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**NEET
PRELIMINARY ROUND
2023
Question Paper**

Date: 02.05.2023 Tuesday

**NEET PERSONAL BATCH BY
EXPERTS @206 Gangotri Icon,
Nilamber Circle, Vasna -Bhayali
Road, Vadodara Gujarat**

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Important Instructions for Mock test :

1. The Answer Sheet is inside this Test Booklet. When you are directed to open the Test Booklet, take out the Answer Sheet and fill in the particulars on OFFICE Copy carefully with **blue/black** ball point pen only.
2. The test is of 3 hours duration and the Test Booklet contains 200 multiple-choice questions (four options with a single correct answer) from Physics, Chemistry and Biology (Botany and Zoology). 50 questions in each subject are divided into two Sections (A and B) as per details given below : (a) Section A shall consist of 35 (Thirty-five) Questions in each subject (Question Nos – 1 to 35, 51 to 85, 101 to 135 and 151 to 185). All questions are compulsory. (b) Section B shall consist of 15 (Fifteen) questions in each subject (Question Nos – 36 to 50, 86 to 100, 136 to 150 and 186 to 200). In Section B, a candidate needs to attempt any 10 (Ten) questions out of 15 (Fifteen) in each subject. Candidates are advised to read all 15 questions in each subject of Section B before they start attempting the question paper. In the event of a candidate attempting more than ten questions, the first ten questions answered by the candidate shall be evaluated.
3. Each question carries 4 marks. For each correct response, the candidate will get 4 marks. For each incorrect response, one mark will be deducted from the total scores. The maximum marks are 720.
4. **Use Blue/Black Ball Point Pen** only for writing particulars on this page/markings responses on Answer Sheet.
5. Rough work is to be done in the space provided for this purpose in the Test Booklet only.
6. On completion of the test, the candidate must hand over the Answer Sheet (ORIGINAL and OFFICE Copy) to the Invigilator before leaving the Room/Hall. The candidates are allowed to take away this Test Booklet with them.
7. Do not make any stray marks on the Answer Sheet. Do not write your Roll No. anywhere else except in the specified space in the Test Booklet/ Answer Sheet.
8. Use of white fluid for correction is NOT permissible on the Answer Sheet.
9. No candidate, without special permission of the centre Superintendent or Invigilator, would leave his/her seat.
10. The candidates should not leave the Examination Hall without handing over their Answer Sheet to the Invigilator on duty and sign (with time) the Attendance Sheet twice. Cases, where a candidate has not signed the Attendance Sheet second time, will be deemed not to have handed over the Answer Sheet and dealt with as an Unfair Means case
11. The candidates will write the Correct Test Booklet Code as given in the Test Booklet/Answer Sheet in the Attendance Sheet.

Physics

SECTION : A

1. The dimensions of universal gravitational constant are

- (1) $M^{-2} L^2 T^{-1}$
- (2) $M^{-1} L^3 T^{-2}$
- (3) $ML^2 T^{-1}$
- (4) $M^{-2} L^3 T^{-2}$

2. The water drops fall at regular intervals from a tap 5 m above the ground. The third drop is leaving the tap at an instant when the first drop touches the

ground. How far above the ground is the second drop at that instant? (Take $g = 10 \text{ m/s}^2$)

- (1) 1.25 m
- (2) 2.50 m
- (3) 3.75 m
- (4) 5.00 m

3. The motion of a particle along a straight line is described by equation:

$$x = 8 + 12t - t^3$$

where x is in metre and t in second. The retardation of the particle when its velocity becomes zero, is:

- (1) 24 ms^{-2}
- (2) zero
- (3) 6 ms^{-2}
- (4) 12 ms^{-2}

4. A person swims in a river aiming to reach exactly opposite point on the bank of a river. His speed of swimming is 0.5 m/s at an angle 120° with the direction of flow of water. The speed of water in stream is

- (1) 1.0 m/s
- (2) 0.5 m/s
- (3) 0.25 m/s
- (4) 0.43 m/s

5. When light propagates through a material medium of relative permittivity ϵ_r and relative permeability μ_r , the

velocity of light, v is given by (c-velocity of light in vacuum)

- (1) $v = c$
- (2) $v = \sqrt{\frac{m_r}{\epsilon_r}}$
- (3) $v = \sqrt{\frac{\epsilon_r}{m_r}}$
- (4) $v = \frac{c}{\sqrt{\epsilon_r \mu_r}}$

6. A 5000 kg rocket is set for vertical firing. The exhaust speed is 800 ms^{-1} . To give an initial upward acceleration of 20 ms^{-2} , the amount of gas ejected per second to supply the needed thrust will be ($g = 10 \text{ ms}^{-2}$)

- (1) 127.5 kg s^{-1}
- (2) 187.5 kg s^{-1}
- (3) 185.5 kg s^{-1}
- (4) 137.5 kg s^{-1}

7. A position dependent force, $F = (7 - 2x + 3x^2) \text{ N}$ acts on a small body of mass 2 kg and displaces it from $x = 0$ to $x = 5 \text{ m}$. Work done in joule is

- (1) 35
- (2) 70
- (3) 135
- (4) 270

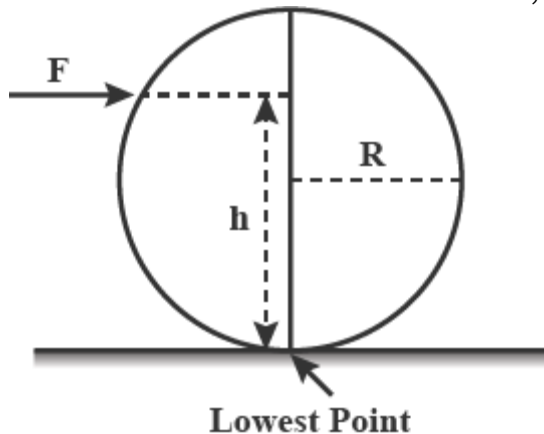
8. Water falls from a height of 60 m at the rate of 15 kg/s to operate a turbine. The losses due to frictional force are 10% of energy. How much power is generated by the turbine? ($g = 10 \text{ m/s}^2$)

- (1) 8.1 kW
- (2) 10.2 kW
- (3) 12.3 kW
- (4) 7.0 kW

9. A particle of mass $m = 5$ units is moving with uniform speed $V = 3\sqrt{2}$ units in the XY plane along the line $Y = X + 4$. The magnitude of the angular momentum about origin is:

- (1) 60 units
- (2) $40\sqrt{2}$ units
- (3) zero
- (4) 7.5 units

10. A solid sphere of radius R is placed on a smooth horizontal surface. A horizontal force F is applied at height h from the lowest point. For the maximum acceleration of the centre of mass,



- (1) $h = R$
- (2) $h = 2R$
- (3) $h = 0$
- (4) The acceleration will be same whatever h may be

