Aakash
+ BYJU'S

Corporate Office : Aakash Tower, 8, Pusa Road, New Delhi-110005, Phone : 011-47623456

MM : 720

REVISION TEST SERIES

Time : 3 Hrs. 20 Min.

(*for* NEET-2022)
Test – 7

Topics covered :

Physics	**:**	Gravitation, Mechanical Properties of Solids, Mechanical Properties of Fluids, Thermal Properties of Matter, Thermodynamics, Kinetic Theory, Oscillations, Waves
Chemistry	**:**	Surface Chemistry, Organic Chemistry–Some Basic Principles and Techniques, Hydrocarbons, Electrochemistry, Solutions, The Solid State, Chemical Kinetics
Botany	**:**	Plant Growth and Development, Respiration in Plants, Photosynthesis in Higher Plants, Mineral Nutrition, Transport in Plants
Zoology	**:**	Structural Organisation in Animals– Animal Morphology (Cockroach) Animal Kingdom, Chemical Coordination and Integration, Neural Control and Coordination, Locomotion and Movement

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.

PHYSICS

**Choose the correct answer:**

SECTION-A

1. Assume that gravitational force between earth and its satellite is inversely proportional to distance (r) between them, then

   (1) Orbital velocity of satellite will be independent of r

   (2) Orbital velocity of satellite will be proportional to $\dfrac{1}{r^{1/2}}$

   (3) Time period of satellite is proportional to r^2

   (4) Time period of satellite is proportional to $r^{1/2}$

2. Figure shows the elliptical orbit of a satellite of mass m about a planet O. The shaded area *OAB*, *OCD* and *OEF* are in ratio 3:1:2. If t_1, t_2 and t_3 are the time for the satellite to move from E to F, A to B and C to D respectively, then
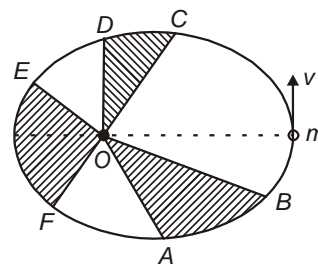
(1) $3t_1 = 2t_2 = 6t_3$ (2) $t_1 = t_2 = t_3$

(3) $3t_1 = 6t_2 = 2t_3$ (4) $t_1 = 2t_2 = 3t_3$

3. Which of the following graphs represents the variation of acceleration due to gravity (g') with depth (h) from the surface of earth of radius (R)?

(1)

(2)

(3)

(4)
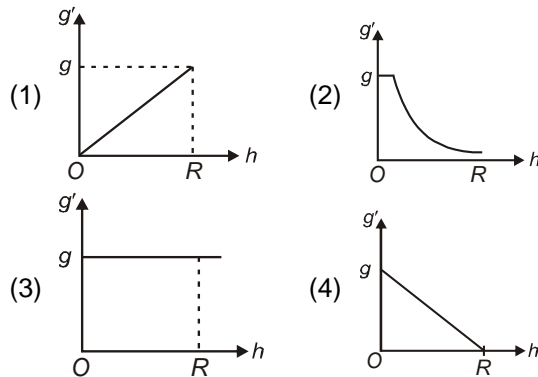
4. Radius of a planet is thrice the radius of earth and both have same average mass densities. If v_P and v_E are the escape velocities of the planet and earth from their respective surfaces, then

(1) $v_P = \sqrt{3}v_E$ (2) $v_P = 2v_E$

(3) $v_P = 3v_E$ (4) $v_P = \sqrt{2}v_E$

5. Infinite number of point masses each of mass 2 kg are placed on x-axis at positions 1 m, 2 m, 4 m, 8 m..... The magnitude of gravitational force experienced by a point object of mass 1 kg placed at origin is (All quantities are in SI unit)

(1) $\dfrac{8}{3}G$ (2) $\dfrac{4}{3}G$

(3) $\dfrac{3}{4}G$ (4) Zero

6. Gravitational potential in a region is given by $V = -(x^2y + yz + xyz)$, where V is in J/kg and x, y, z are in m. The gravitational field intensity (in N/kg) at (1 m, 1 m, 1 m) is
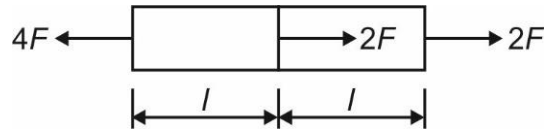
(1) $(\hat{i} + \hat{j} + \hat{k})$ (2) $(3\hat{i} + 3\hat{j} + 2\hat{k})$

(3) $(\hat{i} + 2\hat{j} + 2\hat{k})$ (4) $(\hat{i} + \hat{j} + 2\hat{k})$

7. A particle is thrown up with speed $\sqrt{\dfrac{3gR}{2}}$ from surface of earth. The maximum height attained by the particle is
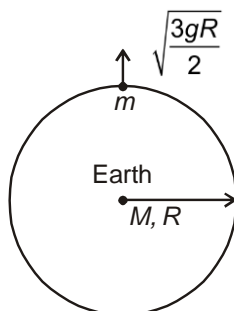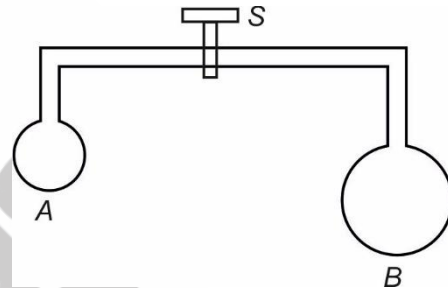

(1) R (2) $2R$

(3) $3R$ (4) $4R$

8. A uniform bar is subjected to axial forces as shown in figure. If Y is Young's modulus of elasticity of the bar and A is its cross-sectional area, then total elongation will be


(1) $\dfrac{4Fl}{AY}$ (2) $\dfrac{6Fl}{AY}$

(3) $\dfrac{5FL}{AY}$ (4) $\dfrac{FL}{AY}$

9. Two liquid bubbles are connected by a tube as shown in figure. If valve 'S' is opened, then


(1) Size of bubble A increases and size of bubble B decreases

(2) Size of bubble A decreases and size of bubble B remain same

(3) Both bubbles will acquire same size

(4) Size of A decreases and size of bubble B increases

10. A U-tube of base length 'l' is filled with equal volume of two liquids of densities ρ and 2ρ. If tube is moving with an acceleration of $g/3$ on horizontal plane as shown in figure, then value of height (h) is
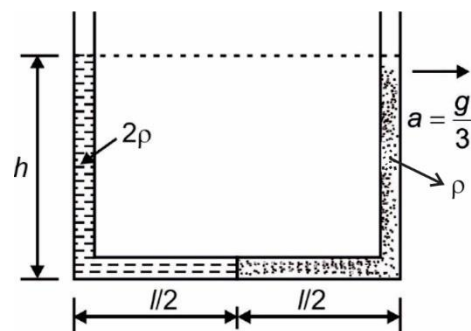

(1) l (2) $l/2$

(3) $l/3$ (4) $l/4$

11. An incompressible and non-viscous liquid flows through a horizontal tube of different cross-sectional area as shown in figure. The velocity (v) of the fluid is
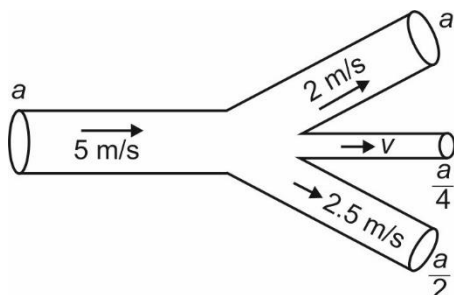
    (1) 0.5 m/s   (2) 7 m/s

    (3) 3.5 m/s   (4) Zero

12. Eight equal drops are falling through air with a steady velocity of 10 cm/s. If they coalesce, then new terminal velocity will be

    (1) 20 cm/s   (2) 40 cm/s

    (3) 30 cm/s   (4) 10 cm/s

13. Find the value of acceleration a for which point x is just exposed to air as shown in the figure
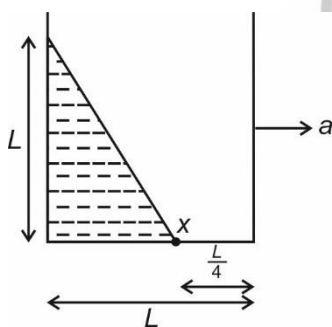
    (1) $\dfrac{3g}{4}$ (2) $\dfrac{4g}{3}$

    (3) $\dfrac{2g}{3}$ (4) $\dfrac{3g}{2}$

14. The value of m so that elongation in both the identical massless rods are same, is
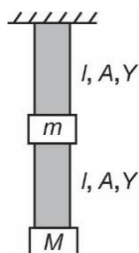


