    (2) Temperature difference across *A* = 5°C
    (3) Temperature difference across *A* = 10°C
    (4) Temperature difference across *A* = 25°C

11. Consider the Bohr model of hydrogen like atom. Column-I contains some entries and Column-II contains proportionality on atomic number *Z*.

| | **Column-I** | | **Column-II** |
|---|---|---|---|
| A. | Radius of an orbit | (P) | Is proportional to *Z* |
| B. | Velocity of electron in an orbit | (Q) | Is independent of *Z* |
| C. | Energy of electron in an orbit | (R) | Is inversely proportional to *Z* |
| D. | Angular momentum of electron in an orbit | (S) | Is proportional to $Z^2$ |

   (1) A(R), B(P), C(S), D(Q)
   (2) A(P), B(Q), C(R), D(S)
   (3) A(R), B(Q), C(S), D(P)
   (4) A(S), B(P), C(Q), D(R)

12. For thermonuclear fusion reaction, the estimated temperature of the system should be about
    (1) $3 \times 10^9$ K (2) $3 \times 10^5$ K
    (3) $3 \times 10^3$ K (4) $3 \times 10^6$ K

13. For a given surface the Gauss's law is stated as $\int \vec{E}.\vec{ds} = 0$. From this we can conclude that
    (1) *E* is necessarily zero on the surface
    (2) *E* is perpendicular to the surface at every point
    (3) Total electric flux through the surface is zero
    (4) Flux is going out of the half surface while flux is going in to the other half surface

14. Consider the following two statements.
    (A) For a charged particle moving from point '*P*' to point '*Q*', the net work done by an electrostatic field on the particle is independent of the path connecting point *P* to point *Q*.
    (B) The net work done by a conservative force on an object moving along closed loop is zero.

    Which of the following option is true?
    (1) Statement A is correct while statement B is incorrect
    (2) Statement B is correct while statement A is incorrect
    (3) Statement A and statement B, both are correct
    (4) Statement A and statement B, both are incorrect

15. A suspended simple pendulum of length *l* is making an angle $\theta$ with the vertical. On releasing the pendulum from this position, find the speed of bob of pendulum when it reaches its lowest position.
    (1) $\sqrt{2gl\,(1-\sin\theta)}$ (2) $\sqrt{2gl\cos\theta}$
    (3) $\sqrt{2gl\sin\theta}$ (4) $\sqrt{2gl\,(1-\cos\theta)}$

16. A particle is projected with speed 50 m/s at an angle $\theta$ with horizontal such that horizontal range acquired by the particle is double of the maximum height achieved by it. Which of the following is correct value of $\theta$?
    (1) $\tan^{-1}(2)$ (2) $\cos^{-1}(\sqrt{5}/2)$
    (3) $\sin^{-1}(2/\sqrt{5})$ (4) Both (1) and (3)

17. The distance of two planets from the Sun are $10^{27}$ m and $10^{26}$ m. The ratio of time periods of these two planets around the Sun is

(1) 10 (2) 100

(3) $10\sqrt{10}$ (4) $\sqrt{10}$

18. The acceleration '*a*' of a body starting from rest varies with time '*t*' as $a = 3t + 4$ in SI units. The velocity of the body at time $t = 2$ s will be

(1) 10 m/s (2) 18 m/s

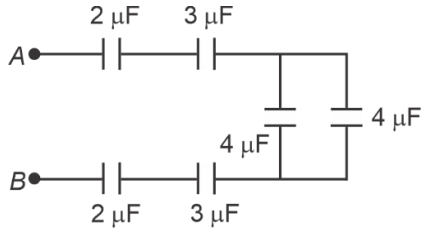
(3) 14 m/s (4) 26 m/s

19. The velocity of a small ball of mass 10 g and density 7.8 g/cc when dropped in a container filled with glycerine becomes constant after some time. If the density of glycerine is 1.3 g/cc, what is the viscous force acting on the ball?

(1) $5.126 \times 10^3$ dyne (2) $8.166 \times 10^3$ dyne

(3) $7.521 \times 10^3$ dyne (4) 1633.33 dyne

20. The effective capacity between *A* and *B* in the figure shown is




(1) $\frac{43}{24}\mu F$ (2) $\frac{24}{43}\mu F$

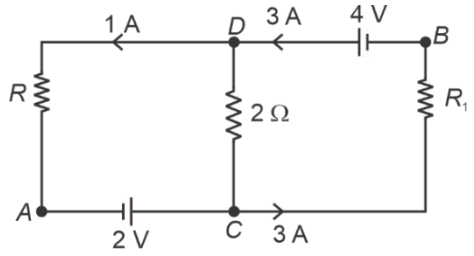
(3) $\frac{43}{12}\mu F$ (4) $\frac{12}{43}\mu F$

21. Find the current flowing through a copper wire of length 0.2 m, area of cross-section 1 $mm^2$, when connected to a battery of 4 V. Given that electron mobility $= 4.5 \times 10^{-6} \frac{m^2}{Vs}$ and charge on electron = $1.6 \times 10^{-19}$ C. The number density of electron in copper is $8.5 \times 10^{28}$ /$m^3$.

(1) 4.68 A (2) 2.12 A

(3) 1.22 A (4) 4.52 A

22. In the given circuit, if potential at point *A* is zero, find the potential of point *B*.




(1) 6*V* (2) 4*V*

(3) 2*V* (4) 0

23. A source of sound is travelling towards a stationary observer. The frequency of sound heard by the observer is 20% more than the actual frequency. If the speed of sound is *v*, then speed of source is

(1) $\frac{v}{4}$ (2) $\frac{v}{3}$

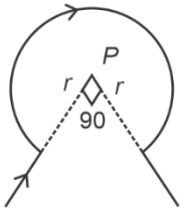
(3) $\frac{v}{2}$ (4) $\frac{v}{6}$

24. A wave of length 2 m is superposed on its reflected wave to form a stationary wave. A node is located at $x = 3$ m. The next node will be located at $x =$

(1) 3.25 m (2) 3.50 m

(3) 3.75 m (4) 4 m

25. The wire shown in figure carries a current of 40 A. If $r = 3.14$ cm, the magnetic field at point *P* will be




(1) $1.6 \times 10^{-3}$ T (2) $3.2 \times 10^{-3}$ T

(3) $6 \times 10^{-4}$ T (4) $4.8 \times 10^{-3}$ T

26. In a common emitter amplifier, using output resistance of 5000 Ω and the input resistance 2000 Ω, if the peak value of input signal voltage is 100 mV and $\beta = 50$, then the peak value of output voltage is

(1) $5 \times 10^{-6}$ V (2) $12.5 \times 10^{-4}$ V

(3) 12.5 V (4) 1.25 V

27. When *n-p-n* transistor is used as an amplifier

(1) Electron move from emitter to collector

(2) Holes move from emitter to base

(3) Electrons move from collector to base

(4) Holes move from base to collector

28. A circular railway track of radius *r* is banked at angle θ so that a train moving with speed *v* can safely go round the track. A student writes: $\tan\theta = \frac{rg}{v^2}$. Why this relation is not correct?

