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CCT- 05

TOPIC COVERED

Physics:	Class 11th Complete Syllabus
Chemistry:	Class 11th Complete Syllabus
Botany:	Class 11th Complete Syllabus
Zoology:	Class 11th Complete Syllabus

Duration: 3 hr 20 min **Max Marks: 720**

General Instructions:

- The test will contain 200 Questions of Physics, Chemistry, Botany, and Zoology & The test will be objective type. (Attempt only 180).
- Every subject contains two Part A-35 Questions and Part B-15 Questions (Attempt only 10).
- All 35 Questions of Part-A are Compulsory to attempt
- Time given for test is 200 minutes.
- Marking is +4 for every correct answer, –1 for every wrong answer.
- You can reattempt the test in case of any technical issue.
- Test will start at 2:00 pm and students can attempt test at any time of their own preferences

PHYSICS

SECTION - A

1. A force $\vec{F} = 3\hat{i} + c\hat{j} + 2\hat{k}$ acting on a particle cause a displacement $\vec{S} = -4\hat{i} + 2\hat{j} + 3\hat{k}$ in its own direction. If the work done is 6*J*, then the value of *c* will be:

(1) 12 (2) 6
(3) 1 (4) 0

2. Two racing car of masses m_1 and m_2 are moving in a circle of radius r_1 and r_2 respectively their speeds are such that each makes a complete circle in the same time *t* the ratio of the angular speed of the first to the second car will be:

(1) $m_1 : m_2$ (2) 1 : 1
(3) $r_1 : 2r_2$ (4) $r_1 : r_2$

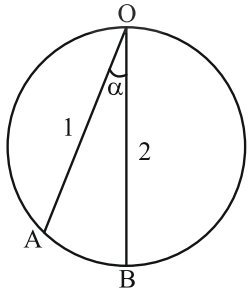
3. Two rods having thermal conductivity in the ratio of 5 : 3 having same length and equal cross-sectional area are join by face to face. If the temperature of the free end of the first rod is 100°C and the temperature of free end of the second rod is 20°C. Then temperature of junction will be:

(1) 85°C
(2) 90°C
(3) 50°C
(4) 70°C

4. If one mole of monoatomic gas $\gamma = \frac{5}{3}$ is mixed with one mole of diatomic gas $\gamma = \frac{7}{5}$. The value of γ for the mixtures is :

(1) 2.5 (2) 1.5
(3) 1.8 (4) none of these

5. Two particles 1 and 2 are allowed to descend on the two functionless chord OA and OB of a vertical circle, at the same instant from point O. The ratio of the velocities of the particles 1 and 2 respectively, when they reach on the circumference will be (OB is the diameter):



(1) sin *a* (2) tan *a*
(3) cos *a* (4) none of these

6. The equation of state of one mole of some gases can be expressed as $\left(P+\frac{a}{V^2}\right)(V-b)=RT$. Here, P is the pressure, V is the volume, T is the absolute temperature and a, b, R are the constants. The dimensions of 'a' are:

(1) $[ML^5T^{-2}]$ (2) $[ML^{-1}T^{-2}]$

(3) $[ML^3T]$ (4) $[ML^6T]$

7. Two waves are represented by the equations,

$Y_1 = A\sin\left(10\pi X - 15\pi t + \frac{\pi}{2}\right)$ and

$Y_2 = 2A\,(30\pi X + 45\pi t)$:

Which of the following statement is correct?

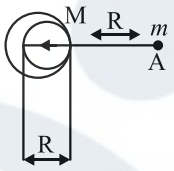
(1) The maximum particle velocity of the second wave is twice that of first.

(2) Their super position will produce a standing wave

(3) Maximum particle acceleration for the second wave is eighteen times that of the first wave.

(4) Their wave velocities are different

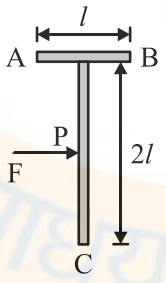
8. A solid sphere of uniform density and radius R applies a gravitational force of attraction equal to F_1 on a particle placed at A, distant $2R$ from the centre of the sphere. A spherical cavity of radius $R/2$ is now made on the sphere as shown in the figure. The sphere with cavity now applies a gravitational force F_2/F_1 will be



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

(3) $\frac{7}{8}$ (4) $\frac{14}{9}$

9. A 'T' shaped object with dimensions shown in the figure, is lying on a smooth floor. A force $\vec{F}$ is applied at the point P parallel to AB, such that the object has only the translational motion without rotation. The distance of P from the point C is



(1) $\frac{2l}{3}$ (2) $\frac{3l}{2}$

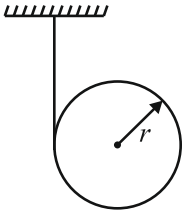
(3) $\frac{4l}{3}$ (4) l

10. A flywheel with a moment of inertia I starts from rest under the action of a constant torque τ. What is the angular velocity of the flywheel after it has rotated through n revolutions?

(1) $\sqrt{\frac{4\pi n\tau}{I}}$ (2) $\sqrt{\frac{2\pi n\tau}{I}}$

(3) $\sqrt{\frac{4\pi nI}{\tau}}$ (4) $\sqrt{\frac{\pi n\tau}{I}}$

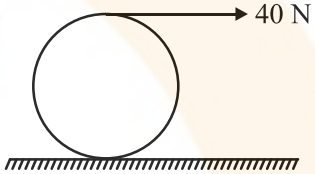
11. A rope is wrapped around a solid cylinder of radius r and mass m (see figure). The cylinder is released from rest. The velocity of the centre of the cylinder after it has moved downward by a distance h is



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

(3) $\sqrt{2gh}$ (4) $\sqrt{\frac{2gh}{3}}$

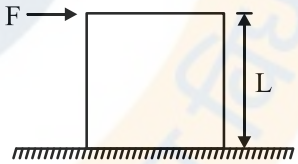
12. A string is wound around a hollow cylinder of mass 5 kg and radius 0.5 m. If the string is now pulled with a horizontal force of 40 N, and the cylinder is rolling without slipping on a horizontal surface (see figure), then the angular acceleration of the cylinder will be [Neglect the mass and thickness of the string]



(1) 20 rad/s^2 (2) 16 rad/s^2

(3) 12 rad/s^2 (4) 10 rad/s^2

13. A cubical block of side L rests on a rough horizontal surface with coefficient of friction μ. A horizontal force F is applied on the block as shown. If the coefficient of friction is sufficiently high, so that the block does not slide before toppling, the minimum force required to topple the block is



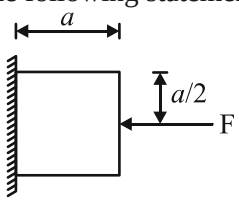
(1) infinitesimal

(2) $mg/4$

(3) $mg/2$

(4) $mg(1-\mu)$

14. A block of mass m is at rest under the action of force F against a wall as shown in the figure. Which of the following statement is incorrect?



(1) $f = mg$, where f is the frictional force.

(2) $F = N$, where N is the normal reaction.

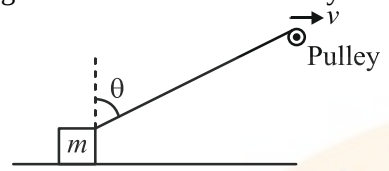
(3) F will not produce torque about centre of mass.

(4) N will not produce torque about centre of mass.