    (1) $m = \dfrac{M}{2}$ (2) $m = \dfrac{M}{3}$

    (3) $m = 0$ (4) $m = M$

15. For a liquid and glass interface, if adhesive force is much greater than cohesive force, then the angle of contact is

    (1) Greater than 90°   (2) Equal to 90°

    (3) Less than 90°   (4) Both (1) and (2)

16. A container is filled with liquid up to height H as shown in figure. There are 2 holes in the container such that water coming out from them have same range. If the range of water coming out of the holes is half of maximum range, then the distance x between these holes is
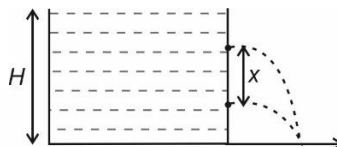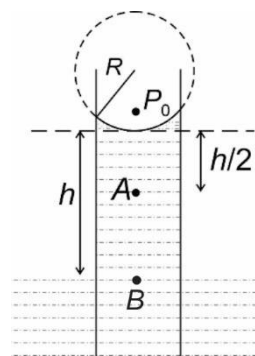

    (1) $\dfrac{\sqrt{5}H}{4}$ (2) $\dfrac{\sqrt{3}H}{4}$

    (3) $\dfrac{2H}{3}$ (4) $\dfrac{\sqrt{3}H}{2}$

17. Bernoulli's theorem is valid for

    (1) Viscous fluid

    (2) Non-ideal fluid

    (3) All types of fluid

    (4) Ideal streamlined flow of fluid

18. A capillary tube is dipped in liquid as shown in the figure. The pressure at point A is [T = Surface tension, ρ = Density of liquid]


    (1) $P_A = P_0 - \dfrac{2T}{R} + \rho g \dfrac{h}{2}$

    (2) $P_A = P_0 + \dfrac{2T}{R} + \rho g \dfrac{h}{2}$

    (3) $P_A = P_0 - \dfrac{2T}{R} - \rho g h$

   (4) $P_A = P_0 + \dfrac{2T}{R} - \rho g h$

19. If the velocity of water layers in river is given by $v = ky^2$, where y is the height from the river bed, then the force required to keep a square plate of area A with constant velocity at height h is [η = coefficient of viscosity]
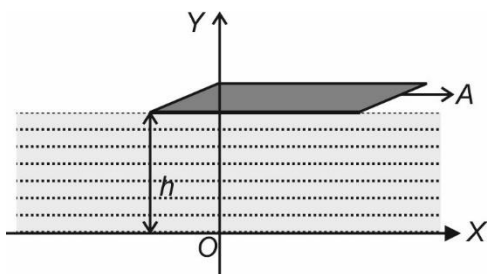

   (1) $\eta Ak\dfrac{h}{2}$

   (2) $4\eta Akh$

   (3) $2\eta Akh$

   (4) ηAkh

20. Four rods of same material and having same cross-section area and length are joined as shown in figure. The temperature of the junction is (Assume there is no heat loss through radiation)
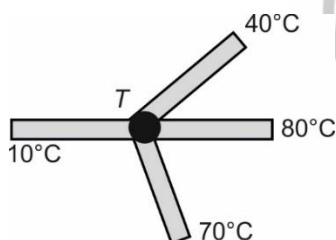

   (1) 20°C

   (2) 60°C

   (3) 50°C

   (4) 30°C

21. 20 gram of ice at –10°C is kept into a calorimeter containing 20 gram of water at 25°C. When equilibrium is reached then calorimeter will contain (neglect thermal capacity of calorimeter)

   (1) 40 gram of water

   (2) 40 gram of ice

   (3) 25 gram of water and 15 gram of ice

   (4) 15 gram of water and 25 gram of ice

22. A cyclic process for a given mass of gas is shown in volume-temperature (V-T) diagram. Corresponding pressure - temperature (P-T) diagram will be
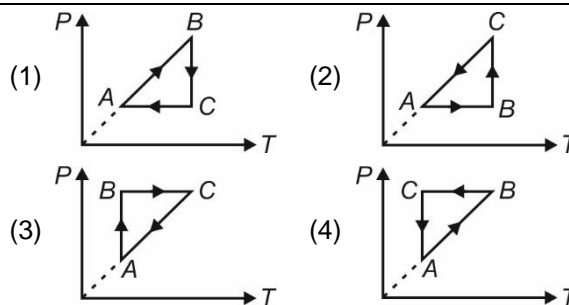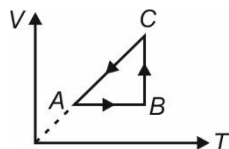
23. Work done in cyclic process shown in pressure – volume (P – V) graph is

   (1) –100 kJ

   (2) –100π kJ

   (3) –25π kJ
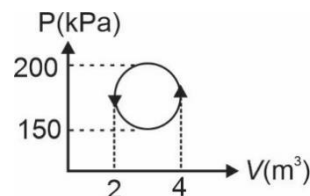
   (4) +25π kJ

24. An ideal diatomic gas is compressed through several processes as shown in pressure-volume (P-V) graph. Which process results in maximum work done on the gas?
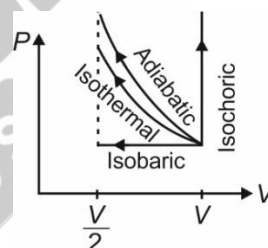
   (1) Adiabatic

   (2) Isothermal

   (3) Isochoric

   (4) Isobaric

25. The efficiency of a heat engine, working with source and sink temperature 927°C and 27°C may be

   (1) 56%

   (2) 79%

   (3) 100%

   (4) 85%

26. At what temperature, the readings of centigrade scale and Fahrenheit scale are in ratio 2 : 3?

   (1) $\left(\dfrac{-160}{3}\right)°C$

   (2) $\left(\dfrac{-160}{3}\right)°F$

   (3) $\left(\dfrac{-320}{3}\right)°C$

   (4) $\left(\dfrac{-160}{5}\right)°F$

27. When a wave travels in a medium, the particle displacement is given by $y = p\sin 2\pi(qt - rx)$, where p, q and r are constants. The maximum particle velocity will be twice the wave velocity, if

   (1) $p > qr$ (2) $p = qr$

   (3) $r = \dfrac{1}{\pi p}$ (4) $r > p\pi$

28. If a spring of force constant k is cut into two parts, such that one part is thrice in length of the other part. Then the force constant of each part are

   (1) $\dfrac{3k}{4}$, $4k$ (2) $\dfrac{4k}{3}$, $4k$

   (3) $\dfrac{k}{4}$, $\dfrac{4k}{3}$ (4) $\dfrac{2k}{3}$, $3k$

29. When sound is produced in an aeroplane moving with a velocity of 200 m/s horizontally its echo is heard to a passenger in the aeroplane after $10\sqrt{5}$ seconds. If velocity of sound in air is 300 ms⁻¹, then elevation of aeroplane is

   (1) 1250 m   (2) 250 m

   (3) 2500 m   (4) $250\sqrt{5}$ m

30. For a certain organ pipe, three successive resonance frequencies are observed at 425 Hz, 595 Hz and 765 Hz. The speed of sound in air is 340 m/s. The pipe is (neglect end correction)

   (1) Closed pipe of length 1 m
   (2) Closed pipe of length 2 m
   (3) Open pipe of length 1 m
   (4) Open pipe of length 2 m

31. Given figure shows an incident pulse P reflected from a rigid support. Which one of following represents the reflected pulse correctly?


   (1)   (2)

   (3)   (4)
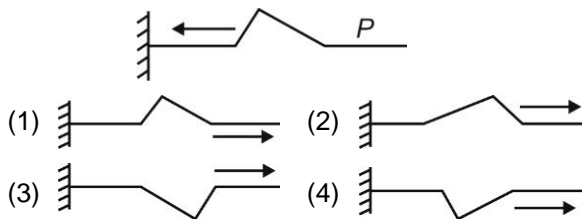
32. The figure shows snapshot of a wave travelling along a taut string in positive x-direction. Various points have been marked on the string. Select the correct option regarding motion of the points at the instant shown
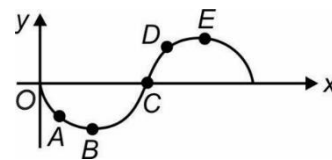
   (1) Points C and D are moving in opposite direction
   (2) Acceleration of points B and E is zero
   (3) Velocity of point C is zero
   (4) Point A and C are moving in opposite direction

33. Which of the following graph for speed of sound in a gas is correct?

   (1)   (2)