11. The moment of inertia of a thin uniform rod of mass M and length L about an axis passing through its midpoint and perpendicular to its length is I_0 . Its

moment of inertia about an axis passing through one of its ends and perpendicular to its length is

- (1) $I_0 + ML^2 / 2$
- (2) $I_0 + ML^2 / 4$
- (3) $I_0 + 2ML^2$
- (4) $I_0 + ML^2$

12. The escape velocity of a body on the surface of the earth is 99.0 km/s . If the earth's mass increases to twice its present value and the radius of the earth becomes half, the escape velocity would become

- (1) 44.8 km/s
- (2) 22.4 km/s
- (3) 11.2 km/s (remains unchanged)
- (4) 5.6 km/s

13. From Ampere's circuital law for a long straight wire of circular cross-section carrying a steady current, the variation of magnetic field in the inside and outside region of the wire is

- (1) Uniform and remains constant for both the regions.
- (2) A linearly increasing function of distance upto the boundary of the wire and then linearly decreasing for the outside region.
- (3) A linearly increasing function of distance r upto the boundary of the wire and then decreasing one with $\frac{1}{r}$ dependence for the outside region.
- (4) A linearly decreasing function of distance upto the boundary of the wire and then a linearly increasing one for the outside region.

14. A cylindrical rod having temperature T_1 and T_2 at its end. The rate of flow of heat is $Q_1 \text{ cal/sec}$. If all the linear dimensions are doubled keeping temperature constant, then the rate of flow of heat Q_2 will be

- (1) $4Q_1$
- (2) $2Q_1$
- (3) $Q_1 / 4$
- (4) $Q_1 / 2$

15. For hydrogen gas, $C_p - C_v = a$ and for oxygen gas, $C_p - C_v = b$, so the relation between a and b is given by

- (1) $a = 16b$
- (2) $16b = a$
- (3) $a = 4b$
- (4) $a = b$

16. The internal energy change in a system that has absorbed 2 kcal of heat and done 500 J of work is:

- (1) 6400 J
- (2) 5400 J
- (3) 7900 J
- (4) 8900 J

17. A series LCR circuit with inductance 10 H , capacitance $10 \mu\text{F}$, resistance 50Ω is connected to an ac source of voltage, $V = 200\sin(100t)$ volt. If the resonant frequency of the LCR circuit is ν_1 and the frequency of the ac source is ν , then

- (1) $\nu_0 = \nu = 50 \text{ Hz}$
- (2) $\nu_0 = \nu = \frac{50}{\pi} \text{ Hz}$
- (3) $\nu_0 = \frac{50}{\pi} \text{ Hz}$, $\nu = 50 \text{ Hz}$

(4) $v = 100 \text{ Hz}$; $\omega = \frac{100}{\pi} \text{ Hz}$

18. Two simple harmonic motions given by $x = A \sin(\omega t + \delta)$ and $y = A \sin(\omega t + \delta + \frac{\pi}{2})$ act on a particle simultaneously. Then the motion of particle will be:

- (1) a circle and the actual motion is clockwise
- (2) an ellipse and the actual motion is counterclockwise
- (3) an ellipse and the actual motion is clockwise
- (4) a circle and the actual motion is counter clockwise

19. The damping force on an oscillator is directly proportional to the velocity. The units of the constant of proportionality are:

- (1) kgms^{-1}
- (2) kgms^{-2}
- (3) kgs^{-1}
- (4) kgs

20. The equation of a sound wave is given as: $y = 0.0015 \sin(62.4 x + 316 t)$. The wavelength of this wave is

- (1) 0.4 unit
- (2) 0.3 unit
- (3) 0.2 unit
- (4) 0.1 unit

21. Two points are located at a distance of 10 m and 15 m from the source of oscillation. The period of oscillation is 0.05 sec and the velocity of the wave is 300 m/sec. What is the phase difference between the oscillations of two points?

- (1) $\pi/3$
- (2) $2\pi/3$
- (3) π
- (4) $\pi/6$

22. A point Q lies on the perpendicular bisector of an electrical dipole of dipole moment p. If the distance of Q from the dipole is r (much larger than the size of the dipole), then the electric field at Q is proportional to

- (1) p^{-1} and r^{-2}
- (2) p and r^{-2}

- (3) p^2 and r^{-3}
- (4) p and r^{-3}

23. A hollow metal sphere of radius 10 cm is charged such that the potential on its surface is 80 V. The potential at the centre of the sphere is

- (1) zero
- (2) 80 V
- (3) 800 V
- (4) 8 V

24. Two parallel metal plates having charges + Q and - Q face each other at a certain distance between them. If the plates are now dipped in kerosene oil tank, the electric field between the plates will

- (1) remain same
- (2) become zero
- (3) increases
- (4) decrease

25. Kirchoff's first law, i.e. $\sum i = 2$ at a junction, deals with the conservation of

- (1) charge
- (2) energy
- (3) momentum
- (4) angular momentum

26. In India electricity is supplied for domestic use at 220 V. It is supplied at 110 V in USA. If the resistance of a 60 W bulb for use in India is R, the resistance of a 60 W bulb for use in USA will be

- (1) $R/2$
- (2) R
- (3) 2R
- (4) $R/4$

27. The thermo e.m.f. E in volts of a certain thermocouple is found to vary with temperature difference θ in $^{\circ}\text{C}$ between the two junctions according to the relation

$$E = 30\theta - \frac{\theta^2}{15}$$

The neutral temperature for the thermocouple will be

- (1) 30°C
- (2) 450°C
- (3) 400°C

(4) 225° C

28. A coil carrying electric current is placed in uniform magnetic field, then

- (1) torque is formed
- (2) e.m.f is induced
- (3) both (1) and (2) are correct
- (3) none of the above

29. Electromagnets are made of soft iron because soft iron has

- (1) low retentivity and high coercive force
- (2) high retentivity and high coercive force
- (3) low retentivity and low coercive force
- (4) high retentivity and low coercive force

30. A conducting circular loop is placed in a uniform magnetic field, $B = 0.025 \text{ T}$ with its plane perpendicular to the loop. The radius of the loop is made to shrink at a constant rate of 1 mm s^{-1} . The induced e.m.f. when the radius is 2 cm, is

- (1) $2\pi\mu\text{V}$
- (2) $\pi\mu\text{V}$
- (3) $\frac{\pi}{2}\mu\text{V}$
- (4) $2\mu\text{V}$

31. What is the value of inductance L for which the current is maximum in a series LCR circuit with $C = 10 \mu\text{F}$ and $\omega = 1000\text{s}^{-1}$?