15. A point initially at rest moves along X-axis. Its acceleration varies with time as $a = (3t - 2)$ ms^{-2}. If it starts from origin, then the distance covered in 4s is

(1) 12 m (2) 20 m
(3) 15 m (4) 28 m

16. A block is dragged on a smooth plane with the help of a rope which moves with velocity v as shown in the figure. The horizontal velocity of the block is



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

17. A pipe of length 85 cm is closed from one end. The number of possible natural oscillations of air column in the pipe whose frequencies lie below 1250 Hz are
(take, velocity of sound in air = 340 ras^{-1})

(1) 5 (2) 4
(3) 6 (4) 10

18. A black body at a temperature of 127°C radiates heat at the rate of 9 cal cm^{-2} s^{-1}. At a temperature of 527°C the rate of heat radiated per unit area in cal cm^{-2} s^{-1} is

(1) 80 (2) 120
(3) 144 (4) 180

19. A body of mass 4 kg is acted upon by a force which causes a displacement in it given by $x = t^2$ m, where t is time in second. The work done by force in 4s is

(1) 64 J (2) 128 J
(3) 200 J (4) 240 J

20. In a capillary tube, water rises to 4 mm. The height of water that will rise in another capillary tube having one-fourth radius of the first is

(1) 16 mm (2) 14 mm
(3) 12 mm (4) 9 mm

21. An observer moves towards a stationary source of sound with a velocity $\frac{1}{5}^{\text{th}}$ of the velocity of sound. The percentage increase in the apparent frequency is

(1) 20%
(2) 50%
(3) 25%
(4) 40%

22. A car starts from rest and move with uniform acceleration a on a straight road from time $t = 0$ to $t = 5$s. After that, a constant deceleration brings it to rest. In this process, the average speed of the car is

(1) $\frac{5}{2}a$ (2) $5a$
(3) $\frac{2}{5}a$ (4) $\frac{25}{2}a$

23. Two capillary of lengths L and $2L$ and of radii R and $2R$ are connected in series. The net rate of flow of fluid through them will be (Given rate of the flow through single capillary, $X = \frac{\pi pR^4}{8\eta L}$)

(1) 8/9 X
(2) 7/5 X
(3) 5/7 X
(4) 8/5 X

24. Two bodies of masses 10 kg and 2 kg are moving with velocity

$$(-2\hat{i} + 7\hat{j} + 3\hat{k}) \text{ and } (10\hat{i} - 35\hat{j} + 3\hat{k}),$$

respectively. The velocity of the centre of mass will be

(1) $2\hat{k}$ ms^{-1}
(2) $2\hat{j}$ ms^{-1}
(3) $3\hat{k}$ ms^{-1}
(4) $3\hat{j}$ ms^{-1}

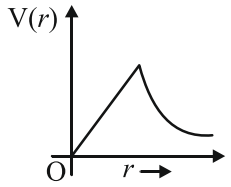
25. A projectile P is projected at an angle of 30° with the horizontal. If a second projectile θ is projected such that their speeds are in ratio 3 : 1 for same maximum height, then the angle of projection of Q is

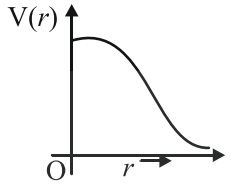
(1) $\sin^{-1}\left(\frac{3}{1}\right)$ (2) $\sin^{-1}\left(\frac{1}{3}\right)$
(3) $\sin^{-1}\left(\frac{3}{2}\right)$ (4) $\sin^{-1}\left(\frac{2}{3}\right)$

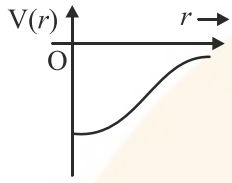
26. A body of mass m_1, moving with a velocity 3 ms^{-1} collides with another body at rest of mass m_2. After collision, the velocities of the two bodies are 2 ms^{-1} and 5 ms^{-1} respectively, along the direction of motion of m_1. The ratio of $\frac{m_1}{m_2}$ is

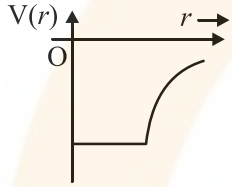
(1) $\frac{5}{12}$
(2) 5
(3) $\frac{1}{5}$
(4) $\frac{12}{5}$

27. Which graph of the following closely depicts the correct variation of the gravitational potential $V(r)$ due to a large planet of radius R and uniform mass density?

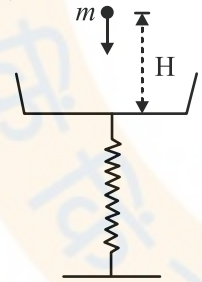
(1) 

(2) 

(3) 

(4) 

28. Particle each of mass m are falling into weighing pan from height H at a rate of n particles per second. Find reading of weighing pan after time T, if collision of particle with weighing pan is perfectly inelastic. (Neglect oscillation of weighing pan).



(1) $mgH + mgnT$

(2) $mn\,(gT + \sqrt{2gH})$

(3) $mng\sqrt{2gH}$

(4) None of these

29. If the temperature of the sink of a Carnot engine is 57°C and its efficiency is 10%. then the temperature of the source is

(1) 227°C (2) 93.6°C

(3) 127.5°C (4) 85.7°C

30. The work done by a gas is maximum, when it expands

(1) isothermally (2) adiabaiicalty

(3) isentropically (4) isobarically

31. A well with vertical side and water at the bottom resonates at 3 Hz and at no other lower frequency. The air in the well has density 1.10 kg m^{-3} and bulk modulus of 1.32×10^5 Nm^{-2}, then the depth of well is

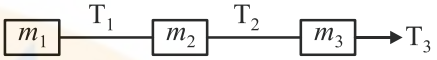
(1) 30 m

(2) 29 m

(3) 25 m

(4) 32 m

32. In the figure shown, m_1 = 10 kg, m_2 = 6 kg, m_3 = 4 kg. If T_3 = 40 N, then T_2 is



(1) 13 N

(2) 32 N

(3) 25 N

(4) 35 N

33. Match the corresponding entries of Column I with Column II and choose the correct option from the codes given below.

	Column I (Rotation)		**Column II (Moment of inertia)**
A.	Thin rod of length L about an axis perpendicular to the rod and passing through mid point	P.	$\frac{MR^2}{2}$
B.	Circular disc of radius P about an axis passing through the diameter	Q.	$\frac{ML^2}{12}$
C.	Hollow cylinder of radius R about an axis passing through the axis of cylinder	R.	$\frac{2MR^2}{5}$

Codes :

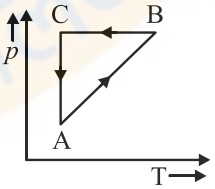
(1) A → Q, B → P, C → R

(2) A → P, B → R, C → C

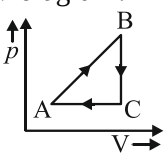
(3) A → Q, B → R, C → P

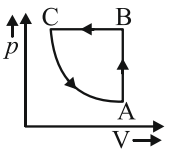
(4) A → R, B → Q, C → P

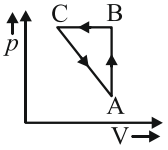
34. A cyclic process is shown on the $p - T$ diagram.

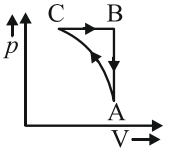


Which of the curve shows the same process on $p - V$ diagram?