(i) Equality of dimensions does not guarantee correctness of the relation

(ii) The relation is dimensionally incorrect

(1) (i) (2) (ii)

(3) Both (i) and (ii) (4) Neither (i) nor (ii)

29. The product of 1.2, 2.54 and 3.257 is
(1) 9.934 (2) 9.93
(3) 9.9346 (4) 9.9

30. A time varying horizontal force $F = at$ acts on a block of mass $m$ kept on a smooth horizontal surface. An identical block is kept on the first block. The coefficient of friction between the blocks is $\mu$. The time after which the relative sliding between the blocks prevails is
(1) $\frac{2mg}{a}$ (2) $\frac{2\mu mg}{a}$
(3) $\frac{\mu mg}{a}$ (4) $2\mu mga$

31. Two wires $P$ and $Q$ are made of same material and have same volume. The length of $P$ is 3 times that of $Q$. If they are stretched by same force, then find out the ratio of increment in their lengths.
(1) 3 : 4 (2) 5: 8
(3) 6 : 7 (4) 9 : 1

32. In a thermodynamic process, work done on the system is 100 J and heat given to system is 500 cal. Then calculate change in internal energy of system. (approx)
(1) 254 cal (2) 245 cal
(3) 524 cal (4) 542 cal

33. Let $v$, $v_{rms}$ and $v_p$ respectively denote the mean speed, the root mean square speed and the most probable speed of molecules in an ideal monoatomic gas at absolute temperature $T$. The mass of a molecule is $m$. Then
(1) No molecule can have speed greater than $v_{rms}$
(2) No molecule can have speed less than $\frac{v_p}{\sqrt{2}}$
(3) The average kinetic energy of a molecule is $\frac{3}{4}mv_p^2$
(4) None of these

34. A short bar magnet is placed with its north pole pointing north. The neutral point is 10 cm away from the centre of the magnet. If $H$ (horizontal component of earth's magnetic filed) = $0.4G$, calculate the magnetic moment of magnet.
(1) 0.8 A m$^2$ (2) 0.1 A m$^2$
(3) 0.4 A m$^2$ (4) 0.6 A m$^2$

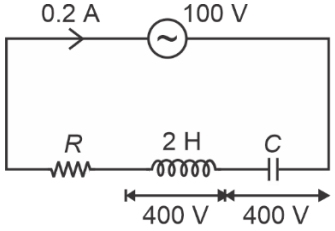
35. An inductor of resistance 200 $\Omega$ and self inductance 1 H is connected to an ac-source of frequency $\frac{100}{\pi}$ Hz. Find out the phase difference between voltage and current in circuit.
(1) 60° (2) 30°
(3) 45° (4) Zero

## SECTION-B

36. Five forces $\vec{F_1}, \vec{F_2}, \vec{F_3}, \vec{F_4}$ and $\vec{F_5}$ acting on a particle of mass 2 kg so that, it is moving with acceleration of 4 m/s$^2$ in east direction. If $\vec{F_1}$ force is removed, then the acceleration becomes 7 m/s$^2$ in north, then the acceleration of the block if only $\vec{F_1}$ is acting will be
(1) 16 m/s$^2$ (2) $\sqrt{65}$ m/s$^2$
(3) $\sqrt{260}$ m/s$^2$ (4) $\sqrt{33}$ m/s$^2$

37. Calculate the least amount of work that must be done to freeze one gram of water at 0°C by means of a refrigerator. Temperature of surroundings is 27°C. Latent heat of fusion $L$ = 80 cal/g.
(1) 2.91 cal (2) 3.91 cal
(3) 6 cal (4) 7.91 cal

38. Which of the following option is correct?




(1) $R$ = 400 $\Omega$, $C$ = 0.5 F
(2) $R$ = 500 $\Omega$, $C$ = 1 $\mu$F
(3) $R$ = 500 $\Omega$, $C$ = 0.5 $\mu$F
(4) $R$ = 400 $\Omega$, $C$ = 0.1 $\mu$F

39. Match the logic gates in Column-I to the output for the given input $A$ and $B$ in column-II

| | Column-I | | Column-II |
|---|---|---|---|
| A. | AND gate | P. | $\overline{A+B}$ |
| B. | OR gate | Q. | $\overline{A \cdot B}$ |
| C. | NAND gate | R. | $A + B$ |
| D. | NOR gate | S. | $A \cdot B$ |

(1) A(P), B(S), C(Q), D(R)
(2) A(S), B(R), C(Q), D(P)
(3) A(Q), B(S), C(P), D(R)
(4) A(Q), B(R), C(P), D(S)

40. If the duration of an event measured is 5.00 second, then the maximum percentage error in the measurement will be
(1) 0.01% (2) 0.4%

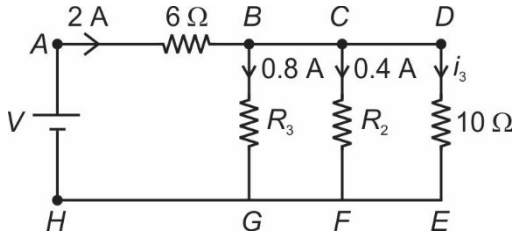
(3) 0.2% (4) 0.3%

41. The magnetic induction at a point distance '*X*' from the centre, on the axis of a circular current carrying coil is inversely proportional to (if $X >>$ radius of coil)

(1) $X$ (2) $X^2$

(3) $X^3$ (4) $X^{3/2}$

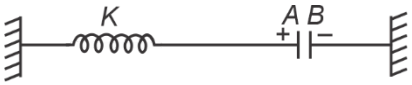
42. The equivalent resistance between points *A* and *H* for the circuit shown below is




(1) 20 Ω (2) 15 Ω

(3) 25 Ω (4) 10 Ω

43. Plate *A* of a parallel plate air filled capacitor is connected to a spring having force constant *K* and plate *B* is fixed. They are held on a frictionless table top in equilibrium as shown in the figure. If a charge $+q$ is placed on plate *A* and a charge $-q$ on plate *B*, by how much does the spring expand?




(1) $\frac{q^2}{\varepsilon_0 KA}$

(2) $\frac{q^2}{2\varepsilon_0 KA}$

(3) $\frac{q^2}{4\varepsilon_0 KA}$

(4) $\frac{\varepsilon_0 KA}{2q^2}$

44. A piece of pure gold of density 19.3 g/cc is suspected to be hollow inside. It weighs 38.250 g in air and 33.865 g in water. Calculate the volume of the hollow portion of the gold.

(1) 6.403 $cm^3$

(2) 5.402 $cm^3$

(3) 1.659 $cm^3$

(4) 2.403 $cm^3$

45. A 400 W sodium street lamp emits yellow light of wavelength 0.6 μm. Assuming it to be 50% efficient in converting electrical energy to light, the approximate number of photons of yellow light it emits per second is

(1) $3 \times 10^{20}$

(2) $1.2 \times 10^{18}$

(3) $5 \times 10^{22}$

(4) $6 \times 10^{20}$

46. The gravitational field in a region is given by $\vec{E} = (6\hat{i} + 2\hat{j})$ N/kg. Work done by the field is zero, if particle moves along the line

(1) $3y + 2x = 3$

(2) $y = 3x + 5$

(3) $3y - 2x = 3$

(4) $y + 3x = 5$

47. A body of mass 2 kg begins to move under the action of a time dependent force $\vec{F} = (4t\hat{i} + 6t^2\hat{j})$ N, where $\hat{i}$ and $\hat{j}$ are unit vectors along *x* and *y* axis.

What is the power delivered by the force at any instant of time '*t*'?