   (3)   (4)
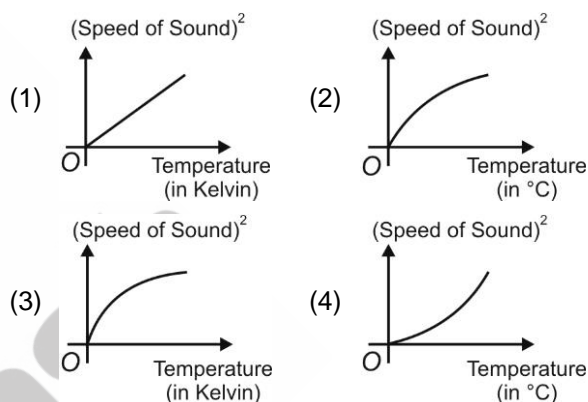
34. A block of mass m is attached to a horizontal massless spring which can move on smooth horizontal surface as shown in the figure. If it is slightly disturbed from its equilibrium position, then the time period of oscillation is
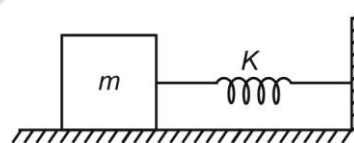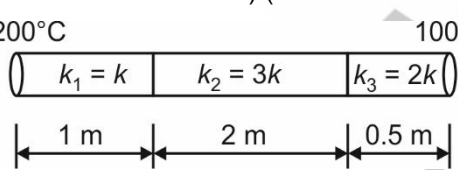
   (1) $2\pi\sqrt{\dfrac{m}{K}}$ (2) $2\pi\sqrt{\dfrac{2m}{3K}}$

   (3) $2\pi\sqrt{\dfrac{m}{2K}}$ (4) $2\pi\sqrt{\dfrac{3m}{2K}}$

35. In a simple harmonic motion when the displacement is maximum, then

   (1) Kinetic energy is maximum and potential energy is minimum
   (2) Potential energy is maximum and Kinetic energy is minimum
   (3) Both Kinetic energy and potential energy are maximum
   (4) Both Kinetic energy and potential energy are minimum

SECTION-B

36. If an object at equator feels weightlessness, then the duration of the day will be nearly

    (1) 1.4 hour　　　　　　(2) 3.4 hour

    (3) 2.2 hour　　　　　　(4) 4.4 hour

37. In an experiment to determine the Young's modulus, if length of wire and radius both are doubled, then the value of Young's modulus will become

    (1) Double　　　　　　(2) Quadruple

    (3) Remain same　　　　(4) Half

38. If pressure at half the depth of a lake is equal to $\left(\dfrac{2}{3}\right)^{rd}$ of pressure at the bottom of the lake, then depth of the lake will be

    ($P_{atm} = 10^5$ N/m^2 and $\rho = 10^3 \dfrac{kg}{m^3}$)

    (1) 10 m　　　　　　　(2) 20 m

    (3) 30 m　　　　　　　(4) 40 m

39. Three rods of same cross-section but of different lengths and conductivity are joined in series. The temperature of the two extreme ends are 200°C and 100°C as shown in figure. The rate of heat transfer H (in watt) for given system is (All quantities are in SI unit) ($A = 23 \times 10^{-2}$ m^2)

    (1) 12k　　　　　　　(2) 14k

    (3) 16k　　　　　　　(4) 18k

40. A rod is placed on smooth horizontal surface. Find the stress if temperature is increased by 40°C (given $\alpha = 5 \times 10^{-5}$ °C^{-1} and $Y = 5 \times 10^{11}$ N/m^2)

    (1) 10^9 N/m^2　　　　(2) 2×10^9 N/m^2

    (3) 10^{11} N/m^2　　　　(4) Zero

41. 40 g water at 50°C is mixed with 20 g ice at −20°C. The final temperature of mixture is

    (1) 0°C

    (2) 2°C

    (3) 3.33°C

    (4) 6.66°C

42. A refrigerator based on Carnot cycle receives heat from 227°C and rejects heat at 727°C. Let the work input required per unit heat received is x. If the same machine is used as a Carnot engine, then its efficiency is y. The ratio of x and y is

    (1) 2

    (2) 1

    (3) 3

    (4) $\dfrac{1}{3}$

43. A wire can be broken by applying a load of 300 N. The force required to break another wire of same length and same material but double in diameter, will be

    (1) 300 N　　　　　　(2) 600 N

    (3) 900 N　　　　　　(4) 1200 N

44. The change in potential energy when a body of mass m is raised to a height $3R$ from the surface of earth will be (R-radius of earth)

    (1) $\dfrac{3}{2} mgR$

    (2) $3mgR$

    (3) $\dfrac{3}{4} mgR$

    (4) $\dfrac{9}{5} mgR$

45. One mole of a monoatomic ideal gas is mixed with 3 moles of a diatomic ideal gas. What is molar specific heat of the mixture at constant volume?

    (1) $\dfrac{5}{4} R$　　　　　　(2) $\dfrac{9}{4} R$

    (3) $\dfrac{3}{4} R$　　　　　　(4) R

46. Which of the following statement is incorrect?

    (1) Changes in pressure have no effect on the speed of sound, at constant temperature

    (2) The speed of sound in water is higher than that in air

    (3) Changes in temperature have no effect on the speed of sound

    (4) Frequency of sound wave does not change while travelling in different medium

47. A solid cylinder of height H and density ρ is floating in a non-viscous liquid of density ρ_0 as shown in figure. In equilibrium condition, a length h of the cylinder is inside the liquid. If it is displaced slightly from that position, then time period of oscillating cylinder is
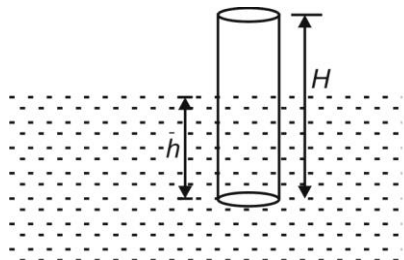
(1) $2\pi\sqrt{\dfrac{H}{g}}$

(2) $2\pi\sqrt{\dfrac{h}{g}}$

(3) $\pi\sqrt{\dfrac{\rho h}{\rho_0 g}}$

(4) $\pi\sqrt{\dfrac{H}{g}}$

48. The acceleration - displacement (a - x) graph of a particle executing simple harmonic motion is shown in the figure. The time period of oscillation is (where A and B are the maximum value of displacement and acceleration respectively)
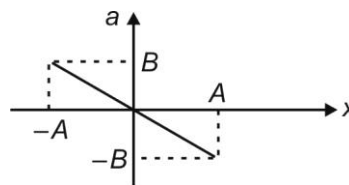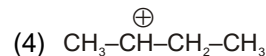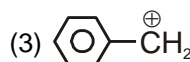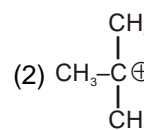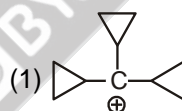
(1) $2\pi\sqrt{\dfrac{B}{A}}$

(2) $2\pi\sqrt{\dfrac{A}{B}}$

(3) $2\pi\sqrt{\dfrac{B}{2A}}$

(4) $2\pi\sqrt{\dfrac{2B}{A}}$

49. An ideal organ pipe resonates at successive frequencies of 50 Hz, 150 Hz, 250 Hz. The fundamental frequency is

(1) 50 Hz

(2) 100 Hz

(3) 150 Hz

(4) 200 Hz

50. A car is travelling with speed of $\dfrac{v}{10}$ and blows horn of frequency 1210 Hz. The apparent frequency heard by a police man chasing the car with speed $\dfrac{v}{11}$ is (where v is speed of sound)

(1) 1210 Hz

(2) 990 Hz

(3) 1100 Hz

(4) 1200 Hz

CHEMISTRY
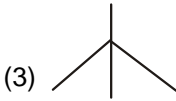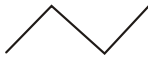
SECTION-A
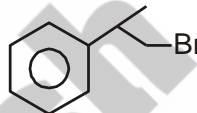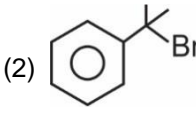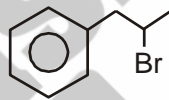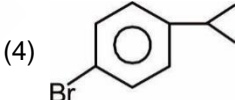
51. Total number of isomers of C_7H_8O containing benzene ring is

(1) 3

(2) 4

(3) 5

(4) 6

52. Which of the following has highest $-I$ effect?

(1) $-NO_2$

(2) $-F$

(3) $-OH$

(4) $-\overset{\oplus}{N}H_3$

53. The mesomeric effects of the groups

$-\ddot{N}H_2$, $-\underset{O}{\overset{\parallel}{C}}-OCH_3$, $-\ddot{N}H-\underset{O}{\overset{\parallel}{C}}-OC_2H_5$,

$-B\overset{CH_3}{\underset{CH_3}{\diagdown}}$ respectively are

(1) $+M, +M, -M, -M$

(2) $+M, -M, +M, -M$

(3) $-M, -M, +M, -M$

(4) $+M, -M, -M, +M$

54. The most stable carbocation is

(1) [structure: bicyclopropyl carbocation]