(1) 

(2) 

(3) 

(4) 

35. A 5 kg shell kept at rest suddenly splits up into three parts. If two parts of mass 2 kg each are found flying due north and east with a velocity of 5 m/s each, then what is the velocity of the third part after explosion?

(1) 10 ms^{-1} due north-east

(2) $\frac{10}{\sqrt{2}}$ ms^{-1} due south-east

(3) $10\sqrt{2}$ ms^{-1} due south-west

(4) $10\sqrt{2}$ ms^{-1} due south-east

SECTION - B

36. The total energy of a particle executing SHM of period 2π seconds is 10.24×10^{-3} J. The displacement of the particle at $\pi/4$ s is $0.08\sqrt{2}$ m. The mass of particle is

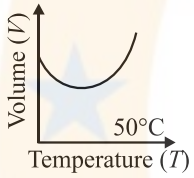
(1) 0.08 kg

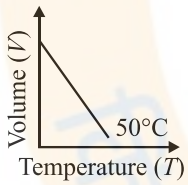
(2) 0.8 kg

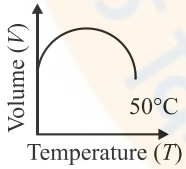
(3) 0.16 kg

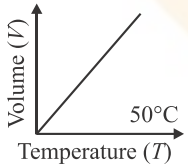
(4) 1.6 kg

37. Which one of the graphs represents the temperature dependency of volume of water correctly?

(1) 

(2) 

(3) 

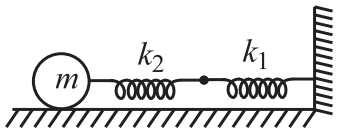
(4) 

38. A wheel having a moment of inertia I about its axis of rotation is acted upon by a constant torque τ_0. If the motion is resisted by a torque $\tau_f = -k\omega$ due to bearing friction, the maximum speed which will be attained by the wheel is

(1) $\frac{2\tau_0}{k}$ (2) $\frac{\tau_0}{2k}$

(3) $\frac{\tau_0}{k}$ (4) $\frac{k}{\tau_0}$

39. Two springs are joined and connected to a mass m as shown in the figure. If the force constants of the two springs are k_1 and k_2, then the frequency of oscillation of mass m is



(1) $v = \frac{1}{2\pi}\sqrt{\frac{k_1k_2}{(k_1+k_2)m}}$

(2) $v = \frac{1}{2\pi}\sqrt{\frac{(k_1+k_2)}{(k_1k_2)m}}$

(3) $v = \frac{1}{2\pi}\sqrt{\frac{(k_1k_2)}{k_1+k_2}}$

(4) $v = \frac{1}{2\pi}\sqrt{\frac{(k_1+k_2)m}{k_1k_2}}$

40. The efficiency of Carnot heat engine working between two temperature is 60%. If the temperature of the source alone is decreased by 100 K, the efficiency becomes 40%. Find the temperature of the source and sink.

(1) 90K (2) 120K

(3) 150K (4) 200K

41. If a body is taken up to a height of 1600 km from the earth's surface, then the percentage loss of gravitational force acting on that body will be – (Radius of earth R_e = 6400 km).

(1) 50% (2) 36%

(3) 25% (4) 10%

42. Consider a compound slab consisting of two different materials having length in the ratio 1 : 1 and thermal conductivity. K and $2K$ but equal thickness. The equivalent thermal conductivity of the slab is

(1) $\sqrt{\frac{3}{5}}K$ (2) $\frac{4}{3}K$

(3) $\frac{8}{\sqrt{5}}K$ (4) $\frac{5}{\sqrt{3}}K$

43. The dimensional formula for acceleration, velocity and length are $\alpha\beta^{-2}$, $\alpha\beta^{-1}$ and $\alpha\gamma$. What is the dimensional formula for the coefficient of friction?

(1) $\alpha^0\beta^0\gamma^0$ (2) $\alpha\beta\gamma$

(3) $\alpha^{-1}\beta^0\gamma^0$ (4) $\alpha^0\beta^-\gamma^0$

44. A coin of mass 4.8 kg and radius half meter is rolling on a surface without sliding with angular speed of 600 rotation/min. The total kinetic energy of the coin is

(1) 360 J (2) $1440\ \pi^2$ J

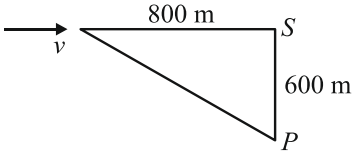
(3) $4000\ \pi^2$ J (4) $600\ \pi^2$ J

45. A steam boat goes across a lake and comes back (1) on a quite day, when the water is still and (2) on a rough day. when there is uniform air current, so as to help the journey onward and to impede the journey back.
If the speed of the launch on both days was same, in which case it will complete the journey in lesser time?
(1) Case (1)
(2) Case (2)
(3) Same in both
(4) Nothing can be predicted

46. Indian space agency (ISRO) thinking about making space elevator on earth by using steel cables. If an untampered space elevator cable would need a material capable of sustaining a length of 5000 km of its own weight at sea level to reach a geostationary altitude of 35800 km without yielding. So, for this idea, the length of the steel cable which will break under its own weight when suspended vertically is
(Take, breaking strength of steel = 1.2×10^9 Nm^{-2}, density of steel cable = 8×10^3 kg/m^3 and gravitational acceleration, $g = 10$ m/s^2)
(1) 20,000 m (2) 50 km
(3) 15000 km (4) 15 km

47. A particle of mass 10 *g* is describing SHM along a straight line with a period of 2*s* and amplitude of 10 cm. The difference in kinetic energy, when it is 2 cm and 5 cm from its equilibrium position is
(1) $100\ \pi^2$ erg (2) $105\ \pi^2$ erg
(3) $480\ \pi^2$ erg (4) $375\ \pi^2$ erg

48. A person *P* is 600 m away from the station. When, train is approaching station with 72 km h^{-1}, it blows a whistle of frequency 800 Hz. when 800 m away from the station. If speed of sound is 340 ms^{-1}, then the frequency heard by the person is



(1) 800 Hz (2) 839.5 Hz
(3) 829.5 Hz (4) 843.5 Hz

49. A particle executes SHM with a time period of 2s and amplitudes 5 cm. Starting from the mean position, its displacement and velocity after 1/3*s* are
(1) 4.33 cm, 7.85 cm^{-1}
(2) 4.5 cm, 6.75 cm^{-1}
(3) 7.85 cm, 4.33 cm^{-1}
(4) 6.75 cm, 4.5 cm^{-1}

50. Copper of fixed volume *V* is drawn into wire of length *l*. When this wire is subjected to a constant force *F*, the extension produced in the wire is Δl. Which of the following graphs is a straight line?
(1) Δl versus $\frac{1}{l}$
(2) Δl versus l^2
(3) Δl versus $\frac{1}{l^2}$
(4) Δl versus l

CHEMISTRY

SECTION - A

51. Which of the following has the biggest radius?
(1) Cs^+ (2) Mg^{2+}
(3) Na^+ (4) Li^+

52. Bohr's radius for the H-atom (n = 1) is approximately 0.53 Å. The radius of the first excited state (n = 2) orbit is
(1) 0.13 Å (2) 106 Å
(3) 4.77 Å (4) 2.12 Å