(1) $4t^2 + 6t^3$

(2) $4t^3 + 6t^5$

(3) $8t^3 + 12t^5$

(4) $3t^2 + 8t^3$

48. The 6563 Å wavelength emitted by a hydrogen in star is found to be red-shifted by 15 Å. The speed with which star is receding away from the earth is

(1) $5.79 \times 10^6$ m/s

(2) $7.62 \times 10^3$ m/s

(3) $6.85 \times 10^5$ m/s

(4) $4.22 \times 10^5$ m/s

49. An object is kept at a distance of 20 cm from a concave lens of focal length 10 cm. At what distance from the lens should a concave mirror of focal length 30 cm be placed such that the final image coincides with object?

(1) 10 cm

(2) 20 cm

(3) $\frac{160}{3}$ cm

(4) $\frac{100}{3}$ cm

50. Limiting friction due to normal force 10 N and coefficient of friction 0.2 is

(1) 10 N

(2) 20 N

(3) 2 N

(4) 4 N

## CHEMISTRY

### SECTION-A

51. The $K_C$ for the reaction A + B ⇌ 2C is 9. If one mole A and B are mixed initially in 10 L container then equilibrium concentration of C is

(1) $\frac{3}{5}$ M (2) $\frac{3}{50}$ M

(3) $\frac{6}{5}$ M (4) $\frac{3}{25}$ M

52. Octet rule is not valid in

(1) $N_2O_3$ (2) $N_2O$

(3) NO (4) $N_2O_5$

53. Which of the following mixture of solution will lead to the formation of negatively charged colloidal [AgI]/$I^-$ sol?

(1) 100 ml of 0.1 M $AgNO_3$ + 100 ml of 0.1 M KI

(2) 100 ml of 0.1 M $AgNO_3$ + 50 ml of 0.1 M KI

(3) 100 ml of 0.1 M $AgNO_3$ + 75 ml of 0.1 M KI

(4) 100 ml of 0.1 M $AgNO_3$ + 150 ml of 0.1 M KI

54. For a first order reaction, ratio of time required for 99.9% completion to the 90% completion of the reaction is

(1) 9 : 1 (2) 6 : 1

(3) 3 : 1 (4) 10 : 1

55. The value of $k_f$ is given by

(1) $\frac{R \times M_1 \times T_f}{1000 \times \Delta_{fus}H}$ (2) $\frac{R \times M_1 \times T_f^2}{1000 \times \Delta_{fus}H}$

(3) $\frac{R \times M_1^2 \times T_f}{1000 \times \Delta_{fus}H}$ (4) $\frac{R \times M_1 \times T_f}{1000 \times \Delta_{fus}H^2}$

56. A solution of nitric acid has 63% nitric acid by mass. If density of solution is 1.5 g $mL^{-1}$ then molarity of the solution is

(1) 2.5 M (2) 5 M

(3) 10 M (4) 15 M

57. In the brown ring test for nitrate ion the brown coloured complex so formed is

(1) $[Fe(H_2O)_5NO]^{3+}$

(2) $[Fe(H_2O)_5NO]^{2+}$

(3) $Fe_4[Fe(CN)_6]\cdot xH_2O$

(4) $[Fe(CN)_5NO]^{2-}$

58. **Statement-I:** The first ionisation enthalpy of molecular oxygen is almost identical with that of Xe.

**Statement-II:** The electron gain enthalpy Ar is identical with Kr.

In the light of the above statements, identify the correct option.

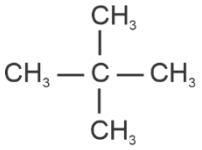
(1) Statement-I is correct but statement-II is incorrect

(2) Statement-I is incorrect but statement-I is correct

(3) Both statement-I and statement-II are true

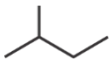
(4) Both statement-I and statement-II are false

59. Which of the following alkanes on photochemical monochlorination yield maximum number of isomers (exclude stereoisomers)?

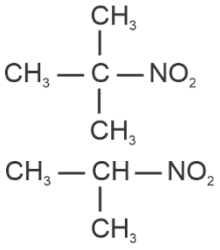
(1) 

(2) 

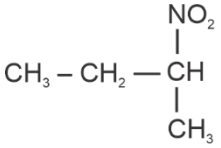
(3) 

(4) 

60. Which of the following nitro compounds on reaction with nitrous acid gives a compound X, which when dissolved in alkali imparts red colour to the solution?

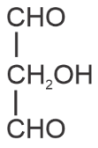
(1) 

(2) $CH_3–CH_2NO_2$

(3) 

61. Glycerol on reaction with periodic acid gives

(1) 2HCOOH + HCHO

(2) 

(3) $2HCHO + HCOOH$

(4) $3CO_2$

62. Monomers of PHBV are

(1) 3-hydroxybutanoic acid and 3-hydroxypentanoic acid

(2) 2-hydroxypropanoic acid and 3-hydroxybutanoic acid

(3) Ethylene glycol and 3-hydroxypentanoic acid

(4) Adipic acid and hexamethylenediamine

63. Identify the incorrect statement.

(1) Barbiturates are hypnotic

(2) Norethindrone is an example of synthetic progesterone derivative

(3) Sulphur dioxide and sulphite are useful antioxidants for wine and beer

(4) Aspartame is a trichloroderivative of sucrose

64. Ionic mobility of which of the following metal ions is lowest when aqueous solution of their salt are put under an electric field?

(1) Be (2) Mg

(3) Ca (4) Sr

65. The angular momentum of an electron in 3*d* orbital is

(1) $\frac{\sqrt{6}h}{2\pi}$

(2) $\frac{\sqrt{3}h}{2\pi}$

(3) $\frac{\sqrt{5}h}{\pi}$

(4) $\frac{2h}{\pi}$

66. Which of the following gas is the major contributor to global warming?

(1) $O_3$ (2) $CO_2$

(3) $H_2O$ (4) $N_2O$

67. The incorrect statement regarding carbon monoxide is

(1) It is colourless and odourless gas

(2) It is highly poisonous gas due to its ability to form highly stable carboxy-haemoglobin complex

(3) It is a powerful reducing agent and reduces all metal oxides

(4) It contain one sigma and two $\pi$ bonds between carbon and oxygen.

68. Match the oxides given in List-I with their property enlisted in List-II.

| | **List-I** | | **List-II** |
|---|---|---|---|
| a. | $Na_2O$ | (i) | Acidic |
| b. | $Al_2O_3$ | (ii) | Basic |
| c. | $Cl_2O_7$ | (iii) | Neutral |
| d. | $N_2O$ | (iv) | Amphoteric |

Select the correct option among the following.

| | **a** | **b** | **c** | **d** |
|---|---|---|---|---|
| (1) | (ii) | (iv) | (iii) | (i) |
| (2) | (i) | (iii) | (iv) | (ii) |
| (3) | (ii) | (iv) | (i) | (iii) |
| (4) | (iii) | (i) | (ii) | (iv) |

69. A vessel contains $H_2$ and $O_2$ in 1 : 2 molar ratio at 5 atm pressure. The ratio of their rate of diffusion is

(1) 1: 4 (2) 2 : 1

(3) 2 : 3 (4) 1 : 3

70. Which of the following ions has electronic configuration [Ar] $3d^5$?

(1) $Mn^{3+}$ (2) $Fe^{2+}$

(3) $Co^{4+}$ (4) $Cr^{2+}$

71. Which of the following statements about Hydrogen is correct?

(1) Hydrogen has three isotopes of which Deuterium is the most common

(2) In laboratory dihydrogen is prepared by the reaction of granulated Zn with dil·HCl

(3) Tritium isotope of hydrogen contains equal number of protons and neutrons

(4) Dihydrogen does not act as a reducing agent

72. The number of moles of nitrogen molecules required to produce 50 moles of ammonia through Haber's process is

(1) 30 (2) 25

(3) 35 (4) 20

73. **Statement-I:** Work done during free expansion of an ideal gas in a isothermal process is zero.