- (1) 1 mH
- (2) cannot be calculated unless R is known
- (3) 10 mH
- (4) 100 mH

32. Green-house effect is the heating up of earth's atmosphere due to

- (1) green plants
- (2) infra-red rays
- (3) X-rays
- (4) ultraviolet rays

33. Light travels through a glass plate of thickness t and refractive index n . If c is the speed of light in vacuum, the time taken by light to travel this thickness of glass is

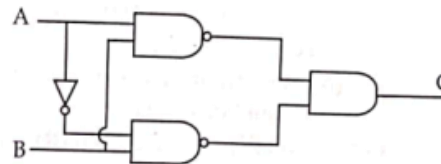
(1) ntc

(2) $\frac{tc}{n}$

(3) $\frac{t}{nc}$

(4) $\frac{nt}{c}$

34.



The truth table for the given logic circuit is

(1)

| A | B | C |
|---|---|---|
| 0 | 0 | 0 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 0 |

(2)

| A | B | C |
|---|---|---|
| 0 | 0 | 1 |
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 1 |

(3)

| A | B | C |
|---|---|---|
| 0 | 0 | 1 |
| 0 | 1 | 0 |
| 1 | 0 | 1 |
| 1 | 1 | 0 |

(4)

| A | B | C |
|---|---|---|
| 0 | 0 | 0 |
| 0 | 1 | 1 |
| 1 | 0 | 0 |
| 1 | 1 | 1 |

35. The periodic waves of intensities I_1 and I_2 pass through a region at the same time in the same direction. The sum of the maximum and minimum intensities is:

(1) $I_1 + I_2$

(2) $(\sqrt{I_1} + \sqrt{I_2})^2$

(3) $(\sqrt{I_1} - \sqrt{I_2})^2$

(4) $2(I_1 + I_2)$



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SECTION : B

36. The 21 cm radio wave emitted by hydrogen in interstellar space is due to the interaction called the hyperfine interaction in atomic hydrogen. The energy of the emitted wave is nearly

- (1) 10^{-17} J
- (2) 1 J
- (3) 7×10^{-8} J
- (4) 10^{-24} J

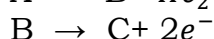
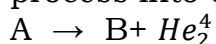
37. In the Davisson and Germer experiment, the velocity of electrons emitted from the electron gun can be increased by

- (1) increasing the potential difference between the anode and filament
- (2) increasing the filament current
- (3) decreasing the filament current
- (4) decreasing the potential difference between the anode and filament

38. When an electron jumps from the fourth orbit to the second orbit, one gets the

- (1) second line of Lyman series
- (2) second line of Paschen series
- (3) second line of Balmer series
- (4) first line of Pfund series

39. An element A decays by a two-step process into element C.



then

- (1) A and C are isotopes
- (2) A and C are isobars
- (3) A and B are isotopes
- (4) A and B are isobars

40. A ball is projected with a velocity, 10 ms^{-1} , at an angle of 60° with the vertical direction. Its speed at the highest point of its trajectory will be

- (1) Zero
- (2) $5\sqrt{3} \text{ ms}^{-1}$
- (3) 5 ms^{-1}
- (4) 10 ms^{-1}

41. The nuclei of which one of the following pairs of nuclei are isotones?

- (1) ${}_{34}\text{Se}^{74}$, ${}_{31}\text{Ga}^{71}$
- (2) ${}_{38}\text{Sr}^{84}$, ${}_{38}\text{Sr}^{86}$
- (3) ${}_{42}\text{Mo}^{92}$, ${}_{40}\text{Zr}^{92}$
- (4) ${}_{20}\text{Ca}^{40}$, ${}_{16}\text{S}^{32}$

42. The half life of a radioactive isotope 'X' is 02 years. It decays to another element 'Y' which is stable. The two elements 'X' and 'Y' were found to be in the ratio of 1: 7 in a sample of a the given rock. The age of the rock is estimated to be

- (1) 60 years
- (2) 80 years
- (3) 100 years
- (4) 40 years

43. The following truth-table belongs to which one of the following four gates?

| A | B | Y |
|---|---|---|
| 1 | 1 | 0 |
| 1 | 0 | 0 |
| 0 | 1 | 0 |
| 0 | 0 | 1 |

- (1) NOR
- (2) XOR
- (3) NAND
- (4) OR

44. The output of OR gate is 1

- (1) if either input is zero
- (2) if both inputs are zero
- (3) if either or both inputs are 1
- (4) only if both inputs are 1

45. A transistor is operated in common emitter configuration at $V_c = 2\text{V}$ such that a change in the base current from $100\mu\text{A}$ to $300\mu\text{A}$ produces a change in the collector current from 10mA to 20mA . The current gain is

- (1) 50
- (2) 75
- (3) 100
- (4) 25

46. A wire of length L, area of cross section A is hanging from a fixed support. The length of the wire changes

to L1 when mass M is suspended from its free end. The expression for Young's modulus is :

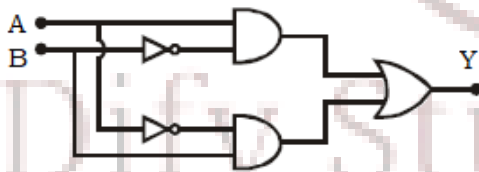
- (1) $\frac{MgL}{AL_1}$
 (2) $\frac{MgL}{A(L_1 - L)}$
 (3) $\frac{MgL_1}{AL}$
 (4) $\frac{Mg(L_1 - L)}{AL}$

- (1) 4v
 (2) v
 (3) 2v
 (4) 3v

47. The acceleration due to gravity at a height 1 km above the earth is the same as at a depth d below the surface of earth. Then

- (1) d = 1 km
 (2) d = $\frac{3}{2}$ km
 (3) d = 2 km
 (4) d = $\frac{1}{2}$ km

48. In the combination of the following gates the output Y can be written in terms of inputs A and B as



- (1) $\overline{A \cdot B}$
 (2) $A \cdot \overline{B} + \overline{A} \cdot B$
 (3) $\overline{A + B}$
 (4) $\overline{A \cdot B} + A \cdot B$

49. Which of the following acts as a circuit protects device?

- (1) Conductor
 (2) Inductor
 (3) Switch
 (4) Fuse

50. The escape velocity from the Earth's surface is v. The escape velocity from the surface of another planet having a radius, four times that of Earth and same mass density is

Chemistry

SECTION : A

51. The maximum number of molecules is present in

- (1) 15 L of H_2 gas at STP
- (2) 5 L of N_2 gas at STP
- (3) 0.5 g of H_2 gas
- (4) 10 g of O_2 gas

52. If ionization potential for hydrogen atom is 93.6 eV, then ionization potential for He^+ will be

- (1) 54.4 eV
- (2) 6.8 eV
- (3) 13.6 eV
- (4) 24.5 eV

53. Which of the following is not permissible arrangement of electrons in an atom?

- (1) $n = 5, l = 3, m = 0, s = +1/2$
- (2) $n = 3, l = 2, m = -3, s = -1/2$
- (3) $n = 3, l = 2, m = -2, s = -1/2$
- (4) $n = 4, l = 0, m = 0, s = -1/2$

54. Which one of the following ions will be the smallest in size?

- (1) Na^+
- (2) Mg^{2+}
- (3) F^-
- (4) O_2^+

55. Which statement is NOT correct?

- (1) A sigma bond is weaker than a S-bond.
- (2) Sigma bond is weaker than a π (pi) bond.
- (3) A double bond is stronger than a single bond.
- (4) A double bond is shorter than a single bond.