53. Heat of formation of two moles of $NH_3(g)$ is –90 KJ. Bond energies of H – H and N – H bonds are 435 KJ and 390 KJ mol^{-1} respectively. The value of the bond energy of N ≡ N will be
(1) –472.5 KJ (2) –945 KJ
(3) 472.2 KJ (4) 945 KJ

54. The structure of diborane (B_2H_6) contains
(1) Four 2 centered-2-electron bonds and two 3 centered-2-electron bonds
(2) Two 2 centered-2-electron bonds and four 3 centered-2 electron bonds
(3) Two 2 centered-2 electron bonds and two 3 centered-3 electron bonds
(4) Four 2 centered-2 electron bonds and four 3 centered-2 electron bonds

55. Thermal stability of hydrides of first group (Alkali metals) elements follows the order
(1) LiH > NaH > KH > RbH
(2) LiH > KH > NaH > RbH
(3) LiH > RbH > KH > NaH
(4) LiH > KH > RbH > NaH

56. The number of radial nodes & angular nodes for an orbital with n = 4; l = 1 is
(1) 3, 1 (2) 2, 1
(3) 2, 0 (4) 4, 0

57. Which of the following does not have sp^3d hybridization?
(1) SF_4 (2) $BrCl_3$
(3) $XeOF_2$ (4) XeF_4

58. At 0°C, the density of a certain gaseous oxide at 2 bar is same as that of dinitrogen at 5 bar. What is the molecular mass of the oxide?
(1) 70 g/mol
(2) 35 g/mol
(3) 140 g/mol
(4) 280 g/mol

59. Which of the following order of radii is correct?
(1) Li < Be < Mg (2) $H^+ < Li^+ < H^-$
(3) O < F > Ne (4) $Na^+ > F^- > O^{-2}$

60. The alkali metal which forms only the normal oxide on heating in air is:
(1) K (2) Rb
(3) Na (4) Li

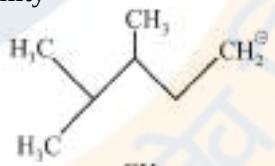
61. Inorganic benzene is
(1) $B_3H_3N_3$ (2) BH_3NH_3
(3) $B_3H_6N_3$ (4) $H_3B_3N_6$

62. 2-methyl but-2-ene is
(1) $CH_3-\underset{\displaystyle CH_3}{\underset{|}{CH}}-CH_2CH_3$
(2) $CH_3-\underset{\displaystyle CH_3}{\underset{|}{C}}=CH-CH_3$
(3) $CH_3-\underset{\displaystyle CH_3}{\underset{|}{CH}}-CH=CH_2$
(4) $CH_3-\underset{\displaystyle CH_3}{\underset{|}{CH}}=CH-CH_3$

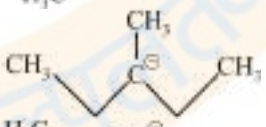
63. Number of possible isomers (including stereoisomers) with molecular formula C_4H_8 is
(1) 3 (2) 4
(3) 5 (4) 6

64. Arrange the following in the increasing order of stability

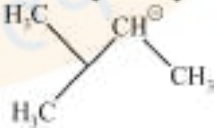
x =



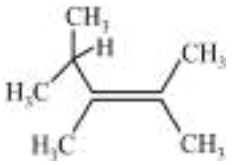
y =



z =



(1) x < y < z (2) y < z < x
(3) x > y > z (4) x = y = z



65. The compound contains how many hyper conjugate hydrogen atoms
(1) 9 (2) 15
(3) 10 (4) 11

66. 26.8 gm of $Na_2SO_4.nH_2O$ contains 12.6 gm of water. The value of n is
(1) 1 (2) 10
(3) 6 (4) 7

67. Calculate the amount of work done by two moles of an ideal gas at 298 K in reversible isothermal expansion from 10 litre to 20 litre [log 2 = 0.3010]
(1) –3435 J (2) –343.5 J
(3) –34.35 J (4) –3.435 J

68. Which of the following is not a protonic and?
(1) $B(OH)_3$ (2) $PO(OH)_3$
(3) $SO(OH)_2$ (4) $SO_2(OH)_2$

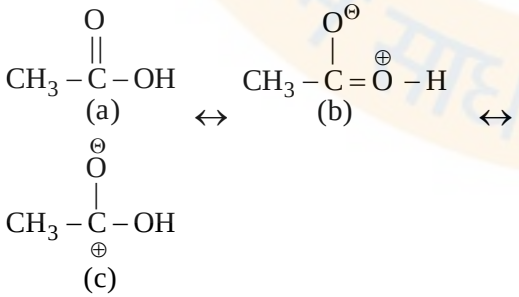
69. The number of moles of $CaCl_2$ needed to react with excess of $AgNO_3$ to produce 4.31 gm of AgCl (Molecular mass of AgCl = 143.5)
(1) 0.03 (2) 0.015
(3) 0.045 (4) 0.06

70. Among the following which is polar
(1) CO_2 (2) SO_2
(3) $BeCl_2$ (4) 

71. If the pressure of a gas contained in a closed vessel is increased by 0.4% and the temperature increased by 1K then the initial temperature must be
(1) 250K (2) 250°C
(3) 25K (4) 25°C

72. The second ionization potentials in electron volts of oxygen and fluorine atoms are respectively given by
(1) 35.1, 38.3 (2) 38.3, 38.3
(3) 38.3, 35.1 (4) 35.1, 35.1

73. Compare relative stability of following resonating structure:



(1) a > b > c (2) a > c > b
(3) b > a > c (4) c > a > b

74. In which of the following reaction, H_2O_2 is acting as a reducing agent?
(1) $SO_2 + H_2O_2 \rightarrow H_2SO_4$
(2) $2KI + H_2O_2 \rightarrow 2KOH + I_2$
(3) $Ag_2O + H_2O_2 \rightarrow 2Ag + H_2O + O_2$
(4) $PbS + 4H_2O_2 \rightarrow PbSO_4 + 4H_2O$

75. The pH of a solution obtained by mixing 100 ml of 0.2 M CH_3COOH with 100 ml of 0.2 M NaOH would be (pK_a for CH_3COOH = 4.74)
(1) 4.74 (2) 8.87
(3) 9.10 (4) 8.57

76. Vapour density of PCl_5 is 104.16 but when heated to 230°C its vapour density is reduced to 62. The degree of dissociation of PCl_5 at this temperature will be
(1) 6.8% (2) 68%
(3) 46% (4) 64%

77. At STP, a container has 1 mole of Ar, 2 moles of CO_2, 3 moles of O_2 and 4 moles of N_2. Without changing the total pressure if one mole of O_2 is removed, the partial pressure O_2 is
(1) Changed by about 16%
(2) Halved
(3) Changed by 26%
(4) Unchanged

78. At STP if 1 mL of water contains 20 drops then number of molecules in a drop of water is
(1) 6.023×10^{23} molecules
(2) 1.376×10^{26} molecules
(3) 1.344×10^{18} molecules
(4) 4.34×10^{20} molecules

79. In a periodic table the basic character of oxides:
(1) increases from left to right and decreases from top to bottom
(2) decreases from right to left and increases from top to bottom
(3) decreases from left to right and increases from top to bottom
(4) decreases from left to right and increases from bottom to top