(2) $CH_3-\overset{CH_3}{\underset{CH_3}{\overset{|}{\underset{|}{C}}}}\oplus$

(3) [benzyl cation] $\langle O\rangle-\overset{\oplus}{C}H_2$

(4) $CH_3-\overset{\oplus}{C}H-CH_2-CH_3$

55. Which of the following sets of elements can be detected by Lassaigne's test?

(1) N, H, P

(2) N, Cl, P, S

(3) N, Br, B, P

(4) N, S, F, C

56. In Carius method, 0.18 g of an organic compound gave 0.11 g of AgBr. The percentage of Br in the compound is

(Atomic mass of Ag = 108 u and Br = 80 u)

(1) 34%

(2) 39%

(3) 26%

(4) 30%

57. 5 g of an organic compound is Kjeldahlized and the NH_3 evolved is neutralized by 100 ml of 2N H_2SO_4. The percentage of nitrogen in the compound is

    (1) 26%
    (2) 36%
    (3) 46%
    (4) 56%

58. Correct basic strength order for the following is

    (i) $H_3C - \overset{\ominus}{C}H_2$
    (ii) $H_2C = \overset{\ominus}{C}H$

    (iii) $HC \equiv \overset{\ominus}{C}$

    (1) (i) > (ii) > (iii)
    (2) (ii) > (i) > (iii)
    (3) (iii) > (ii) > (i)
    (4) (ii) > (iii) > (i)

59. The most durable metal plating for the protection of iron from corrosion is

    (1) Cu plating
    (2) Ni plating
    (3) Zn plating
    (4) Sn plating

60. The most stable free radical among the following is

    (1) $C_6H_5 - CH_2 - \overset{\bullet}{C}H_2$
    (2) $C_6H_5 - \overset{\bullet}{C}H - CH_3$
    (3) $H_3C - \overset{\bullet}{C}H_2$
    (4) $H_3C - \overset{\bullet}{C}H - CH_3$

61. Which of the following crystal system has four possible variation?

    (1) Cubic
    (2) Hexagonal
    (3) Orthorhombic
    (4) Trigonal

62. Example of molecular solid is

    (1) SiO_2
    (2) AlN
    (3) SO_3
    (4) MgO

63. In a cubic crystal system, each atom at edge centre is shared with

    (1) 2 unit cells
    (2) 4 unit cells
    (3) 6 unit cells
    (4) 8 unit cells

64. If number of closed packed atoms are 100, then number of octahedral voids is

    (1) 100
    (2) 200
    (3) 50
    (4) 150

65. Minimum packing efficiency is of

    (1) Simple cubic unit cell
    (2) Face centred cubic unit cell
    (3) Body centred cubic unit cell
    (4) Hexagonal unit cell

66. If NaCl is doped with 10^{-3} mol% of $AlCl_3$, then % cationic vacancies is

    (1) 4×10^{-3} mol%
    (2) 0.5×10^{-3} mol%
    (3) 10^{-3} mol%
    (4) 2×10^{-3} mol%

67. Coordination number of atom present in an octahedral void is

    (1) 3
    (2) 4
    (3) 8
    (4) 6

68. Which of the following has highest boiling point?

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

69. Consider the following reaction sequence,

    The compound D is

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

70. The correct order of solubility of He, CO_2 and O_2 in water at 298 K and 1 atm is

    (1) $He > O_2 > CO_2$
    (2) $O_2 > CO_2 > He$
    (3) $CO_2 > O_2 > He$
    (4) $CO_2 > He > O_2$

71. Mass percentage of urea in 0.5 molal aqueous solution of urea is

    (1) 15.2%
    (2) 2.9%
    (3) 5.1%
    (4) 28.2%

72. The vapour pressure of two liquids A and B are 100 and 150 torr respectively. The vapour pressure of solution obtained by mixing 3 moles of A and 2 moles of B will be

    (1) 250 torr
    (2) 120 torr
    (3) 110 torr
    (4) 135 torr

73. If 0.2 molal aqueous solution of a monobasic weak acid is 40% dissociated, then the freezing point of the solution will be

    (K_f of water = 1.86 K kg mol^{-1})

    (1) −0.23°C
    (2) −0.52°C
    (3) −0.15°C
    (4) −0.41°C
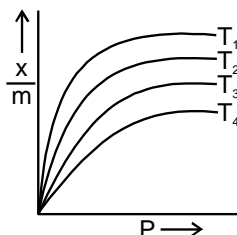
74. Which among the following aqueous solutions will boil at lowest temperature?

    (1) 0.1 m $AgNO_3$ (2) 0.1 m sucrose

    (3) 0.1 m CH_3COOH (4) 0.1 m $CaCl_2$

75. Which is incorrect for negative deviation solution?

    (1) $(\Delta H)_{mix.} < 0$ (2) $(\Delta G)_{mix.} < 0$

    (3) $(\Delta V)_{mix.} < 0$ (4) $(\Delta S)_{mix.} < 0$

76. Based on Freundlich adsorption isotherm, the correct order of temperature is
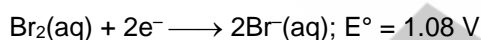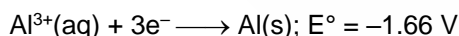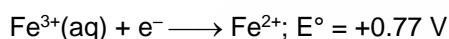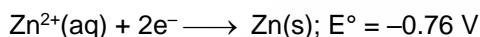

    (1) $T_1 > T_2 > T_3 > T_4$ (2) $T_2 > T_3 > T_1 > T_4$

    (3) $T_4 > T_2 > T_3 > T_1$ (4) $T_4 > T_3 > T_2 > T_1$

77. Colloidal partices has the size between

    (1) 10^{-9} to 10^{-3} m   (2) 10^{-6} to 10^{-3} m

    (3) 10^{-9} to 10^{-6} m   (4) 10^{-8} to 10^{-2} m

78. Consider the following electrode potentials data.

    $Zn^{2+}(aq) + 2e^- \longrightarrow Zn(s); E° = -0.76$ V

    $Fe^{3+}(aq) + e^- \longrightarrow Fe^{2+}; E° = +0.77$ V

    $Al^{3+}(aq) + 3e^- \longrightarrow Al(s); E° = -1.66$ V

    $Br_2(aq) + 2e^- \longrightarrow 2Br^-(aq); E° = 1.08$ V
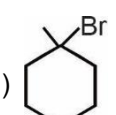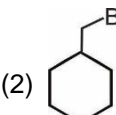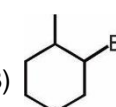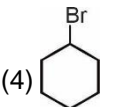
    Select the correct order of reducing power.

    (1) $Br^- > Fe^{2+} > Zn > Al$

    (2) $Al > Zn > Fe^{2+} > Br^-$

    (3) $Al > Zn > Br^- > Fe^{2+}$

    (4) $Al > Fe^{2+} > Zn > Br^-$

79.
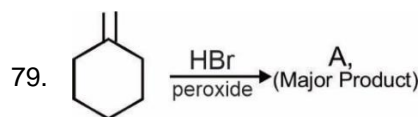
    A will be

80. Resistance of 0.1 M KCl solution in a conductance cell is 200 ohm and conductivity is 0.015 S cm^{-1}. The value of cell constant is

    (1) 6.3 cm^{-1} (2) 4.2 cm^{-1}

    (3) 3.0 cm^{-1} (4) 5.1 cm^{-1}

81. The product of electrolysis of aqueous Na_2SO_4 with inert electrodes are

    (1) Na and H_2 (2) H_2 and O_2

    (3) Na and O_2 (4) H_2 and SO_2

82. Bredig's arc method is used for the preparation of colloidal solution of

    (1) Gold   (2) Protein

    (3) Sulphur   (4) Gum

83. Gel is a colloidal solution consisting of

    (1) Solid in liquid   (2) Liquid in liquid

    (3) Gas in liquid   (4) Liquid in solid

84. Unit of rate constant for a first order reaction is

    (1) $Mol^{-1}Ls^{-1}$ (2) $MolL^{-1}s^{-1}$

    (3) $Mol^{-2}L^2s^{-1}$ (4) s^{-1}

85. A hypothetical reaction, $A_2 + B_2 \rightarrow 2AB$ follows the mechanism as given below

    $A_2 \rightleftharpoons A + A$ (fast)

    $A + B_2 \rightarrow AB + B$ (slow)

    $A + B \rightarrow AB$ (fast)
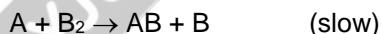
    The overall order of the reaction is

    (1) 2   (2) 1

    (3) 1½   (4) 0

SECTION-B

86. A reaction proceeds by first order, 75% of this reaction was completed in 32 minute. The time required for 50% completion is