**Statement-II:** Work is a path function.

In the light of above statements choose the correct option among the following.

(1) Statement-I is true but statement-II is false

(2) Statement-I is false but statement-II is true

(3) Both statement-I and statement- II are true

(4) Both statement-I and statement- II are false

74. Identify the incorrect statement among the following.

(1) Pig iron can be moulded into a variety of shapes

(2) Mineral's are naturally occurring chemical substances in the earth's crust

(3) Sulphides ore are concentrated by froth floation process

(4) Zn can be used to reduce alumina

75. **Statement-I:** Lithium is the strongest reducing agent among alkali metals.

**Statement-II:** Fluorine is the strongest oxidising agent among halogens.

In the light of above statements choose the correct option a among the following.

(1) Statement-I is true but statement-II is false

(2) Statement-I is false but statement-II is true

(3) Both statement-I and statement-II are false

(4) Both statement-I and statement-II are true

76. If the $E^{\circ}_{cell}$ for a given reaction has a positive value, which of the following gives the correct relationship for the value of $\Delta G^{\circ}$ and $K_{eq}$?

(1) $\Delta G^{\circ} < 0, K_{eq} < 1$ (2) $\Delta G^{\circ} < 0, K_{eq} > 1$

(3) $\Delta G^{\circ} > 0, K_{eq} < 1$ (4) $\Delta G^{\circ} > 0, K_{eq} > 1$

77. An atom at the corner of a simple cubic unit cell is shared among how many unit cells?

(1) 2 (2) 4

(3) 6 (4) 8

78. Total number of atoms present in a unit cell of diamond is

(1) 6 (2) 8

(3) 4 (4) 2

79. IUPAC name of the compound $[CoCl_2(en)_2]Cl$ is

(1) Bis (ethane-1, 2-diamine) dichloridocobalt (III) chloride

(2) Bis (ethane-1, 2-diamine) dichloridocobalt (II) chloride

(3) Dichloridobis (ethane-1, 2-diamine) cobalt (III) chloride

(4) Dichloridobis (ethane-1, 2-diamine) cobalt (II) chloride

80. **Statement-I:** The stereoisomers related to each other as superimposable mirror images are called enantiomers.

**Statement-II:** If one of the enantiomers is dextro rotatory, the other will be laevo rotatory.

In light of above statements, choose the correct answer.

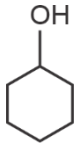
(1) Statement-I is correct but statement-II is incorrect

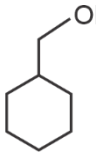
(2) Statement-I is incorrect but statement-II is correct

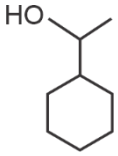
(3) Both statement-I and statement-II are correct

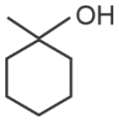
(4) Both statement-I and statement-II are incorrect

81. Which among the following alcohols on reaction with copper at 573 K gives alkene as major product?

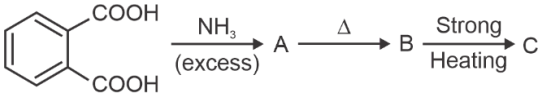
(1) 

(2) 

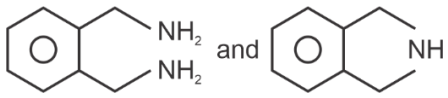
(3) 

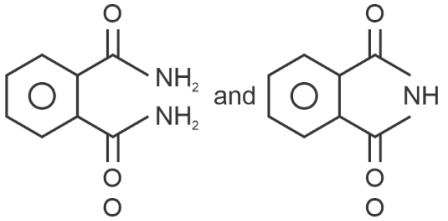
(4) 

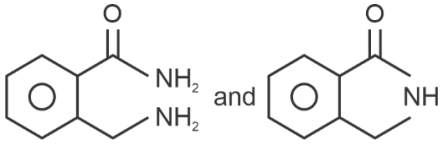
82. Consider the following reaction sequence




B and C respectively are

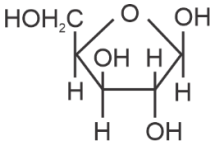
(1) 

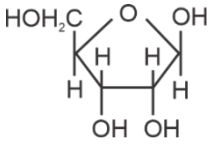
(2) 

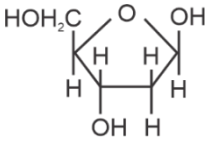
(3) 

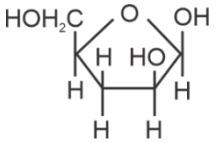
(4) 

83. Correct structure of sugar moiety present in RNA molecule is

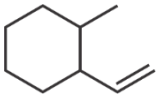
(1) 

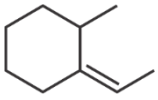
(2) 

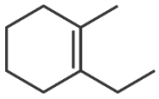
(3) 

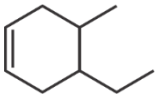
(4) 

84. The compound which will release minimum amount of heat on reaction with dihydrogen in presence of palladised charcoal is

(1) 

(2) 

(3) 

(4) 

85. Catalyst used in the given reaction is

$$CH_4 + H_2O \xrightarrow{1273\,K} CO + 3H_2$$

(1) Cu (2) $Mo_2O_3$

(3) Ni (4) $V_2O_5$

## SECTION-B

86. Concentration of $CH_3COO^-$ ions in a mixture of 0.1 M $CH_3COOH$ and 0.1 M HCl is

[$K_a$ ($CH_3COOH$) = $1.8 \times 10^{-5}$]

(1) $1.8 \times 10^{-5}$ M (2) $4.2 \times 10^{-3}$ M

(3) $2.1 \times 10^{-3}$ M (4) $2.1 \times 10^{-4}$ M

87. Which of the following is not an experimental quantity?

(1) Order

(2) Molecularity

(3) Rate constant

(4) Reaction rate

88. In which of the following both the dispersed phase and dispersion medium are not liquid?

(1) Milk (2) Hair cream

(3) Butter (4) Paints

89. Which of the following does not favours covalent character in ionic compound?

(1) Smaller size of cation

(2) Larger size of anion

(3) Greater charge on cation

(4) Lesser charge on anion

90. If enthalpy of hydrogenation of benzene to cyclohexane is –200 kJ $mol^{-1}$ and resonance energy of benzene is –152 kJ $mol^{-1}$ then enthalpy of hydrogenation of cyclohexene will be

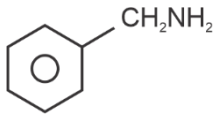
(1) –8 kJ $mol^{-1}$

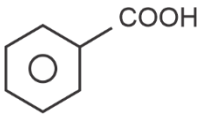
(2) –16 kJ $mol^{-1}$

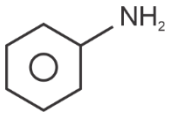
(3) –32 kJ $mol^{-1}$

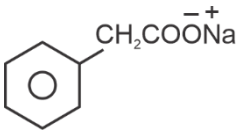
(4) –48 kJ $mol^{-1}$

91. Benzamide on reaction with bromine in an aqueous or ethanolic solution of sodium hydroxide gives

(1) 

(2) 

(3) 

(4) 

92. Identify the incorrect relation.

(1) $V_C = 3b$ (2) $T_C = \frac{8a}{27\,Rb}$

(3) $P_C = \frac{a}{27\,b^2}$ (4) $T_B = \frac{27a}{Rb}$

93. **Statement-I:** Quick lime slaked with soda gives solid soda lime.