80. O_2^{2-} is isoelectronic with:
(1) H_2 (2) N_2
(3) F_2 (4) S

81. Which shows highest magnetic moment?
(1) V^{3+} (2) Cr^{3+}
(3) Fe^{3+} (4) Co^{3+}

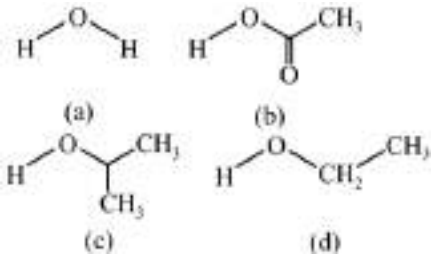
82. The type of hybrid orbitals used by chlorine atom in ClO_2^- ions:
(1) sp^3 (2) sp^2
(3) sp (4) dsp^3

83. What is the decreasing order of strength of bases?

$OH^-, NH_2^-, H-C\equiv C^-, CH_3CH_2^-$

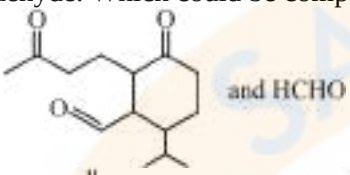
(1) $CH_3CH_2^- > NH_2^- > H-C\equiv C^- > OH^-$
(2) $H-C\equiv C^- > CH_3CH_2^- > NH_2^- > OH^-$
(3) $H-C\equiv C^- > CH_3CH_2^- < NH_2^- > OH^-$
(4) $NH_2^- > H-C\equiv C^- > OH^- > CH_3CH_2^-$

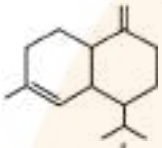
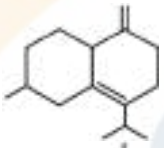
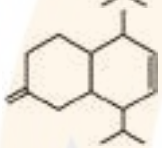
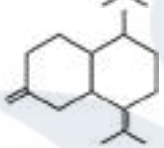
84. Rank the following compounds in order from most acidic to least acidic.



(1) c > d > a > b (2) d > a > b > c
(3) b > a > d > c (4) a > b > d > c

85. The molecular formula of compound A is $C_{15}H_{24}$. Ozonolysis gives the following compound and formaldehyde. Which could be compound A?



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

SECTION - B

86. According to the molecular orbital theory, which of the following statements about magnetic character and bond order is correct regarding O_2^+?
(1) Paramagnetic and bond order < O_2
(2) Paramagnetic and bond order > O_2
(3) Diamagnetic and bond order < O_2
(4) Diamagnetic and bond order > O_2

87. Which one of the following is a correct set with respect to a molecule; hybridization and shape?
(1) $BeCl_2$: sp^2, linear
(2) $BeCl_2$: sp^2, triangular planar
(3) BCl_3 : sp^2, triangular planar
(4) BCl_3 : sp^3, tetrahedral

88. Thermodynamically, most stable form of carbon is:
(1) Diamond (2) Graphite
(3) Peat (4) Coal

89. The statement that is not correct for periodic classification of elements is
(1) The Properties of elements are a periodic function of their atomic numbers
(2) Non-metallic elements are less in number than metallic elements
(3) The first ionization energies of elements along a period do not vary in a regular manner with increase in atomic number at some places
(4) For transition elements, the d-subshells are filled with electrons uniformly with increase in atomic number without any exceptions

90. When 50 cm^3 of a strong acid is added to 50 cm^3 of an alkali, the temperature rises by 5°C. If 250 cm^3 of each liquid are mixed, the temperature rise would be:
(1) 10°C (2) 5°C
(3) 20°C (4) 25°C

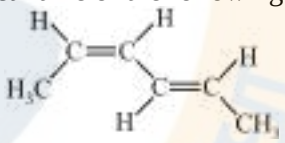
91. In Bohr series of lines of hydrogen spectrum, which of the following inter-orbit jumps of the electron represents highest energy emission?
(1) $5 \rightarrow 1$ (2) $4 \rightarrow 1$
(3) $3 \rightarrow 1$ (4) $2 \rightarrow 1$

92. The compressibility factor for an ideal gas
(1) < 1 (2) > 1
(3) infinity (4) 1

93. Equal masses of Methane, Hydrogen gases, are mixed in a container at 300 K fraction of total pressure exerted by methane gas is
(1) $\frac{1}{9}$ (2) $\frac{8}{9}$
(3) $\frac{1}{2}$ (4) $\frac{1}{3}$

94. Which of the following are isomers?
(1) Ethyl alcohol and dimethyl ether
(2) Methyl alcohol and dimethyl ether
(3) Propanone and Ethanol
(4) Propionic acid and Acetone

95. The correct name of the following structure is



(1) (E), (E)-2, 4-hexadiene
(2) (Z), (Z)-2, 4-hexadiene
(3) (E), (Z)-3, 5-hexadiene
(4) (Z), (E)-2, 4-hexadiene

96. Maximum number of hydrogen bonds per H_2O molecule is
(1) 2 (2) 4
(3) 3 (4) 1

97. A mixture of 2-bromopropane and bromoethane is heated with sodium metal in ether medium. The alkane/s formed during the reaction is/are
(1) butane only
(2) 2-methylbutane only
(3) 2,2-dimethylbutane only
(4) all of these

98. UV radiation from sun causes a reaction that produces _____ layer in atmosphere
(1) carbon monoxides
(2) sulphur dioxide
(3) fluorides
(4) ozone

99. What will be the pH of a solution formed by mixing 40 cm^3 of 0.1 M HCl with 10 cm^3 of 0.45 M NaOH?

(1) 10 (2) 8

(3) 5 (4) 12

100. Equivalent amounts (moles) of H_2 and I_2 are heated in a closed vessel till equilibrium is obtained. If 80% of the H_2 can be converted to HI, the K_C at this temperature is

(1) 64 (2) 16

(3) 0.25 (4) 4

BOTANY

SECTION - A

101. Partial oxidation of glucose to form pyruvic acid is called
(1) Glycolysis (2) Krebs' cycle
(3) EMP pathway (4) Both (1) and (3)

102. In prokaryotes, vacuole that is found to provide buoyancy is
(1) Gas vacuole
(2) Food vacuole
(3) Contractile vacuole
(4) Sap vacuole

103. Which of the given forms of lysosome performs exocytosis?
(1) Primary Lysosome
(2) Secondary Lysosome
(3) Residual bodies
(4) Autophagic vacuoles

104. Select the most possible reason w.r.t. active involvement of nucleolus in protein synthesis
(1) Nucleoli are always large and more numerous in cell
(2) Nucleolus in the site for rRNA synthesis
(3) Nucleolus is not bounded by a membrane
(4) Nucleolus is not separated from rest of cytoplasm.