    (1) 8 minute   (2) 16 minute

    (3) 20 minute   (4) 24 minute

87. For the reaction, $3A + 2B \rightarrow 5C + 4D$. Which of the following does not express the reaction rate?

    (1) $\dfrac{1}{3}\dfrac{d[A]}{dt}$ (2) $\dfrac{1}{5}\dfrac{d[C]}{dt}$

    (3) $\dfrac{1}{4}\dfrac{d[D]}{dt}$ (4) $-\dfrac{1}{2}\dfrac{d[B]}{dt}$

88. How many times the rate of a reaction will be increased when temperature is increased from 20°C to 40°C?

(Given: Temperature coefficient = 3)

(1) 4 times　　　　(2) 9 times

(3) 27 times　　　(4) 8 times

89. Which enzyme converts starch to maltose?

(1) Invertase　　　(2) Zymase

(3) Maltase　　　　(4) Diastase

90. Positively charged sol among the following is

(1) Silver sol　　　(2) $Al_2O_3 \cdot xH_2O$

(3) Congo red sol　(4) Gelatin

91. Consider the following standard reduction potentials:

I.　$Fe^{+2} + 2e^- \rightarrow Fe;\ E_1^{\circ}$

II.　$Fe^{+3} + e^- \rightarrow Fe^{+2};\ E_2^{\circ}$

III.　$Fe^{+3} + 3e^- \rightarrow Fe;\ E_3^{\circ}$
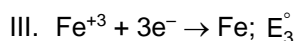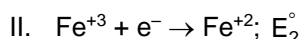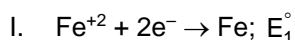
The correct relation between E_1°, E_2° and E_3° is

(1) $E_3^{\circ} = \dfrac{2E_1^{\circ} + E_2^{\circ}}{3}$　　(2) $E_3^{\circ} = \dfrac{2E_1^{\circ} - E_2^{\circ}}{3}$

(3) $E_3^{\circ} = 3E_1^{\circ} + 2E_2^{\circ}$　　(4) $E_3^{\circ} = \dfrac{3E_1^{\circ} - E_2^{\circ}}{2}$

92. Consider the following cell at 25°C :

$Pt(s)|H_2(g,\ 400\ torr)|\ H^+|H_2(g,\ 300\ torr)|Pt(s)$
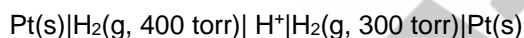
The emf (approx) of the cell is

(1) −7.4 mV　　　(2) −3.7 mV

(3) 7.4 mV　　　　(4) 3.7 mV

93. The solution showing positive deviation from ideal behaviour is

(1) $CH_3COCH_3 + CS_2$

(2) $HCl + H_2O$

(3) $HNO_3 + H_2O$

(4) $CH_3COCH_3 + C_6H_5NH_2$

94. The temperature independent concentration term is

(1) Molarity

(2) Mole fraction

(3) Normality

(4) %(w/v)

95. Select the anti-aromatic species in the following

(1) 　　(2)

(3) 　　(4)
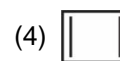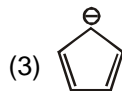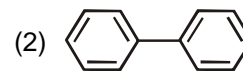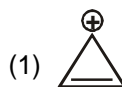
96. Which is least reactive towards nitration?

(1) Benzene　　　(2) Nitrobenzene

(3) Chlorobenzene　(4) Phenol

97. The incorrect statement regarding defects in crystalline solid is

(1) Schottky defect decreases the density of ionic solid

(2) Frenkel defect does not affect the stability of ionic solid

(3) Schottky defect increases electrical conductivity of ionic solid.

(4) Frenkel defect is a dislocation defect

98. A metal has a fcc lattice. The edge length of the unit cell is 200 pm. The density of the metal is 10 g ml⁻¹. The molar mass of metal is

($N_A = 6 \times 10^{23}$)

(1) 30 g mol⁻¹　　(2) 24 g mol⁻¹

(3) 40 g mol⁻¹　　(4) 12 g mol⁻¹

99.
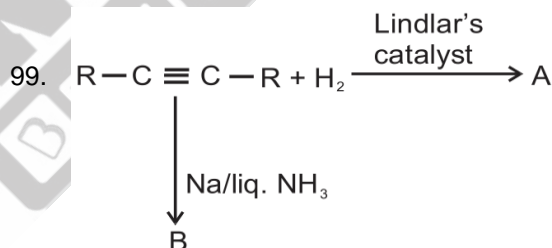
A and B respectively are

(1) cis alkene, cis alkene

(2) trans alkene, cis alkene

(3) cis alkene, trans alkene

(4) trans alkene, trans alkene

100. Cyclohexene on reductive ozonolysis gives

(1) 　　(2)

(3) 　　(4)
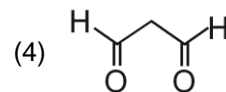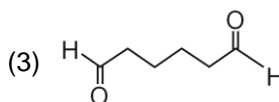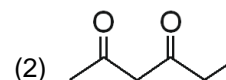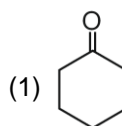
BOTANY

SECTION-A

101. In the stroma of chloroplast, sugar synthesis is dependent on the products of light reaction which are
     (1) ATP and NADPH
     (2) H^+ and O_2
     (3) NADPH + H^+ and CO_2
     (4) CO_2 and H_2O

102. The photosynthetic pigments which gives bright or blue green colour in chromatogram is
     (1) Chlorophyll b
     (2) Xanthophyll
     (3) Chlorophyll a
     (4) Carotenoids

103. The most crucial step of Calvin cycle is
     (1) Oxidation
     (2) Reduction
     (3) Regeneration
     (4) Carboxylation

104. When special proteins of the cell membrane help to move substances across the membrane without expenditure of ATP, it is called
     (1) Simple diffusion
     (2) Facilitated diffusion
     (3) Active transport
     (4) Uphil transport

105. Osmosis is the movement of
     (1) Solute particles from its lower concentration to higher concentration
     (2) Solvent particles from its lower to higher concentration
     (3) Solvent particles from its higher to lower concentration through a semi-permeable membrane
     (4) Solvent particles from lower water potential to higher water potential

106. Transpiration is said to be necessary for all of the given, **except**
     (1) Cooling of the leaf surface
     (2) Maintaining the shape and structure of plants
     (3) Supplying water needed for photosynthesis
     (4) Phosphorylation in chloroplast

107. If a cell is placed in hypertonic solution, the protoplast starts shrinking and it first leaves the corner of cell at a stage which is called
     (1) Evident plasmolysis
     (2) Limiting plasmolysis
     (3) Incipient plasmolysis
     (4) Deplasmolysis

108. During nitrogen fixation, for production of one molecule of ammonia, how many ATP are required?
     (1) 16 ATP
     (2) 8 ATP
     (3) 12 ATP
     (4) 6 ATP

109. Select the correct statement(s) w.r.t. root pressure.
     a. It is a positive pressure.
     b. It is observable at night and early morning when transpiration is high.
     c. It is responsible for guttation.
     d. It plays a major role in water movement in tall trees.
     (1) a and b
     (2) b, c and d
     (3) a and c
     (4) a and d

110. During photorespiration, loss of CO_2 occurs in which of the given organelles?
     (1) Chloroplast
     (2) Peroxisome
     (3) Mitochondria
     (4) Glyoxysome

111. Which of the given is not a C_3 plant?
     (1) Wheat
     (2) Rice
     (3) Potato
     (4) Maize

112. In roots, which tissue layer acts as control point for solutes and allow the passage of ions in one direction only?
     (1) Epiblema
     (2) Endodermis
     (3) Pericycle
     (4) Cortex

113. Select the **incorrect** statement w.r.t. photosystem II.
     (1) It is associated with release of O_2
     (2) It occurs on the inner surface of thylakoid
     (3) It is involved only in non-cyclic flow of electrons
     (4) It is found in both grana and stroma lamellae

114. Choose the **incorrect** statement.
     (1) In PS I, the reaction centre chlorophyll a has an absorption peak at 700 nm.
     (2) The LHC are made up of pigment molecules which are bound to proteins.
     (3) Many chlorophyll 'b' molecules form the reaction centre.
     (4) Antenna molecules absorbs photons of different wavelength.