**Statement-II:** Lime water is the aqueous solution of calcium carbonate.

In the light of above two statements, select the correct options among the following.

(1) Statement-I is true and statement-II is false

(2) Statement-I is false and statement-II is true

(3) Both statements-I and II are true

(4) Both statement-I and II are false

94. If atomic radius of the first orbit of H-atom is x, then the radius of the 3rd orbit of H-atom will be

(1) $\frac{x}{3}$ (2) 9x

(3) $\frac{x}{9}$ (4) 3x

95. Given: $Br_2 + 2e^- \rightarrow 2Br^-$, $E^\circ$ = +1.09 V

Standard electrode potential for the electrode

$\frac{1}{2}Br_2 + e^- \rightarrow Br^-$ will be

(1) $\frac{+1.09}{2}$ V (2) + 1.09 × 2V

(3) + 1.09 V (4) $\sqrt{+1.09}$ V

96 When $Cu^{2+}$ (1M)/Cu(s) electrode is diluted 10 times, the electrode potential

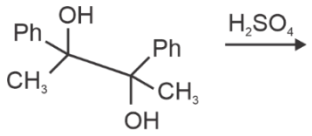
(1) Increases by 0.029 V

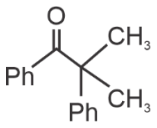
(2) Increases by 0.236 V

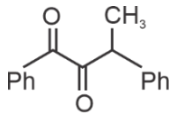
(3) Decreases by 0.315 V

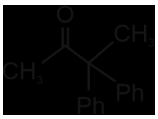
(4) Decreases by 0.029 V

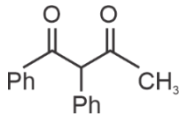
97. Major product of the given reaction is




(1) 


(2) 


(3) 

(4) 


98. **Statement-I:** CO is a $\pi$-acid ligand.

**Statement-II:** CO is a stronger ligand than CN .

In light of above statements, choose the correct answer.

(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

99. Consider the following statements about crystallisation technique.

(a) It is based on the difference in the solubilities of the compound and impurities in a suitable solvent.

(b) The impure compound is dissolved in a solvent in which it is sparingly soluble at room temperature but appreciably soluble at higher temperature.

(c) Impurities, which impart colour to the solution are removed by adsorbing over activated charcoal.

The correct statements are:

(1) (a) and (b) only (2) (b) and (c) only

(3) (a) and (c) only (4) (a), (b) and (c)

100. Addition of $Br_2$ to propene in presence of $CCl_4$ involves which intermediate?

(1) Carbene

(2) Carbon free radicals

(3) Carbanion

(4) Cyclic bromonium ion

# BOTANY

## SECTION-A

101. If a cross between violet flowered pea plant and white flowered pea plant produces 50% offspring with violet flowers and 50% offspring with white flowers, the genotypes of parents should be
(1) Aa × aa (2) Aa × Aa
(3) AA × aa (4) AA × Aa

102. All of the following were the reasons for use of *Drosophila* as ideal material for genetic studies, except
(1) It can be grown in simple synthetic medium
(2) Male is larger than female
(3) Easily observable hereditary variations are present
(4) Single mating produces large number of progenies

103. A cross was made between a pure round yellow seeded pea plant with wrinkled green seeded pea plant.
The $F_1$ progeny obtained is heterozygous round yellow seeded pea plants that were selfed and total 400 seeds are collected. What is the total number of seeds with recombinant traits?
(1) 150 (2) 200
(3) 75 (4) 100

104. Read the following features.
(a) Nitrogenase activity in heterocyst
(b) Mucilagenous sheath covering
(c) Presence of carbon as well as nitrogen fixing enzymes
(d) Presence of flagella
How many of the given features is/are true for *Nostoc*?
(1) One (2) Two
(3) Three (4) Four

105. Both diatoms and dinoflagellates are protists but differ in
(1) Mode of nutrition
(2) Cell wall composition
(3) Body organisation
(4) Cell type

106. Kuru disease is caused by
(1) A proteinaceous infectious particle
(2) A virus, containing ssRNA
(3) An infectious RNA particle
(4) A virus, containing dsRNA

107. Read the given statements and select the **correct** option.
**Statement A:** Photosynthesis is under the influence of external factors only.
**Statement B:** Photosynthesis process utilizes less than 1% of the water absorbed by a plant.
(1) Only statement A is correct
(2) Only statement B is correct
(3) Both statements are correct
(4) Both statements are incorrect

108. The biosphere reserves consist of
(1) An area of active cooperation between reserve management and the local people that comprises outermost part of Biosphere Reserve
(2) Transition zone that is the innermost part of it
(3) Natural zone that surrounds the core zone
(4) Buffer zone as the outermost part of biosphere reserve

109. Van Mahotsava is related to
(1) Conservation of forests
(2) Melting of polar ice caps
(3) Integrated waste water treatment
(4) Handling human excreta using dry composting toilets

110. Choose the **correct** one for DNA
(1) Presence of uracil
(2) Mutates at faster rate
(3) Able to Generate its replica
(4) Has free 2′ OH in pentose sugar

111. During DNA replication, DNA ligase
(1) Unwinds double helical DNA
(2) Joins discontinuously synthesized fragments on template with polarity $5' \rightarrow 3'$
(3) Provides energy for polymerisation reaction
(4) Has topoisomerase activity

112. During DNA replication, elongation of new strand is catalysed by
(1) DNA dependent DNA polymerase
(2) DNA helicase

(3) DNA gyrase

(4) Phosphorylase

113. 2 to 8 apical and equal flagella are found in members of

(1) Red algae (2) Brown algae

(3) Phaeophyceae (4) Green algae

114. Select the **incorrect** match.

(1) Psilopsida – *Pteris*

(2) Lycopsida – *Selaginella*

(3) Pteropsida – *Adiantum*

(4) Sphenopsida – *Equisetum*

115. Which among the following elements is **not** remobilised?

(1) Phosphorus (2) Nitrogen

(3) Calcium (4) Potassium

116. Which of the following bacteria help in denitrification?

(1) *Nitrobacter* (2) *Thiobacillus*

(3) *Nitrosomonas* (4) *Nitrococcus*

117. Centromere splits and chromatids separate during

(1) Anaphase (2) Telophase

(3) Prophase (4) Metaphase

118. Read the following statements and select the **correct** option.

**Statement A:** Meiosis involves two sequential cycles of nuclear and cell division but only one single cycle of DNA replication.