105. How many of the given events occur(s) in G_2 phase of cell cycle?
(A) DNA Replication
(B) Tubulin protein synthesis
(C) Centriole duplication
(D) Duplication of mitochondria
(1) 2 (2) 3
(3) 4 (4) 1

106. What will be the amount of DNA in meiosis-II products if meiocyte contains 36 pg DNA in G_1 phase?
(1) 36 pg (2) 18 pg
(3) 72 pg (4) 9 pg

107. The microtubules of the spindle fibres attach to the kinetochore during which of the given stages of mitosis?
(1) Prophase (2) Metaphase
(3) Anaphase (4) Telophase

108. If numbers of bivalents are 6 in prophase I then what will be the number of chromosomes after meiosis I in each daughter cell?
(1) 6 (2) 3
(3) 24 (4) 12

109. In taxonomic hierarchy, the family of cats and dogs are assigned to the same
(1) Order
(2) Class
(3) Genus
(4) Species

110. The **correct** binomial epithet of mango is
(1) *Mangifera indica*
(2) *Mangifera indica* Linn
(3) *Mangifera indica Linn*
(4) *Mangifera Indica Linn*

111. Systematics differs from taxonomy as the former includes
(1) Identification of organisms
(2) Characterisation of organisms
(3) Nomenclature of organisms
(4) Evolutionary relationship among organisms

112. Select the **incorrect** match w.r.t. taxonomic categories of wheat
(1) Family – Solanaceae
(2) Class – Monocotyledonae
(3) Division – Angiospermae
(4) Genus – Triticum

113. Fruiting bodies are absent in which of the given pairs of classes of fungi?
(1) Phycomycetes and Ascomycetes
(2) Ascomycetes and Basidiomycetes
(3) Basidiomycetes and Deuteromycetes
(4) Phycomycetes and Deuteromycetes

114. Moneran with introns in their genetic sequences and are responsible for production of methane (biogas) from the dung of ruminants is
(1) *Halococcus*
(2) *Thermoproteus*
(3) *Methanobacterium*
(4) *Thermoplasma*

115. Read the given statements stating which ones are true (T) and which ones are false (F) and select the **correct** option.
(A) Herpes virus is single stranded DNA virus
(B) *Puccinia* causes rust disease in wheat
(C) *Penicillium* is a facultative parasite and saprophytic fungi

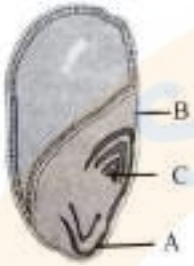
	A	B	C
(1)	F	T	T
(2)	T	T	F
(3)	F	F	T
(4)	T	F	F

116. Match the Column-I and Column-II w.r.t. protozoans and their locomotory structures

Column-I	**Column-II**
(A) *Amoeba*	(i) Cilia
(B) *Trypanosoma*	(ii) Pseudopodia
(C) *Paramoecium*	(iii) Flagella

	A	**B**	**C**
(1)	(i)	(ii)	(iii)
(2)	(ii)	(iii)	(i)
(3)	(iii)	(ii)	(i)
(4)	(iii)	(i)	(ii)

117. Examine the given figure and select **correct** statement w.r.t. its labelled parts



(1) 'A' encloses plumule
(2) 'C' is radicle
(3) 'C' is enclosed in a sheath called coleoptile
(4) 'B' is endosperm

118. Drupes develop from:
(1) Monocarpellary superior ovaries
(2) Monocarpellary inferior ovaries
(3) Multicarpellary half-inferior ovaries
(4) Monocarpellary half-inferior ovaries

119. The placenta develops at the base of the ovary in
(1) Marigold
(2) *Dianthus*
(3) *Argemone*
(4) China rose

120. Flowers are zygomorphic in all of the given, **except**
(1) Pea
(2) Gulmohar
(3) Bean
(4) Mustard

121. Vascular cambium is not seen initially but develops at the time of secondary growth in
(1) Dicot root
(2) Monocot root
(3) Monocot stem
(4) Dicot stem

122. Monocot stems cannot undergo the secondary growth, because
(1) Water-containing cavities are present in vascular bundles
(2) Vascular bundles are conjoint and closed
(3) Ground tissue is not differentiated into cortex and pith
(4) Endodermis is absent in monocot stem

123. **Statement A**: In Phaeophyceae, food is stored as complex carbohydrates which may be in the form of laminarin or mannitol.
Statement B: The characteristic red colour in red algae is due to the predominance of fucoxanthin.
(1) Only A is correct
(2) Only B is correct
(3) Both A and B are correct
(4) Both A and B are incorrect

124. Which of the given pteridophytes produces two kinds of spores, macro (large) and micro (small) spores?
(1) *Salvinia* (2) *Lycopodium*
(3) *Dryopteris* (4) *Adiantum*

125. Water potential of pure water at standard temperature, which is not under any pressure is equal to
(1) Turgor pressure (2) Zero
(3) Solute potential (4) Pressure potential

126. Select the **incorrect** statement w.r.t. apoplast pathway
(1) Consists of living parts of plant body
(2) Is faster than symplast
(3) There is little resistance in the movement of water
(4) Metabolic state of root does not affect apoplast pathway

127. Water channels are made up of ____ types of aquaporins.
(1) 4 (2) 8
(3) 16 (4) 32

128. Transpiration is affected by several external factors except.
(1) Temperature (2) Light
(3) Humidity (4) Canopy structure

129. Which of the given elements activate the critical enzymes that are involved in carbon fixation during photosynthesis?
(1) Mg (2) Zn
(3) S (4) Mo

130. Select the **incorrect** statement w.r.t. leghaemoglobin
(1) Is an O_2 scavenger
(2) Is a red or pink coloured pigment
(3) Is present in cytosol of nodule cell
(4) Is a Mo-Fe protein

131. How many electrons, protons and ATPs are required to produce five molecules of ammonia w.r.t. nitrogen fixation?
(1) $8e^-$, $8H^+$, 8 ATP
(2) $8e^-$, $8H^+$, 16 ATP
(3) $40e^-$, $40H^+$, 40 ATP
(4) $20e^-$, $20H^+$, 40 ATP

132. Which of the given bacteria fix nitrogen while living in symbiotic association as well as in free-living state?
(1) *Rhizobium* (2) *Frankia*
(3) *Anabaena* (4) *Azotobacter*

133. T.W. Engelmann described the first action spectrum of photosynthesis by experimenting on
(1) *Cladophora* (2) Mouse
(3) Mint plant (4) Both (2) and (3)

134. Kranz anatomy is a characteristic feature of all of the given plants, **except**
(1) Maize (2) Sugarcane
(3) Rice (4) Amaranthus

135. The primary CO_2 acceptor in C_4 pathway is a
(1) 5-C compound (2) 3-C compound
(3) 4-C compound (4) 6-C compound

SECTION - B

136. How many molecules of ATP and NADPH respectively are required for fixation of $3CO_2$ molecules in C_4 plants?
(1) 5 and 2 (2) 10 and 6
(3) 15 and 6 (4) 30 and 12

137. Which of the given is pacemaker enzyme of EMP pathway?
(1) Phosphohexoisomerase
(2) Phosphofructokinase
(3) Aldolase
(4) Phosphoglycerate kinase

138. Which of the given substrates has minimum RQ under aerobic respiration?
(1) Glucose (2) Oxalic acid
(3) Fat (4) Malic acid

139. Which of the given intermediates obtained in amphibolic pathway is raw material for alkaloids?
(1) Acetyl CoA
(2) Oxaloacetic acid
(3) Succinyl CoA
(4) α–Ketoglutaric acid

140. Select the **incorrect** statement w.r.t. fermentation.
(1) Involves complete degradation of glucose
(2) Oxygen is not required
(3) End products can be lactic acid or ethanol
(4) There is a net gain of 2 ATP for each molecule of glucose fermented