56. Compound X on reaction with O_3 followed by Zn/H_2O gives formaldehyde and 2-methyl propanal as products. The compound X is

- (1) Pent-2-ene
- (2) 3-Methylbut-1-ene
- (3) 2-Methylbut-1-ene
- (4) 2-Methylbut-2-ene

57. The number of unpaired electrons in a paramagnetic diatomic molecule of an element with atomic number 16 is

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

58. In which of the following ionisation processes the bond energy increases and the magnetic behaviour changes from paramagnetic to diamagnetic?

- (1) $N_2 \rightarrow N_2^+$
- (2) $O_2 \rightarrow O_2^+$
- (3) $C_2 \rightarrow C_2^+$
- (4) $NO \rightarrow NO^+$

59. If 500 ml of gas A at 400 torr and 666.6 ml of B at 600 torr are placed in a 3 litre flask, the pressure of the system will be

- (1) 200 torr
- (2) 100 torr
- (3) 550 torr
- (4) 366 torr

60. For a first order reaction $A \rightarrow$ Products, initial concentration of A is 0.1 M, which becomes 0.001 M after 5 minutes. Rate constant for the reaction in min^{-1} is

- (1) 0.2303
- (2) 1.3818
- (3) 0.9212
- (4) 0.4606

61. The enthalpy and entropy change for the reaction: $Br_{2(l)} + Cl_{2(g)} \rightarrow 2BrCl_{(g)}$ are 30 kJ mol^{-1} and $105 \text{ J K}^{-1} \text{ mol}^{-1}$ respectively. The temperature at which the reaction will be in equilibrium

- (1) 273 K
- (2) 450 K
- (3) 300 K
- (4) 285.7 K

62. In the neutral or faintly alkaline medium, $KMnO_4$ oxidises iodide into iodate. The change in oxidation state of manganese in this reaction is from

- (1) +6 to +5
- (2) +7 to +4

- (3) +6 to +4
(4) +7 to +3

63. A 10.0 L flask contains 64 g of oxygen at 27°C. (Assume O₂ gas is behaving ideally). The pressure inside the flask in bar is (Given R = 0.0831 L bar K⁻¹ mol⁻¹)

- (1) 4.9
(2) 2.5
(3) 498.6
(4) 49.8

64. Equimolar solutions of the following substances were prepared separately.

Which one of these will record the highest pH value?

- (1) BaCl₂
(2) AlCl₃
(3) LiCl
(4) BeCl₂

65. The dielectric constant of H₂O is 80. The electrostatic force of attraction between Na⁺ and Cl⁻ will be

- (1) reduced to 1/40 in water than in air
(2) reduced to 1/80 in water than in air
(3) will be increased to 80 in water than in air
(4) will remain unchanged.

66. In which of the following the hydration energy is higher than the lattice energy?

- (1) MgSO₄
(2) RaSO₄
(3) SrSO₄
(4) BaSO₄

67. Which of the following structure is similar to graphite?

- (1) B
(2) B₄C
(3) B₂H₆
(4) BN

68. Given below are two statements:

Statement I: In Lucas test, primary, secondary and tertiary alcohols are distinguished on the basis of their reactivity with conc. HCl + ZnCl₂, known as Lucas Reagent.

Statement II: Primary alcohols are most reactive and immediately produce turbidity at room temperature on reaction with Lucas Reagent.

In the light of the above statements, choose the most appropriate answer from the options given below:

- (1) Statement I is incorrect but Statement II is correct
(2) Both Statement I and Statement II are correct
(3) Both Statement I and Statement II are incorrect
(4) Statement I is correct but Statement II is incorrect

69. IUPAC name of the following is CH₂=CH-CH₂-CH₂-C≡CH

- (1) 1, 5-hexenyne
(2) 1-hexene-5-yne
(3) 1-hexyne-5-ene
(4) 1, 5-hexynene

70. How many stereoisomers does this molecule have?



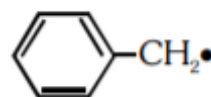
- (1) 4
(2) 6
(3) 8
(4) 2

71. $3\text{O}_2(\text{g}) \rightleftharpoons 2\text{O}_3(\text{g})$

for the above reaction at 298 K, K_c is found to be 3.0×10^{-59} . If the concentration of O₂ at equilibrium is 0.040 M then concentration of O₃ in M is

- (1) 1.2×10^{21}
(2) 4.38×10^{-32}
(3) 1.9×10^{-63}
(4) 2.4×10^{31}

72. The radical



is aromatic because it has:

- (1) 7 p-orbitals and 6 unpaired electrons
(2) 7 p-orbitals and 7 unpaired electrons
(3) 6 p-orbitals and 7 unpaired electrons
(4) 6 p-orbitals and 6 unpaired electrons

73. In face-centred cubic lattice, a unit cell is shared equally by how many unit cells?

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

74. Vapour pressure of benzene at 30°C is 121.8 mm. When 15 g of a non volatile solute is dissolved in 250 g of benzene its vapour pressure decreased to 120.2 mm. The molecular weight of the solute (M_o. wt. of solvent = 78)

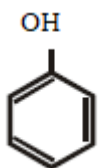
- (1) 356.7
- (2) 456.8
- (3) 530.1
- (4) 656.7

75. 200 mL of an aqueous solution of a protein contains its 1.26 g. The osmotic pressure of this solution at 300 K is found to be 2.57×10^{-3} bar. The molar mass of protein will be (R = 0.083 L bar mol⁻¹ K⁻¹)

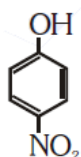
- (1) 51022 g mol⁻¹
- (2) 122044 g mol⁻¹
- (3) 31011 g mol⁻¹
- (4) 61038 g mol⁻¹

76. Which one is the most acidic compound ?

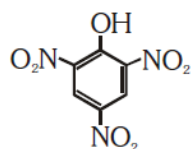
(1)



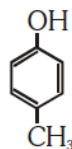
(2)



(3)



(4)



77. A chemical reaction is catalyzed by a catalyst X. Hence X

- (1) reduces enthalpy of the reaction
- (2) decreases rate constant of the reaction
- (3) increases activation energy of the reaction
- (4) does not affect equilibrium constant of the reaction

78. For an endothermic reaction, energy of activation is E_a and enthalpy of reaction is ΔH (both of these in kJ/mol). Minimum value of E_a will be:

- (1) less than ΔH
- (2) equal to ΔH
- (3) more than ΔH
- (4) equal to zero

79. A particular station of All India Radio, New Delhi broadcasts on a frequency of 1,368 kHz (kilohertz). The wavelength of the electromagnetic radiation emitted by the transmitter is : [speed of light c = 3.0×10^8 ms⁻¹]

- (1) 21.92 cm
- (2) 219.3 m
- (3) 219.2 m
- (4) 2192 m

80. PH₄I + NaOH forms

- (1) PH₃
- (2) NH₃
- (3) P₄O₆
- (4) P₄O₁₀

81. Repeated use of which one of the following fertilizers would increase the acidity of the soil?

- (1) Urea
- (2) Superphosphate of lime
- (3) Ammonium sulphate
- (4) Potassium nitrate

82. The oxidation state of Cr in $K_2Cr_2O_7$ is

- (1) + 5
- (2) + 3
- (3) + 6
- (4) + 7

83. Which of the following forms colourless compound?

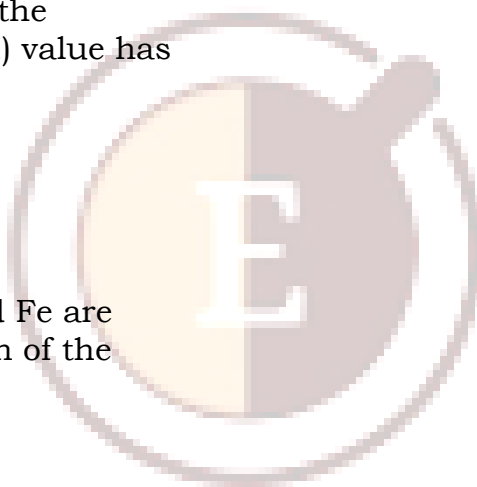
- (1) Sc^{3-}
- (2) V^{3-}
- (3) Ti^{3+}
- (4) Cr^{3+}

84. Four successive members of the first series of the transition metals are listed below for which one of them the standard potential ($E_{M^{2+}/M}$) value has a positive sign?

- (1) Co (Z= 27)
- (2) Ni (Z= 28)
- (3) Cu (Z= 29)
- (4) Fe (Z= 26)

85. Atomic number of Cr and Fe are respectively 24 and 26, which of the following is paramagnetic?

- (1) $[Cr(CO)_6]$
- (2) $[Fe(CO)_5]$
- (3) $[Fe(CN)_6]^{-4}$
- (4) $[Cr(NH_3)_6]^{+3}$



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SECTION : B

86. Right option for the number of tetrahedral and octahedral voids in hexagonal primitive unit cell are :

- (1) 12, 6
- (2) 8, 4
- (3) 6, 12
- (4) 2, 1

87. The reaction of toluene with Cl_2 in presence of FeCl_3 gives 'X' and reaction in presence of light gives

'Y'. Thus, 'X' and 'Y' are:

- (1) X= Benzal chloride,
Y= o - Chlorotoluene
- (2) X= m - Chlorotoluene,
Y= p - Chlorotoluene
- (3) X= o -and p - Chlorotoluene,
Y= Trichloromethyl - benzene
- (4) X= Benzyl chloride,
Y= m - Chlorotoluene

88. The pK_b of dimethylamine and pK_a of acetic acid are 3.27 and 4.77 respectively at T (K). The correct option for the pH of dimethylammonium acetate solution is :

- (1) 6.25
- (2) 8.50
- (3) 5.50
- (4) 7.75

89. Schotten-Baumann reaction is a reaction of phenols with

- (1) Benzoyl chloride and sodium hydroxide
- (2) Acetyl chloride and sodium hydroxide
- (3) Salicylic acid and conc. H_2SO_4
- (4) Acetyl chloride and conc H_2SO_4

90. A carbonyl compound reacts with hydrogen cyanide to form cyanohydrin which on hydrolysis forms a racemic mixture of α -hydroxy acid. The carbonyl compound is

- (1) acetone
- (2) diethyl ketone
- (3) formaldehyde
- (4) acetaldehyde

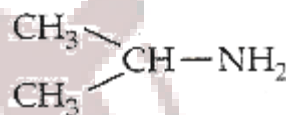
91. What is the decreasing order of basicity of primary, secondary and tertiary methylamines and NH_3 ?

- (1) $\text{NH}_3 > \text{C}_2\text{H}_5\text{NH}_2 > (\text{C}_2\text{H}_5)_2\text{NH} > (\text{C}_2\text{H}_5)_3\text{N}$
- (2) $(\text{C}_2\text{H}_5)_3\text{N} > (\text{C}_2\text{H}_5)_2\text{NH} > \text{C}_2\text{H}_5\text{NH}_2 > \text{NH}_3$
- (3) $(\text{C}_2\text{H}_5)_2\text{NH} > \text{C}_2\text{H}_5\text{NH}_2 > (\text{C}_2\text{H}_5)_3\text{N} > \text{NH}_3$
- (4) $(\text{C}_2\text{H}_5)_2\text{NH} > (\text{C}_2\text{H}_5)_3\text{N} > \text{C}_2\text{H}_5\text{NH}_2 > \text{NH}_3$

92.

An organic compound ($\text{C}_3\text{H}_9\text{N}$), when treated with nitrous acid, gave an alcohol and N_2 gas was evolved. on warming with CHCl_3 and caustic potash gave which on reduction gave isopropyl methylamine. Predict the structure of (A).

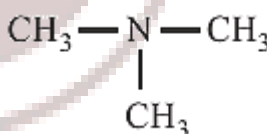
(1)



(2)



(3)



(d)



93. Enzymes are made up of

- (1) Edible proteins
- (2) Proteins with specific structure
- (3) Nitrogen containing carbohydrates
- (4) Carbohydrates

94. Bakelite is prepared by the reaction between

- (1) urea and formaldehyde
- (2) ethylene glycol
- (3) phenol and formaldehyde
- (4) tetramethylene glycol

95. Which one of the following is employed as Antihistamine?

- (1) Chloramphenicol
- (2) Diphenyl hydramine
- (3) Norothindrone
- (4) Omeprazole

96. A first order reaction has a specific reaction rate of 10^{-2} sec^{-1} . How much time will it take for 20g of the reactant to reduce to 5 g ?

- (1) 138.6 sec
- (2) 346.5 sec
- (3) 693.0 sec
- (4) 238.6 sec

97. Which oxide of nitrogen is not a common pollutant introduced into the atmosphere both due to natural and human activity?