**Statement B:** Interphase lasts less than 5% of the duration of cell cycle.

(1) Only statement A is correct

(2) Only statement B is correct

(3) Both statements are incorrect

(4) Both statements are correct

119. Select the physiological effects of gibberellins in the plant and mark the **correct** option.

(a) Delay senescence

(b) Increases length of stem in sugarcane

(c) It can promote flowering in pineapple plant

(d) It control xylem differentiation and helps in cell division

(1) (c) and (d) (2) Only (a)

(3) (a) and (b) (4) (a),(b) and (d)

120. Bulbil is a vegetative propagule of

(1) Water hyacinth (2) Ginger

(3) *Bryophyllum* (4) *Agave*

121. Some species of Asteraceae and grasses have evolved the special mechanism called apomixis. It refers to

(1) Production of fruits without fertilisation

(2) Pollination by moth

(3) Production of seeds without fertilisation

(4) Formation of diploid pollen grain

122. Select the **incorrect** statement

(1) Citric acid is produced by bacteria only

(2) A clot buster called streptokinase is produced by bacteria *Streptococcus*

(3) Statins and ethanol are produced by yeast

(4) Lipases helps in removing oily stains

123. Which of the following statements is **not** true?

(1) Cork is formed by extra-stelar cambium

(2) Cell walls of phellogen become thick due to the deposition of suberin

(3) Phellogen, phellem and phelloderm are collectively known as periderm

(4) Bark in trees also includes secondary phloem

124. The structure which is present in both dicot and monocot stem is

(1) Hypodermis (2) Endodermis

(3) Medullary rays (4) Pith

125. A number of leaflets are present on a common axis called rachis. This statement is true for

(1) Guava (2) Silk cotton

(3) *Nerium* (4) Neem

126. In the floral formula, the symbols $A_{2+4}$ and $A_{3+3}$ respectively are given for the members of families

(1) Solanaceae and Brassicaceae

(2) Brassicaceae and Liliaceae

(3) Fabaceae and Brassicaceae

(4) Liliaceae and Fabaceae

127. Match the following columns and choose the **correct** option w.r.t. shapes of different types of cells.

| | **Column-I** | | **Column-II** |
|---|---|---|---|
| A. | Mesophyll cell | (i) | Comma shaped |
| B | Tracheid | (ii) | Elongated |

.

| | | | |
|---|---|---|---|
| C. | Vibrio | (iii) | Biconcave |
| D. | Red blood cell | (iv) | Round and oval |

| | A | B | C | D |
|---|---|---|---|---|
| (1) | (iii) | (iv) | (i) | (ii) |
| (2) | (iv) | (i) | (iii) | (ii) |
| (3) | (iv) | (ii) | (i) | (iii) |
| (4) | (iii) | (ii) | (iv) | (i) |

128. The structures in plant cells which are **not** surrounded by any membrane are
(1) Gas vacuole and centriole
(2) Ribosome and nucleolus
(3) Lysosome and food vacuole
(4) Gas vacuole and nucleolus

129. Select the **incorrect** statement regarding cytoskeleton.
(1) It is a network of filamentous structures
(2) It consists of microtubules, microfilaments and intermediate filaments
(3) It is found in multicellular organisms only
(4) It maintains the shape of the cell

130. Which of the features of life forms can be seen in non-living objects too?
(1) Reproduction
(2) Consciousness
(3) Growth
(4) Sensitivity to touch

131. Select the **incorrect** match w.r.t. mango.
(1) Family – Anacardiaceae
(2) Class – Dicotyledonae
(3) Order – Sapindales
(4) Division – Plantae

132. How many TCA cycles are required for the complete oxidation of one molecule of glucose?
(1) One (2) Two
(3) Three (4) Four

133. Read the following statements and select the correct option.

**Statement A:** In Mung bean, resistance to yellow mosaic virus is due to mutation breeding.

**Statement B:** Parbhani Kranti is resistant to yellow mosaic virus.
(1) Only statement A is correct
(2) Only statement B is correct
(3) Both statements A and B are correct
(4) Both statements A and B are incorrect

134. In the population interaction called commensalism,
(1) Both species are benefitted
(2) One species is benefitted and other is neither harmed nor benefitted
(3) One species is benefitted and other one is harmed
(4) Both species are harmed

135. Xerarch succession starts in/on
(1) Pond (2) Aquatic regions
(3) Wetland (4) Dry areas

## SECTION-B

136. Starch synthesis gene in pea seeds shows
(1) Complete dominance
(2) Co-dominance
(3) Incomplete dominance
(4) Epistasis

137. The genetic material in tobacco mosaic virus is
(1) dsDNA (2) ssDNA
(3) dsRNA (4) ssRNA

138. Translation refers to
(1) Formation of newly synthesized DNA over parental DNA
(2) Copying genetic information from one strand of DNA into RNA
(3) Polymerisation of amino acids to form a polypeptide
(4) Movement of ribosome on mRNA

139. Algal bloom
(1) Leads to increase in DO content of water body
(2) Imparts a distinct colour to water body
(3) Leads to decrease in BOD content of water body
(4) Is always beneficial to human beings

140. National park
(1) Is *Ex-situ* conservation strategy
(2) Is reserved for betterment of wildlife
(3) Consists of core, buffer and transition zones

(4) In also called Island of pristine forests

141. Which of the following statements is **incorrect** w.r.t. active transport?
(1) It requires special membrane proteins
(2) It is highly selective
(3) The carrier proteins are sensitive to inhibitors
(4) It is downhill transport

142. Which among the following shows haplontic life cycle?
(1) *Spirogyra* (2) *Ectocarpus*
(3) *Fucus* (4) *Cycas*

143. Select the **odd** one out w.r.t. day neutral plants.
(1) Cucumber (2) Tobacco
(3) Tomato (4) Pepper

144. Consider the following statements and state them True (T) or False (F).
A. Cells of sporogenous tissue undergo mitotic division to form microspore tetrads.
B. Nucellus is enclosed mass of parenchymatous tissue within integument of ovule.
C. Apocarpous, multicarpellary gynoecium is present in *Michelia*

| | **A** | **B** | **C** |
|---|---|---|---|
| (1) | T | T | T |
| (2) | F | T | F |
| (3) | F | F | T |
| (4) | F | T | T |

145. Non-photosynthetic bacteria which fix atmospheric nitrogen while free living in the soil is
(1) *Anabaena*
(2) *Nostoc*
(3) *Azospirillum*
(4) *Oscillatoria*

146. Which of the following is **not** amongst the major functions of epidermal tissue system in flowering plants?
(1) Protection
(2) Gaseous exchange
(3) Photosynthesis
(4) Absorption of water and minerals

147. Select the **correct** option regarding the cohesion of stamens w.r.t. example of plants.

| | Monoadelphous | Diadelphous | Polyadelphous |
|---|---|---|---|
| (1) | Lemon | Tomato | China rose |
| (2) | Mustard | Pea | *Dianthus* |
| (3) | *Allium* | China rose | *Calotropis* |
| (4) | China rose | *Indigofera* | *Citrus* |

148. Read the following statements.
(a) *cis* and *trans* faces are entirely different but interconnected.
(b) It remains in close association with endoplasmic reticulum.
(c) Its membrane is in continuation with the outer membrane of nucleus.
(d) It is important site for the polymerisation of amino acids.