141. Which of the given plant hormones induces seedless tomato formation?
(1) Auxin (2) Cytokinin
(3) ABA (4) GA_3

142. Growth regulators __A__ and __B__ both promote cell division.
Select the option which **correctly** fills A and B.

	A	**B**
(1)	Auxin	Cytokinin
(2)	GA_3	ABA
(3)	GA_3	Auxin
(4)	Auxin	Ethylene

143. Dormancy in seeds may be due to presence of certain chemicals like
(1) Phenolic acid
(2) Auxin
(3) GA
(4) Cytokinin

144. Which of the following plants do not show any correlation between exposure to light duration and induction of flowering response?
(1) Long day plant
(2) Day neutral plant
(3) Short day plant
(4) All of these

145. Match the Column-I and Column-II w.r.t. phytohormones and their functions.

Column-I	**Column-II**
(A) Auxin	(i) Increases size of apple
(B) Abscisic acid	(ii) Controls the xylem differentiation
(C) Ethylene	(iii) Closure of stomata
(D) Gibberellin	(iv) Fruit ripening

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

146. Which one of the following structures is an organelle within an organelle?
(1) Centriole
(2) Ribosome
(3) Peroxisome
(4) Nucleus

147. The network of nucleoprotein fibres called chromatin was named by
(1) Friedrich Meischer
(2) Flemming
(3) Strasburger
(4) Robert Brown

148. During gametogenesis, the enzyme recombinase participates at
(1) S-phase of interphase for DNA replication
(2) Prophase for condensation of chromosomes
(3) Prophase II for crossing over
(4) Prophase I for exchange of genetic materials

149. A typical flower of Solanaceae has 4 pollen mother cells in each pollen sac of its anthers. What will be the number of pollen grains expected in this flower?

(1) 16 (2) 80
(3) 320 (4) 1280

150. Which one of the following is **not** a correct statement?

(1) Monograph contains information of any one taxon
(2) Keys are analytical in nature
(3) National zoological park (Delhi) is one of the finest zoos of Asia.
(4) Petunia and Allium are included in the same family mainly due to similar floral characters

ZOOLOGY

SECTION - A

151. Muscles that help in transportation of food through digestive tract and gametes through the genital tract are
(1) smooth muscles
(2) striated muscles
(3) voluntary muscles
(4) cardiac muscles

152. Which of the following statements is correct?
(1) Most of the cartilage is not replaced by bones in adult
(2) Cartilage is present in nose-tip, intervertebral disc, outer ear joints
(3) Cartilage has no rich blood supply but bone has
(4) Both (2) and (3)

153. Some of the features are given below that evolved for the first time in cnidarians. Mark the wrong one.
(1) Tissue grade of organisation
(2) Blind sac body plan
(3) Nerve cells
(4) Complete digestive tract

154. Which class has the largest number of animals?
(1) Fishes (2) Reptiles
(3) Insects (4) Mammals

155. Some important features are mentioned in the box below:

Oviparous only, Internal fertilisation only, cold-blooded, placoid scales, mesonephric kidneys, streamlined body

How many of the features are common both to chondrichthyes and osteichthyes?
(1) Four
(2) Three
(3) Two
(4) Five

156. Areolar tissue:
(1) Is a type of dense connective tissue
(2) Lacks fibroblast
(3) Often serves as a support framework for epithelium
(4) Possesses macrophages but lacks mast cells

157. The blood group AB cannot be given to a recipient with blood group A, because
(1) The recipient has antibodies B
(2) the recipient has antibodies A
(3) the recipient has antigen B
(4) the recipient lacks antibodies B

158. Which of the following is a correct statement?
(1) Stroke volume divided by heart rate gives the cardiac output
(2) Cardiac output divides by heart rate gives the stroke volume
(3) Heart rate multiplied by cardiac output gives the stroke volume
(4) Stroke volume multiplied by cardiac output gives the heart rate

159. The duration between the first and second heart sounds is
(1) 0.5 second
(2) 0.3 second
(3) 0.1 second
(4) 0.7 second

160. During pulmonary circulation:
(1) Deoxygenated blood is pumped into the pulmonary artery
(2) Deoxygenated blood is pumped into pulmonary vein
(3) Both (1) and (2)
(4) Oxygenated blood is carried by the pulmonary veins into right atrium

161. Due to insufficient filtration in the Bowman's capsule, all are likely to happen except
(1) Accumulation of fluid in the body
(2) Increase in blood pressure
(3) Increase in blood urea level
(4) Loss of glucose through urine

162. Which of the following is incorrect?
(1) Blood vessel leading to glomerulus is called efferent arteriole
(2) Vasa recta, peritubular capillaries, glomerulus all have blood
(3) Cortical nephron has no or highly reduced vasa recta
(4) Vasa recta runs parallel to the Henle's loop in juxtamedullary nephrons.

163. Which of following statements is **false**?
(1) The kidneys have built in mechanism for regulation of glomerular filtration rate (GFR)
(2) Tubular secretion does not play any significant role in urine formation
(3) The amount of urine output per day in normal adult is about 1.5 L
(4) During urine formation, tubular cells secrete H^+, NH_3 and K^+ in the filtrate.

164. Limbic system is concerned with all of the following, except
(1) Regulation of sexual behaviour
(2) Expression of emotional reactions
(3) Motivation
(4) Regulation of breathing

165. Blood vessels are found in the eye in all except
(1) Choroid (2) Cornea
(3) Ciliary body (4) Retina

166. Identify different parts of the brain given in the figure and mark the option that shows correct identification of characteristic of the part labelled as A, B, C, D.

(1) A-Regulates complex functions like memory and communication
(2) B-Controls the body temperature
(3) C-Connects the two cerebral hemispheres
(4) D-Has inner cortex and outer medulla

167. Consider the following symptoms of a disorder.
(a) Mental retardation
(b) Abnormal skin
(c) Deaf-mutism
(d) Stunted growth
Which disorder is **correctly** described by these symptoms?
(1) Acromegaly
(2) Dwarfism
(3) Exophthalmic goitre
(4) Cretinism

168. Which of the following is correct?
(1) Aldosterone is the main glucocorticoid in our body
(2) In our body, cortisol is the main mineralocorticoid
(3) Glucocorticoids stimulate gluconeogenesis but not lipolysis and proteolysis
(4) Glucocorticoids inhibit cellular uptake and utilisation of amino acids

169. Read the following statements and choose **incorrect** one
(1) Pineal gland is located on the dorsal side of forebrain
(2) Melatonin can only influences pigmentation
(3) LH and FSH stimulates gonadal activity
(4) Oxytocin causes milk ejection from the mammary gland

170. Which of the following is an incorrect statement?
(1) Nucleic acids exhibit a wide variety of secondary structures
(2) Nucleic acids are formed by the polymerisation of a large number of nucleotides
(3) The backbone of DNA is built up of alternate sugar and phosphate groups
(4) The two strands of DNA are parallel

171. Which of the following is an incorrect statement?
(1) The essential components of many coenzymes are vitamins
(2) Coenzymes are inorganic compounds whose association with the apoenzyme is only transient.
(3) A number of enzymes require metal ions for their activity
(4) In peroxidase, haem is the prosthetic group and part of active site of enzyme.