- (1) N_2O_5
- (2) NO_2
- (3) NO
- (4) N_2O

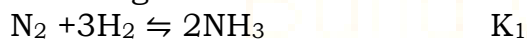
98. For the second period elements the correct increasing order of first ionisation enthalpy is:

- (1) $\text{Li} < \text{Be} < \text{B} < \text{C} < \text{N} < \text{O} < \text{F} < \text{Ne}$
- (2) $\text{Li} < \text{B} < \text{Be} < \text{C} < \text{O} < \text{N} < \text{F} < \text{Ne}$
- (3) $\text{Li} < \text{B} < \text{Be} < \text{C} < \text{N} < \text{O} < \text{F} < \text{Ne}$
- (4) $\text{Li} < \text{Be} < \text{B} < \text{C} < \text{O} < \text{N} < \text{F} < \text{Ne}$

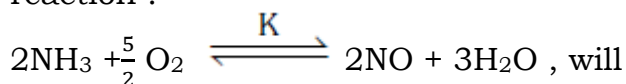
99. Paper chromatography is an example of

- (1) Thin layer chromatography
- (2) Column chromatography
- (3) Adsorption chromatography
- (4) Partition chromatography

100 . The equilibrium constant of the following are :



The equilibrium constant (K) of the reaction :



be

- (1) $K_2 K_3^3 / K_1$
- (2) $K_2 K_3 / K_1$
- (3) $K_2^3 K_3 / K_1$
- (4) $K_1 K_3^3 / K_2$

BOTANY

SECTION : A

101. A system of classification in which a large number of traits are considered, is

- (1) artificial system
- (2) synthetic system
- (3) natural system
- (4) phylogenetic system

102. Trypanosoma belongs to class

- (1) Sarcodina
- (2) Zooflagellata
- (3) Ciliata
- (4) Sporozoa

103. Temperature tolerance of thermal blue-green algae is due to

- (1) cell wall structure
- (2) cell organisation
- (3) mitochondrial structure
- (4) homopolar bonds in their proteins

104. The plasmids present in the bacterial cells are

- (1) circular double helical DNA molecules
- (2) circular double helical RNA molecules
- (3) linear double helical DNA molecules
- (4) linear double helical RNA molecules.

105. In bacteria, plasmid is

- (1) extra – chromosomal material
- (2) main DNA
- (3) non-functional DNA
- (4) repetitive gene

106. Bacterial leaf blight of rice is caused by a species of

- (1) Xanthomonas
- (2) Pseudomonas
- (3) Alternaria
- (4) Erwinia

107. Which one of the following is true for fungi?

- (1) They are phagotrophs
- (2) They lack a rigid cell wall
- (3) They are heterotrophs
- (4) They lack nuclear membrane

108. The 'wing' of Pinus seed is derived from

- (1) testa
- (2) testa and tegmen
- (3) surface of ovuliferous scale
- (4) all the above

109. The largest ovules, largest male and female gametes and largest plants are found among

- (1) Angiosperms
- (2) Tree ferns and some monocots
- (3) Gymnosperms
- (4) Dicotyledonous plants

110. Algae have cell wall made up of:

- (1) cellulose, galactans and mannans
- (2) hemicellulose, pectins and proteins
- (3) pectins, cellulose and proteins
- (4) cellulose, hemicellulose and pectins

111. Epipetalous stamens with free filaments and fused anthers occur in

- (1) Asteraceae
- (2) Solanaceae
- (3) Liliaceae
- (4) Poaceae

112. In a cereal grain the single cotyledon of embryo is represented by

- (1) scutellum
- (2) prophyll
- (3) coleoptile
- (4) coleorhiza

113. Among flowers of Calotropis, tulip, Sesbania, Asparagus, Colchicine, Sweet pea, Petunia, Indigofera, Mustard, Soyabean, Tobacco and groundnut how many plants have corolla with valvate aestivation?

- (1) Five
- (2) Six
- (3) Seven
- (4) Eight

114. Which exposed wood will decay faster

- (1) Sapwood
- (2) Softwood
- (3) Wood with lot of fibres

(4) Heartwood

115. Which one of the following is resistant to enzyme action?

- (1) Cork
- (2) Wood fibre
- (3) Pollen exine
- (4) Leaf cuticle

116. Histamine secreting cells are found in

- (1) connective tissues
- (2) lungs
- (3) muscular tissue
- (4) nervous tissue

117. In which one of the following preparations are your likely to come across cell junctions most frequently?

- (1) Thrombocytes
- (2) Tendon
- (3) Hyaline cartilage
- (4) Ciliated epithelium.

118. Magnification of compound microscope is not connected with

- (1) numerical aperture
- (2) focal length of objective
- (3) focal length of eye piece
- (4) tube length

119. Series of reactions which can convert fatty acids to sugars in plants but not in animals is

- (1) krebs cycle
- (2) glyoxylate cycle
- (3) ornithine cycle
- (4) glycolysis

120. Which one of the following is not a constituent of cell membrane?

- (1) glycolipids
- (2) proline
- (3) phospholipids
- (4) cholesterol.

121. The term 'glycocalyx' is used for

- (1) A layer surrounding the cell wall of bacteria
- (2) A layer present between cell wall and membrane of bacteria
- (3) Cell wall of bacteria

(4) Bacterial cell glyco-engineered to possess Nglycosylated proteins

122. Microtubule is involved in the

- (1) cell division
- (2) muscle contraction
- (3) membrane architecture
- (4) dNA recognition

123. Water movement between cells is due to

- (1) T.P.
- (2) W.P.
- (3) D.P.D
- (4) Incipient plasmolysis

124. Sulphur is an important nutrient for optimum growth and productivity in

- (1) cereals
- (2) fibre crops
- (3) oilseed crops
- (4) pulse crops

125. Boron in green plants assists in

- (1) sugar transport
- (2) activation of enzymes
- (3) acting as enzyme cofactor
- (4) photosynthesis

126. The size of chlorophyll molecule is

- (1) Head $15 \times 15 \text{ \AA}$, tail 25 \AA
- (2) Head $20 \times 20 \text{ \AA}$, tail 25 \AA
- (3) Head $15 \times 15 \text{ \AA}$, tail 20 \AA
- (4) Head $10 \times 12 \text{ \AA}$, tail 25 \AA

127. Chlorophyll 'a' molecule at its carbon atom 3 of the Pyrrole ring II has one of the following

- (1) aldehyde group
- (2) methyl group
- (3) carboxyl group
- (4) magnesium.

128. The first acceptor of electrons from an excited chlorophyll molecule of photosystem II is

- (1) iron-sulphur protein
- (2) ferredoxin
- (3) quinone
- (4) cytochrome

129. When one glucose molecule is completely oxidised, it changes

- (1) 36 ADP molecules into 36 ATP molecules
- (2) 38 ADP molecules into 38 ATP molecules
- (3) 30 ADP molecules into 30 ATP molecules
- (4) 32 ADP molecules into 32 ATP molecules

130. How many ATP molecules could maximally be generated from one molecule of glucose, if the complete oxidation of one mole of glucose to CO_2 and H_2O yields 686 kcal and the useful chemical energy available in the high energy phosphate bond of one mole of ATP is 12 kcal?