115. The enzyme involved in primary CO_2 fixation in C_4 plants is ___A___ and located in ___B___ .

	A	B
(1)	PEPCase	Agranal chloroplast
(2)	RuBisCO	Granal chloroplast
(3)	PEPCase	Cytosol of mesophyll cells
(4)	PEPCase	Granal chloroplast of bundle sheath cells

116. Chemiosmotic hypothesis was explained by
    (1) Joseph Priestley　　(2) Jan Ingenhousz
    (3) P. Mitchell　　(4) Ruben and Kamen

117. In Calvin cycle, for synthesis of two molecules of sucrose, the requirement of ATP and NADPH is respectively
    (1) 72 and 48　　(2) 18 and 12
    (3) 30 and 12　　(4) 60 and 24

118. In nitrogen cycle, ammonia is oxidised to nitrite by
    (1) *Nitrosomonas*　　(2) *Nitrobacter*
    (3) *Pseudomonas*　　(4) *Thiobacillus*

119. High rate of photosynthesis takes place in which of the given lights of the visible spectrum?
    (1) Red　　(2) Blue
    (3) Green　　(4) Both (1) and (2)

120. The direction of movement of water in given plant cells **A**, **B** and **C** can be represented as

A: $\psi_s = -30$ bar, $\psi_P = 10$ bar
B: $\psi_s = -50$ bar, $\psi_P = 20$ bar
C: $\psi_s = -40$ bar, $\psi_P = 30$ bar
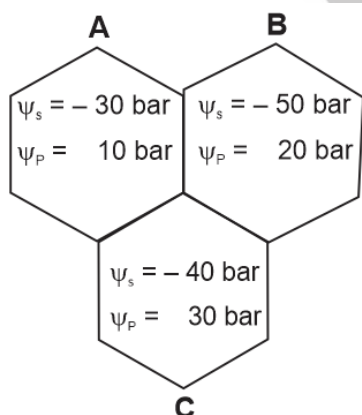
(1) A → B, C ↗ ↖
(2) A → B, ↘ C ↗
(3) A ← B, ↘ C ↙
(4) A ← B, ↖ C ↗

121. Select the odd one out w.r.t. solute potential.
    (1) It is always negative
    (2) For a solution at atmospheric pressure it is equal to Ψ_W
    (3) More the solute molecules, lower is the Ψ_S
    (4) Ψ_W increases due to dissolution of solute in water

122. In passive symport,
    (1) Two types of molecules cross the membrane in opposite direction
    (2) Two types of molecules cross the membrane in same direction
    (3) Only one molecule can cross the membrane
    (4) Same type of molecule can cross the membrane simultaneously but in opposite direction

123. Transfer of amino group from one amino acid to keto group of a keto acid occurs during
    (1) Denitrification　　(2) Ammonification
    (3) Nitrification　　(4) Transamination

124. Which statement is **incorrect** w.r.t. C_4 plants?
    (1) More efficient at low temperature
    (2) Can perform photosynthesis under conditions of high light intensity
    (3) Energy required for CO_2 fixation is more as compared to C_3 plants
    (4) Ribulose biphosphate (RuBP) is the secondary acceptor of CO_2

125. Which of the given respiratory substrate has RQ value equal to 1?
    (1) Glucose　　(2) Oxalic acid
    (3) Tripalmitin　　(4) Protein

126. Read the given statements and choose the **correct** option
    A. Yeasts poison themselves to death when the concentration of alcohol reaches about 10%.
    B. During glycolysis of one glucose molecule, 2 ATP are consumed.
    (1) Only A is correct
    (2) Only A is incorrect
    (3) Both A and B are correct
    (4) Both A and B are incorrect

127. Identify the **wrong** statement

    (1) There are three steps in Krebs cycle where NAD^+ is reduced to $NADH + H^+$.

    (2) Krebs cycle starts with the condensation of acetyl group with fumaric acid to yield citric acid.

    (3) Cytochrome *c* is a small, mobile carrier protein, which transfers electrons between complex III and IV.

    (4) In glycolysis, glucose undergoes partial oxidation and at the end produces 2 molecules of pyruvic acid.

128. Identify the enzyme required for the given reaction.

    Pyruvic acid $\xrightarrow[Mg^{2+}]{A}$ Acetaldehyde
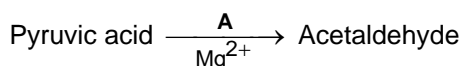
    (1) Pyruvic acid dehydrogenase

    (2) Pyruvic acid oxidase

    (3) Acetaldehyde dehydrogenase

    (4) Pyruvic acid decarboxylase

129. Consider the following statements and select the **correct** option.

    Statement-A : Two ATP molecules are obtained as net gain during anaerobic respiration of one glucose.

    Statement-B : One molecule of $NADH + H^+$ is obtained by oxidative decarboxylation of 1 molecule of pyruvic acid to acetyl CoA.

    (1) Only statement A is incorrect

    (2) Only statement B is incorrect

    (3) Both statements A and B are incorrect

    (4) Both statements A and B are correct

130. Read the following statements and choose the **incorrect** one for respiration

    (1) A series of step-wise reactions is controlled by enzymes.

    (2) Breaking of the C-C bonds of respiratory substrates through oxidation within the cells.

    (3) Liberation of energy.

    (4) Breakdown of complex molecules to yield energy which takes place in mitochondria only.

131. Match the phytohormones given in Column-I with their precursors given in column-II and select the **correct** option.

Column-I (Phytohormones)	Column-II (Precursors)
a. Ethylene	(i) Violaxanthin
b. Auxin	(ii) Methionine
c. Gibberellin	(iii) Tryptophan
d. Abscisic acid	(iv) Acetyl CoA

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

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

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

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

132. Auxin promotes the apical dominance whereas it is counteracted by _____.

    Complete the statement by choosing the **correct** option.

    (1) Gibberellin

    (2) Cytokinin

    (3) Ethylene

    (4) ABA

133. Select the **wrong** statement.

    (1) In epigeal seed germination, hypocotyl grows first

    (2) In a plant, the perception site of light/dark is the leaves

    (3) Rate of respiration decreases rapidly during seed germination

    (4) Vernalisation can help in shortening the period between germination and flowering

134. Auxin (IAA) was first isolated from

    (1) Yeast

    (2) *Rhizopus*

    (3) *Fusarium*

    (4) Human urine

135. Which phytohormone stimulates cell division and delays senescence?

    (1) ABA

    (2) Gibberellins

    (3) Cytokinins

    (4) Vernalins

SECTION-B

136. Choose the correct option regarding the given figure
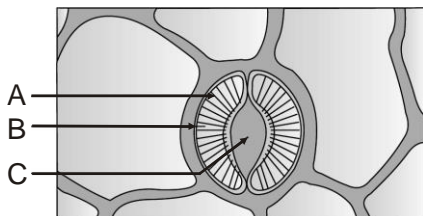
	A	B	C
(1)	Microfibrils	Guard cells	Stomatal aperture
(2)	Stomatal aperture	Microfibrils	Guard cells
(3)	Guard cells	Microfibrils	Epidermal cell
(4)	Microfibrils	Stomatal aperture	Guard cells

137. Select the **wrong** statement w.r.t. symplastic pathway of water movement in root.

    (1) Consists of non-living parts of plant body.

    (2) It is slightly slower.

    (3) It is directly affected by metabolic state of root.

    (4) Some resistance occurs in the movement water through symplast.

138. Read the below given statements and select the correct option.

    Statement-A : Xylem is associated with translocation of mineral salts and some organic nitrogen.

    Statement-B : Phloem translocates a variety of organic and inorganic solutes mainly from sink to source.

    (1) Only statement B is correct

    (2) Both statements are correct

    (3) Both statements are incorrect

    (4) Only statement A is correct

139. Match the enzymes in Column-I with their activator elements in Column-II and mark the correct option.

Column-I	Column-II
(a) RuBisCO	(i) Zn
(b) Carboxylase	(ii) Fe
(c) Catalase	(iii) Mo
(d) Nitrogenase	(iv) Mg

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

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

140. Photorespiration does not occur in C_4 plants because they have a mechanism that increases the concentration of CO_2 at the enzyme site, it is due to

    (1) Formation of malic acid in mesophyll and bundle sheath cells

    (2) Decarboxylation by PEPcase activity

    (3) Breakdown of C_4 acid in bundle sheath cells

    (4) Regeneration of PEP in bundle sheath cells

141. Read below given statements and select the correct option.

    Statement-A : Carotenoids are also called "shield pigments".

    Statement-B : Xanthophyll is the only accessory pigment.