172. _____ structure of protein is necessary for the biological activities of proteins
(1) Primary
(2) Secondary
(3) Tertiary
(4) Quaternary

173. The nervous system in cockroach
(1) is spread throughout the body
(2) is represented by segmentally arranged ganglia and ventral nerve cord
(3) both (1) and (2)
(4) consists of supra-oesophageal ganglia in head and dorsal nerve cord

174. Which of the following is correct for mosaic vision in cockroach?
(1) With the help of several ommatidia, a cockroach receives several images of an object.
(2) It is with more sensitivity but has less resolution
(3) Being common during night, it is called nocturnal vision also
(4) All of these

175. Which of the following statements is incorrect about development of *Periplaneta americana*?
(1) On an average female produces 9-10 oothecae each containing 14-16 eggs
(2) The development is paurometabolous
(3) The nymph grows by moulting about 7-8 times to reach adult form
(4) The next to last nymphal state has wing pads but only adult cockroach has wings

176. The undigested and unabsorbed substances enter the caecum of large intestine through _____.
(1) Gastroesophageal sphincter
(2) Sphincter of Oddi
(3) Pyloric sphincter
(4) Ileocaecal valve

177. Which of the following is not a function of liver?
(1) Detoxification of drugs and harmful substances
(2) Deamination of amino acids
(3) Phagocytosis of worn out RBCs
(4) Storing of fats

178. The enzyme vital for protein digestion but that does not directly act upon food substrate is
(1) Trypsin
(2) Pepsin
(3) Chymotrypsin
(4) Enterokinase

179. Which of the following is/are the major function of buccal cavity?
(1) Mastication of food
(2) Facilitation of swallowing
(3) Facilitation of fat absorption
(4) Both (1) and (2)

180. At alveolar level, the formation of oxyhaemoglobin is favoured by
(1) High pCO_2 (2) High H^+
(3) Low pH (4) High pO_2

181. Select the statement which is incorrect w.r.t. rib cage.
(1) 11^{th} and 12^{th} pair of ribs are not connected ventrally to the sternum
(2) Thoracic vertebrae, ribs and sternum together form the rib cage.
(3) The 8^{th}, 9^{th} and 10^{th} pairs of floating ribs do not articulate directly with sternum
(4) First seven pairs of ribs are called true ribs.

182. Chemosensitive area situated adjacent to the respiratory rhythm centre is highly sensitive to
(1) CO_2
(2) Hydrogen ions
(3) Both (1) and (2)
(4) Oxygen only

183. Which of the following is an incorrect statement w.r.t. CO_2 transport?
(1) Every 100 mL of deoxygenated blood delivers approximately 4 mL of CO_2 to the alveoli
(2) RBCs contain high concentration of carbonic anhydrase
(3) Carbonic anhydrase is absent in blood plasma
(4) At the tissue site where pCO_2 is high, CO_2 diffuses into blood to form HCO_3^- and H^+.

184. A motor unit is best described as
(1) all the nerve fibres and muscle fibres in a single muscle bundle
(2) one muscle fibres and its single nerve fibre
(3) a single motor neuron and all the muscle fibres that it innervates
(4) the neuron which carries the message from muscle to CNS

185. Which of the following statements about human vertebral column is **false**?
(1) Vertebral column consists of 26 vertebrae
(2) It is ventrally placed
(3) It extends from the base of skull and constitutes the main framework of the trunk
(4) Neural canal in vertebra is the passage for spinal cord

SECTION - B

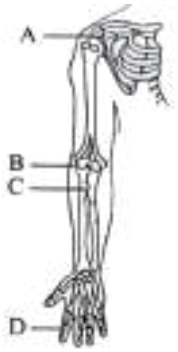
186. Which of the following is **not** a characteristic feature of biceps muscle?
(1) We are usually able to make it contract merely by thinking about it.
(2) It has alternate light and dark bands
(3) Its muscle fibre tapperedat both ends
(4) Its muscle fibres are bounded together in a parallel fashion

187. Find out the **incorrectly** matching pair with respect to the accessory excretory organs and the excretory wastes eliminated by them.
(1) Liver – Bilirubin, biliverdin and cholesterol
(2) Lungs – CO_2 and H_2O
(3) Salivary gland – Heavy metals, drugs, small amounts of nitrogenous wastes
(4) Sebaceous gland – Sebum containing waxes, sterols and hydrocarbons

188. In a nucleotide, an ester bond is present between
(1) Carboxyl and phosphate group of sugar
(2) Carbonate and carboxyl group of sugar
(3) Phosphate and hydroxyl group of sugar
(4) Sulphate and carboxyl group of sugar

189. All of the following are components of diffusion membrane, except
(1) Thin squamous epithelium of alveoli
(2) Basement substance in between alveoli and alveolar capillary
(3) Cuboidal epithelium of alveoli
(4) Endothelium of alveolar capillaries

190. In the given diagram, which joints are found at the marked site.



	A	B	C	D
(1)	Hinge	Ball and socket	Hinge	Condyloid
(2)	Ball and socket	Hinge	Pivot	Hinge
(3)	Pivot	Hinge	Ball and socket	Hinge
(4)	Ball and socket	Pivot	Hinge	Hinge

191. The crista and macula are:
(1) The specific receptors of the vestibular apparatus
(2) Responsible for maintenance of balance of the body and posture
(3) Both (1) and (2)
(4) Parts of middle ear

192. Choose the correct option in order to complete the analogy w.r.t. secondary metabolites.
Pigment : Carotenoid :: Lectin: _____.
(1) Anthocyanin
(2) Concanavalin A
(3) Abrin
(4) Morphine

193. The heart of cockroach:
(1) In the anterior end is closed and open in the posterior end
(2) Consists of thirteen funnel-like contractile chambers
(3) Consists of elongated muscular tube lying along the mid-ventral line of thorax and abdomen
(4) Having chambers which are not interconnected

194. How many enzymes given in a box below are found in succus entericus?

Nucleases, Nucleotidases, Nucleosidases, Chymotrypsinogen

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

195. How much volume of deoxygenated blood delivers approximately 20 ml of CO_2 to the alveoli?
(1) 200 mL (2) 300 mL
(3) 400 mL (4) 500 mL

196. Cnidarians exhibit two basic forms X and Y. The former is a sessile and cylindrical form whereas the latter is umbrella shaped and free-swimming. Identify X and Y and select the correct option w.r.t. its examples.
(1) X-Medusa, e.g., Sea-fan
Y-Polyp, e.g., *Hydra*
(2) X-Medusa, e.g., *Obelia*
Y-Polyp, e.g. Sea-pen
(3) X-Polyp, e.g., Sea-anemone
Y-Medusa, e.g., Jelly fish
(4) X-Polyp, e.g., *Aurelia*
Y-Medusa, e.g., *Adamsia*

197. The human skull has 22 bones with _____ cranial bones and _____ facial bones
(1) 10,12
(2) 14,8
(3) 12,10
(4) 8,14

198. Which of the following hormones is not derived from amino acid tyrosine?
(1) Thyroxine (2) Adrenaline
(3) Norepinephrine (4) Cortisol

199. Patella:
(1) Is cranial bone
(2) Is a cup-shaped bone covering the knee ventrally
(3) Is a rectangular bone
(4) Collar bone

200. Read the following statements and identify the True (T) and False (F) among them.
(i) Pelvic girdle consists of two coxal bones.
(ii) Each coxal bone is formed by the fusion of three bones – ilium, ischium and pubis.
(iii) At the point of fusion of three bones is a cavity called glenoid cavity to which thigh bone articulates.
(iv) The two halves of the pelvic girdle meet dorsally to form the pubic symphysis containing hyaline cartilage.

	(i)	(ii)	(iii)	(iv)
(1)	T	F	F	T
(2)	F	F	T	F
(3)	T	T	F	F
(4)	F	T	F	F