- (1) Thirty
- (2) Fifty -seven
- (3) One
- (4) Two

131. Which is employed for artificial ripening of banana fruits?

- (1) Auxin
- (2) Coumarin
- (3) Ethylene
- (4) Cytokinin

132. Proteinaceous pigment which control activities concerned with light

- (1) phytochrome
- (2) chlorophyll
- (3) anthocyanin
- (4) carotenoids

133. The device which can remove particulate matter present in the exhaust from a thermal power plant is :

- (1) Catalytic Convertor
- (2) STP
- (3) Incinerator
- (4) Electrostatic Precipitator

134. Which one of the following never occurs during mitotic cell division?

- (1) Coiling and condensation of the chromatids
- (2) Spindle fibres attach to kinetochores of chromosomes

(3) Movement of centrioles towards opposite poles

(4) Pairing of homologous chromosomes

135. Syngamy means

- (1) fusion of gametes
- (2) fusion of cytoplasm
- (3) fusion of two similar spores
- (4) fusion of two dissimilar spores

SECTION : B

136. In a flowering plant, archesporium gives rise to

- (1) only tapetum and sporogenous cells
- (2) only the wall of the sporangium
- (3) both wall and the sporogenous cells
- (4) wall and the tapetum

137. Megaspores are produced from the megaspore mother cells after

- (1) Meiotic division
- (2) Mitotic division
- (3) Formation of a thick wall
- (4) Differentiation

138. Molecular weight of chromosome of yeast cell is

- (1) 2.56×10^9
- (2) 40×10^9
- (3) 0.5×10^9
- (4) 1×10^9

139. Which of the following represent maximum number of species among global biodiversity?

- (1) Lichens
- (2) Fungi
- (3) Mosses and Ferns
- (4) Algae

140. How does carbon monoxide, a poisonous gas emitted by automobiles, prevent transport of oxygen into the body tissues?

- (1) By destroying the haemoglobin
- (2) By forming a stable compound with haemoglobin
- (3) By obstructing the reaction of oxygen with haemoglobin
- (4) By changing oxygen into carbon dioxide.

141. Which one of the following is the correct percentage of the two (out of the total of 4) green house gases that contribute to the total global warming?

- (1) CFCs 14%, Methane 20%
- (2) CO₂, 40%, CFCs 30%
- (3) N₂ O 6%, CO₂ 86%

(4) Methane 20%, N₂O 18%

142. In *Antirrhinum* (Snapdragon), a red flower was crossed with a white flower and in F₁ generation pink flowers were obtained. When pink flowers were selfed, the F₂ generation showed white, red and pink flowers. Choose the incorrect statement from the following :

- (1) This experiment does not follow the Principle of Dominance.
- (2) Pink colour in F₁ is due to incomplete dominance.
- (3) Ratio of F₂ is $\frac{1}{4}$ (Red) : $\frac{2}{4}$ (Pink) : $\frac{1}{4}$ (white)
- (4) Law of Segregation does not apply in this experiment

143. An example of colonial alga is :

- (1) Volvox
- (2) Ulothrix
- (3) Spirogyra
- (4) Chlorella

144. Which of the following organisms are known as chief producers in the oceans?

- (1) Dinoflagellates
- (2) Diatoms
- (3) Euglenoids
- (4) Cyanobacteria

145. Ciliates differ from all other protozoans in

- (1) using flagella for locomotion
- (2) having a contractile vacuole for removing excess water
- (3) having two types of nuclei
- (4) using pseudopodia for capturing prey

46. Which of the following pairs of gases is mainly responsible for green house effect?

- (1) Ozone and Ammonia
- (2) Oxygen and Nitrogen
- (3) Nitrogen and Sulphur dioxide
- (4) Carbon dioxide and Methane

147. From evolutionary point of view, retention of the female gametophyte with developing young embryo on the parent

sporophyte for some time, is first observed in :

- (1) Liverworts
- (2) Mosses
- (3) Pteridophytes
- (4) Gymnosperms

148. Consider the following four statements whether they are correct or wrong?

- (A) The sporophyte in liverworts is more elaborate than that in mosses
 - (B) Salvinia is heterosporous
 - (C) The life cycle in all seed-bearing plants is diplontic
 - (D) In Pinus male and female cones are borne on different trees
- (a) Statements (A) and (C)
 - (b) Statements (A) and (D)
 - (c) Statements (B) and (C)
 - (d) Statements (A) and (B)

149. The leaves are modified into tendrils, hooks, pitcher, and bladder in the following plants respectively:

- (a) sweet pea, bignonia, Nepenthes, Utricularia
- (b) sweet pea, bignonia, Utricularia, Nepenthes,
- (c) Nepenthes, bignonia, sweet pea, Utricularia
- (d) Utricularia, Nepenthes, bignonia, sweet pea

150. Select the correct sequence for transport of sperm cells in male reproductive system.

- (a) Testis → Epididymis → Vasa efferentia → Rete testis → Inguinal canal → Urethra
- (b) Seminiferous tubules → Rete testis → Vasa efferentia → Epididymis → Vas deferens → Ejaculatory duct → Urethra → Urethral meatus
- (c) Seminiferous tubules → Vasa efferentia → Epididymis → Inguinal canal → Urethra
- (d) Testis → Epididymis → Vasa efferentia → Vas deferens → Ejaculatory duct → Inguinal canal → Urethra → Urethral meatus

ZOOLOGY

SECTION : A

151. Fish which can be used in biological control of mosquitoes/Larvicidal fish is

- (1) Eel
- (2) Carp
- (3) Cat Fish
- (4) Gambusia

152. An egg laying mammal is

- (1) Kangaroo
- (2) Platypus
- (3) Koala
- (4) Whale

153. Closed circulatory system occurs in

- (1) snail
- (2) cockroach
- (3) cuttle Fish
- (4) all of these

154. One of the following is a very unique feature of the mammalian body:

- (1) Homeothermy
- (2) Presence of diaphragm
- (3) Four chambered heart
- (4) Rib cage

155. Which one of the following statements is totally wrong about the occurrence of notochord, while the other three are correct?

- (1) It is present only in larval tail in Ascidians
- (2) It is replaced by a vertebral column in adult frog
- (3) It is absent throughout life in humans from the very beginning
- (4) It is present throughout life in Amphioxus

156. DNA synthesis can be specifically measured by estimating the incorporation of radio labelled

- (1) uracil
- (2) adenine
- (3) thymidine
- (4) deoxyribose sugar

157. Which one of the following hydrolyses internal phosphodiester bonds in a polynucleotide chain?

- (1) Lipase
- (2) Protease
- (3) Endonuclease
- (4) Exonuclease

158. Secretin and cholecystokinin are two hormones involved in digestion. They are secreted by

- (1) Duodenum
- (2) Ileum
- (3) Oesophagus
- (4) Stomach

159. Which one of the following statements is true regarding digestion and absorption of food in humans?

- (1) Fructose and amino acids are absorbed through intestinal mucosa with the help of carrier ions like Na^+ .
- (2) Chylomicrons are small lipoprotein particles that are transported from intestine into blood capillaries.
- (3) About 60% of starch is hydrolysed by salivary amylase in our mouth
- (4) Oxyntic cells in our stomach secrete the proenzyme pepsinogen.