    (1) Only statement A is correct

    (2) Only statement B is correct

    (3) Both statements are correct

    (4) Both statements are incorrect

142. Mark the correct option w.r.t. trace elements.

    (1) Nitrogen, Phosphorus and Potassium

    (2) Oxygen, Nitrogen and Hydrogen

    (3) Zinc, Iron and Copper

    (4) Calcium, Sulphur and Hydrogen

143. Which one of the following is a micronutrient associated with splitting of water in chloroplast?

    (1) Cu   (2) S

    (3) Mg   (4) Mn

144. Primary CO_2 acceptor in photosynthetic process of C_3 plants is a

    (1) 5 carbon aldose sugar

    (2) 5 carbon ketose sugar

    (3) 3 carbon aldose sugar

    (4) 3 carbon ketose sugar

145. Redox equivalent generated during oxidation of succinate in the TCA cycle is received by
    (1) Complex I   (2) Complex II
    (3) Cytochrome c   (4) Complex III

146. Select the **odd** one w.r.t. redifferentiated tissues.
    (1) Phellogen   (2) Cork
    (3) Secondary cortex   (4) Secondary xylem

147. Identify the **correct** match.

	Physiological effects	Promoting hormones	Inhibiting hormones
a.	Dormancy	Gibberellins	ABA
b.	Abscission of younger fruits	ABA	Auxin
c.	Senescence	ABA	Auxin

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

148. Select the natural auxin among the following.
    (1) IAA   (2) NAA
    (3) 2, 4-T   (4) 2, 4-D

149. Respiratory Quotient (RQ)
    (1) Of oxalic acid and malic acid is more than unity
    (2) Is the ratio of the volume of O_2 evolved to the volume of CO_2 consumed in respiration
    (3) Of organic acids is less than unity
    (4) Is infinity in case of aerobic condition

150. Which of the following are involved in the first step of the Krebs cycle?
    (1) OAA, pyruvic acid, water
    (2) Acetyl CoA, water, isocitric acid
    (3) Malic acid, OAA, citric acid
    (4) Acetyl CoA, OAA, water

ZOOLOGY

SECTION-A

151. Select an autoimmune disorder.
    (1) Muscular dystrophy   (2) Rheumatoid Arthritis
    (3) Osteoporosis   (4) Tetany

152. Select **odd** one w.r.t. paired bones of human.
    (1) Parietal bone
    (2) Temporal bone
    (3) Mandible
    (4) Maxillae

153. Select the **correct** sequence of events taking place during muscle contraction.
    (a) Binding of calcium with subunit of troponin
    (b) Release of neurotransmitter at neuromuscular junction
    (c) Release of calcium ions in sarcoplasm
    (d) Generation of action potential in the sarcolemma
    (e) Formation of cross bridge
    (1) (e), (b), (c), (a), (d)
    (2) (c), (b), (d), (a), (e)
    (3) (b), (d), (c), (a), (e)
    (4) (a), (b), (d), (c), (e)

154. During muscle contraction,
    (1) Chemical energy is changed into mechanical energy
    (2) Mechanical energy is changed into chemical energy
    (3) Temperature of muscle decreases
    (4) Binding of ATP to myosin does not occur

155. The structure not found in housefly is
    (1) Jointed appendages   (2) Book gills
    (3) Mouth   (4) Malpighian tubules

156. Which of the following is incorrect for metameric segmentation?
    a. Body is externally and internally divided into segments.
    b. Serial repetition of atleast some organs.
    c. Found in Annelida, Aschelminthes and Hemichordata.
    (1) a and b only   (2) a only
    (3) a, b and c   (4) c only

157. From the list of animals given below, how many have bilateral symmetry and three germ layers?

    Euspongia, *Taenia*, *Ctenoplana*, *Sycon*, *Fasciola*, *Adamsia*, *Planaria*, *Aurelia*

    (1) Four   (2) Three
    (3) Five   (4) Six

158. Select the correct statement w.r.t. poriferans.

    (1) Sponges are hermaphrodite, yet they exhibit cross fertilization

    (2) Fertilisation is external with direct development

    (3) Water enters the body of *Sycon* via osculum and leaves by ostia

    (4) They exhibit both extracellular and intracellular digestion

159. Identify the animal, which has such a type of body organisation as given in the figure.

    (1) *Fasciola*　　　　　(2) *Pleurobrachia*

    (3) *Gorgonia*　　　　(4) *Ascaris*

160. Consider the following characteristics:

    a. Exclusively marine animal

    b. Digestion is both extracellular and intracellular

    c. Reproduce only by sexual means

    d. Indirect development

    Which of the following organism is best described on the basis of above mentioned characteristics?

    (1) *Ctenoplana*

    (2) *Obelia*

    (3) *Hydra*

    (4) *Spongilla*

161. The hormones of adrenal cortex mainly involved in carbohydrate metabolism are

    (1) Catecholamines

    (2) Mineralocorticoids

    (3) Glucocorticoids

    (4) Sex corticoids

162. Which one of the following is not a characteristic feature of Graves' disease?

    (1) Protrusion of the eye balls

    (2) Weight loss

    (3) Decreased basal metabolic rate

    (4) Enlargement of the thyroid gland (goitre)

163. Observe the given diagrammatic representation of various glands in the body. Choose the correct option regarding the labelled glands.
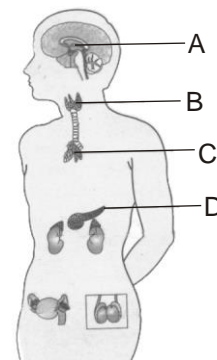
    (1) A - Its secretion acts on bones and influences their Ca^{2+} content

    (2) B - It secretes calcitriol which stimulates Ca^{2+} absorption from food in gastrointestinal tract

    (3) C - Degeneration of this gland with ageing results in weaker immune system

    (4) D- Its secretions interact with the intracellular receptors only and play major role in the regulation of glucose homeostasis

164. Given below are three statements (A-C), each with two blanks. Select the option which correctly fill up the blanks in these statements.

    (A) __i__ increases the Ca^{2+} level in blood. Along with __ii__ it plays a significant role in calcium balance in the body.

    (B) The __i__ secrete __ii__ which acts mainly on the liver cells and stimulates glycogenolysis.

    (C) __i__ stimulates vigorous contractions of uterus at the time of child birth. __ii__ enhances blood pressure by causing constriction of blood vessels.

    (1) A – (i) Calcitonin　　　(ii) PTH

    　　B – (i) Beta cells　　　(ii) Glucagon

    (2) A – (i) PTH　　　　　　(ii) TCT

    　　C – (i) Oxytocin　　　(ii) Vasopressin

    (3) B – (i) Alpha cells　　(ii) Glucagon

    　　C – (i) Catecholamine (ii) Melatonin

    (4) A – (i) Cortisol　　　　(ii) Thyroxine

    　　B – (i) Beta-cells　　　(ii) Insulin

165. Given below is an incomplete table about certain hormones, their source glands and one major effect of each on the body in humans.

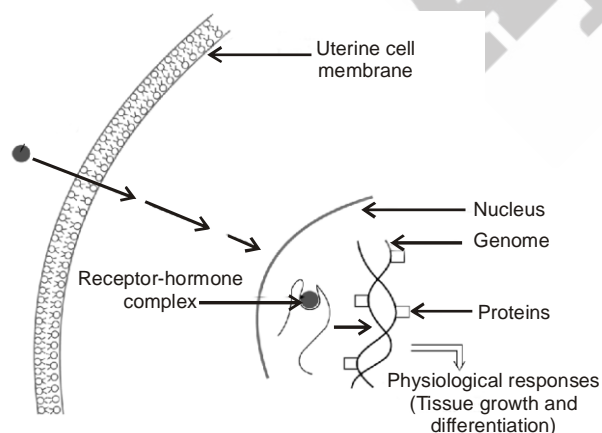| Gland	Secretion	Effect on body
Pineal	A	Maintains normal rhythm of sleep-wake cycle
B	Glucagon	Stimulates conversion of stored glycogen into glucose
C	Cortisol	Stimulates RBC production
Parathyroid	D	Maintains calcium homeostasis

Identify the **correct** option for the blanks A, B, C and D.

	A	B	C	D
(1)	Calcitonin	Posterior pituitary	Hypothalamus	Thyrocalcitonin
(2)	Testosterone	Liver	Parathyroid	Calcitonin
(3)	Melatonin	α-cells of islets of Langerhans	Adrenal gland	Parathormone
(4)	FSH	Anterior pituitary	Thyroid	Parathormone

166. Identify the correct set of hormones which work through the following pathway.

Uterine cell membrane
Nucleus
Genome
Receptor-hormone complex
Proteins
Physiological responses (Tissue growth and differentiation)

    (1) Insulin, Glucagon
    (2) Adrenaline, Noradrenaline
    (3) Estrogen, Progesterone
    (4) Oxytocin, Vasopressin

167. Match the following column-I with column-II and select the **correct** option.

	Column-I		Column-II
a.	Macula	(i)	Sound recognition
b.	Auditory cortex of brain	(ii)	Calorigenic hormone
c.	Thyroxine	(iii)	Connects middle ear cavity with pharynx
d.	Eustachian tube	(iv)	Static equilibrium

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

168. Select the correct statement w.r.t. the structure of human eye.
    (1) Cornea is a highly vascular layer of the human eye.
    (2) Photoreceptors are not present in fovea.
    (3) Light induces dissociation of retinal from opsin resulting in the changes in structure of opsin.
    (4) Space between cornea and lens is filled with vitreous humor.