Identify the statements which are **true** w.r.t. Golgi apparatus and choose the option accordingly.
(1) (a), (b) and (d) (2) (a) and (b) only
(3) (a), (c) and (d) (4) (a) and (d) only

149. Tree → Herbivorous birds → Parasites

Pyramid of energy of the above given food chain is
(1) Spindle shaped
(2) Urn shaped
(3) Inverted
(4) Upright

150. The growth curve of bacterial population in lab is plotted against time, when supplied abundant food as well as other resources are in abundance. What will be the shape of curve?
(1) Hyperbolic (2) Straight line
(3) Parabolic (4) J-shaped

## ZOOLOGY

### SECTION-A

151. Read the given statements and select the **correct** option.

**Statement-A:** Respiratory system of cockroach consists of a network of trachea, that open through 20 small holes called spiracles.

**Statement-B:** Many species of cockroach are of great economic importance.

(1) Both statements are correct

(2) Both statements are incorrect

(3) Only statement A is correct

(4) Only statement B is correct

152. The main function of epithelium lining the dry surface of skin is

(1) Protection against chemical and mechanical stresses

(2) Secretion

(3) Absorption

(4) Forming a diffusion boundary

153. Which one of the following is a fat soluble vitamin and its related deficiency disease?

(1) Vitamin A : Rickets

(2) Vitamin $B_3$ : Pellagra

(3) Vitamin C : Scurvy

(4) Vitamin K : Faulty blood clotting

154. Which of the following enzymes are not present in succus entericus?

(1) Dipeptidases (2) Lipases

(3) Amylases (4) Nucleosidases

155. The formed elements in blood which are phagocytic in function but differ in their contribution in total WBCs count are

a. Neutrophils

b. Eosinophils

c. Basophils

d. Lymphocytes

e. Monocytes

Select the **correct** option.

(1) a and e (2) a, b and c

(3) e and d (4) b and c

156. Given below are four statements regarding human circulatory system.

a. Heart failure is sometimes called congestive heart failure.

b. During joint diastole, all four chambers of heart are in contracted state.

c. A special neural centre is present in the medulla oblongata that can moderate the cardiac function through ANS.

d. Maximum filling of blood in ventricles occurs during joint diastole.

Which of the above statements are **correct**?

(1) a, b and c (2) a, b, c and d

(3) b, c and d (4) a, c and d

157. Choose the **odd** one w.r.t. closed circulatory system.

(1) *Nereis* (2) *Ichthyophis*

(3) *Palaemon* (4) *Pteropus*

158. Consider the given statements and select the option that correctly states them as true**(T)** or false**(F)**.

a. Increased asthmatic attacks in certain seasons are related to inhalation of seasonal pollen.

b. The part of brain where vomit centre is present, also regulates the respiratory rhythm according to the need of the body.

c. Cigarette smoking causes inflammation of trachea and bronchi.

d. Expiration is initiated due to contraction of diaphragm.

| | **a** | **b** | **c** | **d** |
|---|---|---|---|---|
| (1) | T | T | T | T |
| (2) | F | F | T | T |
| (3) | T | T | F | F |
| (4) | F | T | F | T |

159. Select the layer of filtration membrane of nephrons which is responsible for the formation of the filtration slits.

(1) Endothelium of vasa recta

(2) Basement membrane of PCT

(3) Endothelium of glomerular blood vessels

(4) Podocytes forming visceral layer of Bowman's capsule

160. Identify the disorder among the following whose common cause is the decreased levels of estrogen in blood plasma.

(1) Tetany (2) Gout

(3) Osteoporosis (4) Arthritis

161. Select the bone that is a part of axial skeleton.

(1) Coccyx (2) Clavicle

(3) Carpal (4) Coxal

162. Choose the best breeding method for animals that have below average growth rate in beef cattle

(1) Out-crossing

(2) Cross-breeding

(3) Interspecific hybridisation

(4) Inbreeding

163. True coelom and metamerism evolved for the first time in members of phylum

(1) Annelida (2) Arthropoda

(3) Aschelminthes (4) Echinodermata

164. **Assertion (A):** Insects are placed in phylum Arthropoda.

**Reason (R):** Insects have jointed appendages.

In the light of above statements, choose the correct answer from the options given below.

(1) Both (A) and (R) are true and (R) is the correct explanation of (A)

(2) Both (A) and (R) are true but (R) is not the correct explanation of (A)

(3) (A) is true but (R) is false

(4) (A) is false but (R) is true

165. Match Column I with Column II and choose the **correct** option.

| | **Column I** | | **Column II** |
|---|---|---|---|
| a. | *Bombyx* | (i) | Gregarious, polyphagous pest |
| b. | *Locusta* | (ii) | Malpighian tubules |
| c. | *Asterias* | (iii) | Muscular pharynx |
| d. | *Ascaris* | (iv) | Tube feet |

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

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

166. When offspring is produced by __A__ parent(s) with or without involvement of __B__ formation, the reproduction is __C__.

Identify A, B and C in above given statement and choose the correct answer from the options given below.

| | **A** | **B** | **C** |
|---|---|---|---|
| (1) | Single | Gamete | Sexual |
| (2) | Two | Zygote | Asexual |
| (3) | Single | Gamete | Asexual |
| (4) | Two | Egg | Binary fission |

167. The pregnancy in which implantation of embryo occurs at a site other than uterus is called

(1) Ectopic pregnancy

(2) Pregnancy before menarche

(3) Pregnancy after menopause

(4) Normal pregnancy

168. Read the following statements A and B and choose the correct option.

**Statement A:** In a normal pregnant woman, synthesis of estrogen and progesterone is under control of high levels of circulating LH.

**Statement B:** Signals for parturition originate from oxytocin released from maternal pituitary.

(1) Both statements A and B are correct

(2) Both statements A and B are incorrect

(3) Only statement A is correct

(4) Only statement B is correct

169. Select the mismatch among the following.

| | | | |
|---|---|---|---|
| (1) | Sertoli cells | – | Androgens |
| (2) | Leydig cells | – | Testosterone |
| (3) | Granulosa cells | – | Inhibin |
| (4) | Luteal cells | – | Progesterone |

170. What does ICSI stand for?

(1) Inter Cytoplasmic Sperm Injection

(2) Intra Cellular Sperm Injection

(3) Intra Cytoplasmic Sperm Insemination

(4) Intra Cytoplasmic Sperm Injection

171. Match Column I with Column II and choose the **correct** option.

| | **Column I** | | **Column II** |
|---|---|---|---|
| a. | Saheli | (i) | Hormone releasing IUD |
| b. | Multiload 375 | (ii) | CDRI |
| c. | LNG-20 | (iii) | Barrier method |
| d. | Vaults | (iv) | Copper releasing IUD |

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

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

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

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

172. If the safety testing of polio vaccine on transgenic mice is successful, it could replace the use of

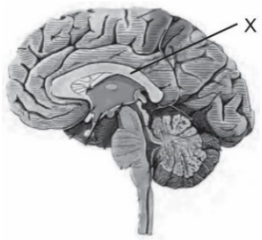
(1) Sheep

(2) Cows

(3) Fish

(4) Monkeys

173. Identify the structure labelled as 'x' in the figure given below.




Select the **correct** option w.r.t. it.