169. Type of neurons in which neurons comprise one axon only and are found only in embryonic stage in humans are termed
    (1) Pseudounipolar   (2) Unipolar
    (3) Bipolar   (4) Multipolar

170. The part of brain that controls the cardiovascular reflexes and respiratory rhythm is
    (1) Medulla oblongata   (2) Pons
    (3) Optic lobe   (4) Hypothalamus

171. In humans, cerebral hemispheres are connected by a tract of nerve fibres called
    (1) Corpora quadrigemina
    (2) Corpus callosum
    (3) Vermis
    (4) Iter

172. The excretory organ in an animal with rudimentary structure in collar region which is structurally similar to notochord, is
    (1) Septal nephridia   (2) Renette cell
    (3) Ctenidia   (4) Proboscis gland

173. Which of the following is correct regarding Aschelminthes?

    (1) Pseudocoelom, organ level of organisation, muscular pharynx

    (2) Pseudocoelom, muscular pharynx and nephridia for excretion

    (3) Pseudocoelom, muscular pharynx with dioecious members

    (4) Pseudocoelom, blind sac body plan, organ system level of organization

174. Which set includes arthropods of economic importance providing useful products to humans?

    (1) *Anopheles*, *Culex*, tse-tse fly

    (2) *Apis*, *Bombyx*, *Laccifer*

    (3) *Limulus*, *Peripatus, Locusta*

    (4) *Locusta*, Grasshopper, *Bombyx*

175. Which of the following animals are correctly matched w.r.t. their taxonomic category?

    (1) Flying fish, Cuttle fish, Silverfish – Mollusca

    (2) Centipede, Millipede, Spider, Scorpion – Insecta

    (3) Housefly, Butterfly, *Tse-tse* fly, Silverfish - Arthropoda

    (4) Silverfish, Sea urchin, Sea cucumber, Sea hare – Echinodermata

176. Oxytocin, a peptide hormone from hypothalamus, has all the following effects, except

    A. Stimulates vigorous contractions of the uterus at the time of child birth

    B. Its hypersecretion causes Cushing's syndrome

    C. Stimulates milk ejection from mammary glands

    D. Its synthetic form is often given to induce labor

    (1) A and C　　　　　(2) B only

    (3) D only　　　　　(4) C and D

177. Which of the following hormones plays significant role in T-lymphocyte differentiation?

    (1) TCT

    (2) PTH

    (3) Thymosin

    (4) TRH

178. In which of the following abdominal segments, from following given options, characteristic mushroom-shaped gland is present in male cockroach?

    (1) $3^{rd} - 4^{th}$

    (2) $4^{th} - 5^{th}$

    (3) $5^{th} - 6^{th}$

    (4) $6^{th} - 7^{th}$

179. Choose the set of animals from following given options which have larval stage in the life history of all members.

    (1) Frog, Earthworm, Lizard, Sparrow

    (2) *Nereis*, Frog, *Scoliodon*, *Echidna*

    (3) Lamprey, Frog, Salamander, *Doliolum*

    (4) Leech, Frog, *Nereis*, *Bungarus*

180. Choose the incorrect statement for forewings of cockroach.

    (1) Also called mesothoracic wings or tegmina

    (2) Opaque, thick, leathery

    (3) They are used for flight

    (4) They cover and protect the metathoracic wings

181. In a male cockroach, genital pouch is formed by

    (1) 7th, 8th, 9th sterna

    (2) 9th, 10th terga and 9th sternum

    (3) 9th, 10th sterna and 9th tergum

    (4) 7th sternum and 9th and 10th terga

182. Choose the **correct** statement w.r.t. *Periplaneta*.

    (1) Exoskeleton of each abdominal segment consists of four chitinous plates called tergites

    (2) The main structure for mastication in cockroach are maxillae which are equipped with short teeth

    (3) The blood circulation is maintained by twelve pairs of fan shaped alary muscles

    (4) Excretory products of cockroach are ammonia and urea that are removed by Malpighian tubules

183. Match Column-I with Column-II and select the correct option using the codes given below.

	Column-I		Column-II
a.	Air sacs	(i)	*Scoliodon*
b.	Diaphragm	(ii)	*Myxine*
c.	Placoid scales	(iii)	*Delphinus*
d.	Jawless osmoconformer	(iv)	*Psittacula*

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

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

184. Choose the correct set of structures in cockroach which are paired.

(1) Labium, Maxilla, Mandible, Hypopharynx

(2) Antennae, Anal styles, Anal cerci, Collaterial glands

(3) Ocelli, Seminal vesicle, Testis, Labium

(4) Tegmina, Labrum, Leg, Frons

185. Which of the following structure is not present in or on the head of cockroach?

(1) Compound eyes   (2) Antennae

(3) Ocellus   (4) Pronotum

SECTION-B

186. Select the **incorrect** statement w.r.t. skeletal muscle myofibril.

(1) The light bands in myofibril contain actin

(2) In the centre of isotropic band, an elastic fibre called M line is present which bisects it

(3) Anisotropic band contains a central part which is not overlapped by thin filaments called the 'H' zone

(4) The portion of the myofibril between two successive 'Z' lines is the functional unit of muscle contraction

187. Osteoporosis is characterised by all of the following, **except**

(1) Inflammation of synovial membrane due to attack of IgM

(2) Decreased bone mass

(3) Increased risk of fractures

(4) Demineralisation due to decreased level of estrogen after menopause

188. The 8th, 9th and 10th pair of ribs are called false ribs because

(1) These are attached directly to sternum with the help of hyaline cartilage

(2) These are attached to 7th rib with the help of hyaline cartilage

(3) These are attached to sternum with the help of fibrous cartilage

(4) These are not attached to thoracic vertebrae

189. Select the **incorrect** match w.r.t. bone listed and their total number in an adult human body.

(1) Patella   – 2

(2) Carpals   – 8

(3) Ribs   – 24

(4) Metatarsals   – 10

190. The head of cockroach is formed by the fusion of six segments and shows great mobility in all directions due to a flexible neck. The neck is a short extension of

(1) Head   (2) Prothorax

(3) Mesothorax   (4) Metathorax

191. Choose the correct statement related to gizzard in cockroach.

(1) The gizzard is followed by crop which is a sac-like structure

(2) Gizzard has an outer layer of thick circular muscles and thick inner cuticle forming six highly chitinous plates called teeth

(3) Gizzard is present between mesenteron and ileum

(4) Gizzard secretes maximum number of digestive enzymes

192. Following paragraph has some blanks. Select the option which fills the blanks correctly.

Blood vascular system of cockroach is (a) type. Blood vessels are (b) and open into spaces. The (c) is composed of colourless (d) and (e) .

(1) (a)-open, (b)-very well developed, (c)-haemolymph (d)-plasma, (e)-haemoglobin

(2) (a)-open, (b)-poorly developed, (c)-haemolymph (d)-plasma, (e)-RBCs

(3) (a)-open, (b)-poorly developed, (c) haemolymph (d)-plasma, (e)-haemocytes

(4) (a)-open, (b)-very well developed, (c)-haemolymph (d)-haemocytes, (e)-plasma

193. Excretion is performed by malpighian tubules in cockroach and each tubule is lined by

    (1) Glandular and flagellated cells

    (2) Non-glandular cells

    (3) Flagellated cells only

    (4) Glandular and ciliated cells

194. How many of the structures given below are paired and found only in male cockroach?

    Testis, Phallic gland, Mushroom gland, Vas deferens, Caudal style, Collaterial gland, Spermatheca, Oviduct, Anal cercus

    (1) 4   (2) 3

    (3) 2   (4) 1

195. Limbless amphibian is

    (1) *Ichthyophis*   (2) *Hyla*

    (3) *Rana*   (4) *Salamandra*

196. Which of the following animals are protochordates?

    (1) *Salpa* and *Pristis*

    (2) *Amphioxus* and *Pterophyllum*

    (3) *Salpa* and *Amphioxus*

    (4) *Salpa, Amphioxus* and *Scoliodon*

197. Read the following statements:

    a. Operculum covers four pairs of gills found in bony fish.

    b. Anadromous migration is seen in all cyclostomes.

    c. Pisces, amphibians and reptiles are cold blooded whereas aves and mammals are warm blooded.

    d. Both poikilothermy and oviparity are observed in amphibians.

Choose the option which includes **correct** statements only

    (1) a, c and d

    (2) a, b and c

    (3) a and b only

    (4) a and d only

198. Choose the odd one w.r.t. Chondrichthyes.

    (1) Air bladder is present which regulates buoyancy

    (2) Teeth are modified placoid scales

    (3) In males, pelvic fins bear claspers

    (4) Mouth is located ventrally

199. Select the exclusive feature of chordates without any exception.

    (1) Presence of closed type of circulatory system

    (2) Nerve cord is present dorsal to notochord in embryos

    (3) Presence of muscular diaphragm

    (4) Presence of paired or unpaired appendages

200. Complete the analogy and select the correct option.

    Homoiothermous : *Aptenodytes* ::

    Poikilothermous : _____

    (1) *Columba*

    (2) *Crocodilus*

    (3) *Neophron*

    (4) *Canis*

❏   ❏   ❏