(1) Lobe involved in motivation

(2) Part of the midbrain

(3) Tract of nerve fibres

(4) Association area

174. Graves' disease is caused due to

(1) Hypersecretion of thyroid hormones

(2) Hyposecretion of thyroid hormones

(3) Hypersecretion of pineal gland

(4) Hyposecretion of PTH

175. Agriculture came around how many years ago?

(1) 18,000 (2) 10,000

(3) 40,000 (4) 75,000

176. In solutions of different pHs, the structure of amino acid changes. If the nature of aqueous solutions of two different amino acids 'X' and 'Y' is basic and acidic, then 'X' and 'Y' respectively are

(1) Phenylalanine and Lysine

(2) Lysine and Glutamate

(3) Glycine and Glutamate

(4) Alanine and Phenylalanine

177. How many of the following are true w.r.t. first cellular forms originated on earth?

(a) They were probably single cells.

(b) They were present in water environment.

(c) They probably arose rapidly through evolutionary forces from living molecules.

(d) Did not possibly originate till about 2000 mya.

(1) One (2) Three

(3) Two (4) Four

178. Calculate the number of hydrogen bonds present in the sequence of a stretch of a double helical DNA 3′ AATCCGAT5′.

(1) 19 (2) 16

(3) 21 (4) 25

179. Match the items in Column I with Column II.

| | **Column I** | | **Column II** |
|---|---|---|---|
| a. | Dissaccharide | (i) | Secondary structure |
| b. | RNA | (ii) | Maltose |
| c. | β-Pleated | (iii) | Uracil |
| d. | Amylase | (iv) | Biocatalyst |

Choose the **correct** option.

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

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

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

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

180. Chemicals released from mast cells during allergic reactions include

(a) Histamine

(b) Serotonin

(c) Adrenaline

(d) Steroids

Select the correct option.

(1) (a) and (b) (2) (b) and (c)

(3) (a), (c) and (d) (4) (b), (c) and (d)

181. Read the statements given below and select the correct option for T-lymphocytes and macrophages.

(1) Both are part of cellular barrier of innate immunity.

(2) Both of them are unique components of specific immune response in vertebrates.

(3) T-lymphocytes are responsible for acquired immunity whereas macrophages are components of non-specific immune response.

(4) Macrophages provide specific immune response and T-lymphocytes provide innate immune response.

182. Select the correct option to complete the analogy.

Colostrum : Natural passive immunity :: ATS : ___

(1) Natural active immunity

(2) Natural passive immunity

(3) Artificial active immunity

(4) Artificial passive immunity

183. To isolate DNA from a fungal cell, the cell should not be treated with

(1) Chitinase

(2) Proteases

(3) Ribonucleases

(4) Deoxyribonucleases

184. Genetic engineering can help to overcome which limitation that is encountered during traditional hybridisation procedures for animal breeding?

(1) Insertion of desirable genes only

(2) High cost involved in breeding

(3) Inclusion of undesirable genes

(4) No creation of unique combinations of genetic setup

185. Select the correctly matched pair.

| | | | |
|---|---|---|---|
| (1) | Continuous culture system | – | Maintain cells in their physiologically most active i.e. lag phase |
| (2) | Batch fermentation | – | Smaller biomass production than open system |
| (3) | Sparger | – | Present in simple stirred tank bioreactor |
| (4) | Bioreactor | – | Used for downstream processing of desired product |

**SECTION-B**

186. One of the representative of phylum Chordata is

(1) Starfish (2) Angel fish

(3) Cuttle fish (4) Shell fish

187. JG cells get activated to release renin when

(a) Glomerular blood flow increases

(b) Glomerular blood pressure decreases

(c) Glomerular blood flow decreases

(d) Glomerular blood pressure increases

Choose the option with correct set.

(1) (a) and (d) only

(2) (a), (b) and (d)

(3) (b), (c) and (d)

(4) (b) and (c) only

188. A centre that can reduce the duration of inspiration is present in _____ region of the brain.

Select the correct option to fill in the blank.

(1) Cerebrum (2) Medulla oblongata

(3) Pons (4) Cerebellum

189. Read the following statements carefully and select the correct answer from the options given below.

(a) The secondary follicle forms a new membrane called zona pellucida surrounding it.

(b) The reproductive cycle in female primates is called menstrual cycle.

(c) Generally one ovum is released during middle of each menstrual cycle.

(d) LH surge induces the rupture of Graafian follicle and thereby the release of corpus luteum.

(1) Statements (a) and (b) are correct

(2) Statements (a), (b) and (c) are correct

(3) Statements (b), (c) and (d) are correct

(4) Statements (b) and (c) are correct

190. What would be the stroke volume if heart beats for 75 times per minute and cardiac output is 6 litres?

(1) 70 mL (2) 80 mL

(3) 100 mL (4) 90 mL

191. The neurotransmitters released during nerve impulse conduction through a chemical synapse bind to their receptors on/in the

(1) Pre-synaptic membrane

(2) Axon terminal of pre-synaptic neuron

(3) Synaptic cleft

(4) Post-synaptic membrane

192. Read the statements carefully.

**Statement A:** Complications due to PIDs lead to infections like STIs.

**Statement B:** The age group 15-24 is the high risk group for the occurrence of STIs.

(1) Only statement A is correct

(2) Only statement B is correct

(3) Both the statements are correct

(4) Both the statements are incorrect

193. *Meloidogyne incognita* is a nematode that parasitizes the ___ of tobacco plant. Choose the option which fills the blank correctly.

(1) Roots (2) Stems

(3) Leaves (4) Seeds

194. Which among the following is not a physiological effect of cortisol?

(1) Suppresses immune response

(2) Stimulates erythropoiesis

(3) Produces inflammatory reactions

(4) Maintains renal functions

195. The basis for the separation and resolution of DNA fragments on agarose gel electrophoresis is

(a) Charge on DNA

(b) Size of the DNA fragments

(c) Movement towards cathode

Choose the correct option.

(1) (a) only (2) (b) and (c)

(3) (a) and (c) (4) (a), (b) and (c)

196. The two enzymes responsible for restricting the growth of bacteriophage in *E.coli* were isolated in the year

(1) 1972 (2) 1963

(3) 1990 (4) 1983

197. Select the option which includes only Australian marsupials.

(1) Wombat, Koala, Flying squirrel

(2) Tasmanian wolf, Bobcat, Spotted cuscus

(3) Sugar glider, Numbat, Wolf

(4) Banded anteater, Bandicoot, Tasmanian wolf

198. Early reptiles originated in __A__ period around __B__ mya. Choose the option which correctly fills the blanks A and B.

| | A | B |
|---|---|---|
| (1) | Permian | 250 |
| (2) | Carboniferous | 350 |
| (3) | Jurassic | 150 |
| (4) | Triassic | 200 |

199. Choose the correct statement w.r.t. reptiles.

(1) Body is covered with moist and cornified skin.

(2) In all reptiles, heart is three chambered.

(3) They are homoiothermous and have pulmonary respiration.

(4) They are mostly terrestrial and have internal fertilization.

200. Consider the statements given below.

(a) The competitive inhibitor does not affect the rate of breakdown of the enzyme-substrate complex.

(b) Fatty acid molecule reacts with glycerol to form ester bond.

(c) In nucleic acids, heterocyclic base and phosphate group are attached at $C_5$ and $C_1$ of the sugar respectively.

(d) When ice melts into water or when water becomes vapour are examples of chemical processes.

How many of the above given statements are **incorrect**?

(1) One
(2) Two
(3) Three
(4) Five

❑ ❑ ❑