160. Listed below are four respiratory capacities (i-iv) and four jumbled respiratory volumes of a normal human adult: Respiratory capacities
Respiratory volumes

- | | |
|---------------------------|---------------|
| (i) Residual volume | 2500mL |
| (ii) Vital capacity | 3500mL |
| (iii) Inspiratory reserve | 1200mL volume |
| (iv) Inspiratory capacity | 4500mL |
- Which one of the following is the correct matching of two capacities and volumes?
- (1) (ii) 2500mL, (iii) 4500mL
 - (2) (iii) 1200mL, (iv) 2500mL
 - (3) (iv) 3500 mL, (i) 1200mL
 - (4) (i) 4500 mL, (ii) 3500mL

161. The lymph serves to

- (1) transport oxygen to the brain
- (2) transport carbon dioxide to the lungs
- (3) return the interstitial fluid to the blood

(4) return the WBCs and RBCs to the lymph nodes

162. A drop of each of the following, is placed separately on four slides. Which of them will not coagulate?

- (1) Blood serum
- (2) Sample from the thoracic duct of lymphatic system
- (3) Whole blood from pulmonary vein
- (4) Blood plasma.

163. Uric acid is nitrogenous waste in

- (1) Mammals and molluscs
- (2) Birds and lizards
- (3) Frog and cartilaginous fishes
- (4) Insects and bony fishes

164. Which one of the following statements is correct with respect to kidney function regulation?

- (1) When someone drinks lot of water, ADH release is suppressed.
- (2) Exposure to cold temperature blood flow stimulates formation of Angiotensin II.
- (3) An increase in glomerular blood flow stimulates formation of Angiotensin II.
- (4) During summer when body loses lot of water by evaporation, the release of ADH is suppressed.

165. Which one of the following is the correct matching of three items and their grouping category?

- | Items | Group |
|--|-------|
| (1) ilium, ischium, pubis - coxal bones of pelvic girdle | |
| (2) actin, myosin, - muscle proteins rhodopsin. | |
| (3) cytosine, uracil, - pyrimidines thiamine | |
| (4) malleus, incus, - ear ossicles cochlea | |

166. Anaesthetics reduce pain by blocking nerve conduction due to

- (1) Blocking neurotransmitter receptor
- (2) Blocking Na^+ channel
- (3) Blocking K^+ channel
- (4) All the above

167. A person entering an empty room suddenly finds a snake right in front on opening the door. Which one of the following is likely to happen in his neurohormonal control system?

- (1) Sympathetic nervous system is activated releasing epinephrin and norepinephrin from adrenal medulla.
- (2) Neurotransmitters diffuse rapidly across the cleft and transmit a nerve impulse.
- (3) Hypothalamus activates the parasympathetic division of brain.
- (4) Sympathetic nervous system is activated releasing epinephrin and norepinephrin from adrenal cortex.

168. What is true for cleavage?

- (1) Size of embryo increases
- (2) Size of cells decrease
- (3) Size of cells increase
- (4) Size of embryo decreases

169. Seminal plasma in human males is rich in:

- (1) fructose and calcium
- (2) glucose and calcium
- (3) DNA and testosterone
- (4) ribose and potassium

170. The test-tube Baby Programme employs which one of the following techniques

- (1) Intra cytoplasmic sperm injection (ICSI)
- (2) Intra uterine insemination (IUI)
- (3) Gamete intra fallopian transfer (GIFT)
- (4) Zygote intra fallopian transfer (ZIFT)

171. The process of mating between closely related individuals is

- (1) self breeding
- (2) inbreeding
- (3) hybridisation
- (4) heterosis

172. The homologous organs are those that show similarity in

- (1) size
- (2) origin
- (3) function
- (4) appearance

173. The process by which organisms with different evolutionary history evolve similar phenotypic adaptations in response to a common environmental challenge, is called:

- (1) Convergent evolution
- (2) Non-random evolution
- (3) Adaptive radiation
- (4) Natural selection

174. Human immuno deficiency virus (HIV) has a protein coat and a genetic material which is

- (1) single stranded DNA
- (2) double stranded DNA
- (3) single stranded RNA
- (4) double stranded RNA

175. Antibodies in our body are complex

- (1) steroids
- (2) prostaglandins
- (3) glycoproteins
- (4) lipoproteins

176. Two microbes found to be very useful in genetic engineering are

- (1) *Vibrio cholerae* and a tailed bacteriophage
- (2) *Diplococcus* sp. and *Pseudomonas* sp.
- (3) Crown gall bacterium and *Caenorhabditis elegans*
- (4) *Escherichia coli* and *Agrobacterium tumefaciens*

177. Which one of the following is commonly used in transfer of foreign DNA into crop plants?

- (1) *Meloidogyne incognita*
- (2) *Agrobacterium tumefaciens*
- (3) *Penicillium expansum*
- (4) *Trichoderma harzianum*

178. A temporary endocrine gland in the human body is :

- (1) Corpus cardiacum
- (2) corpus luteum
- (3) Corpus allatum
- (4) Pineal gland

179. Which of the following is made up of dead cells?

- (1) Collenchyma
- (2) Phellem
- (3) Phloem
- (4) Xylem parenchyma

180. Which of the following features is used to identify a male cockroach from a female cockroach?

- (1) Presence of a boat shaped sternum on the 9th abdominal segment
- (2) Presence of caudal styles
- (3) Presence of anal cerci
- (4) Forewings with darker tegmina

181. Select the correct sequence of organs in the alimentary canal of cockroach starting from mouth

- (1) Pharynx → Oesophagus → Crop → Gizzard → Ileum → Colon → Rectum
- (2) Pharynx → Oesophagus → Gizzard → Crop → Ileum → Colon → Rectum
- (3) Pharynx → Oesophagus → Gizzard → Ileum → Crop → Colon → Rectum
- (4) Pharynx → Oesophagus → Ileum → Crop → Gizzard → Colon → Rectum

182. The genetically modified brinjal in India has been developed for

- (1) Drought resistance
- (2) Enhancing mineral content
- (3) Enhancing shelf life
- (4) Insect resistance

183. In the clotting mechanism pathway, thrombin activate factors

- (1) VIII, X, V
- (2) XI, VIII, X
- (3) XI, IX, X
- (4) XI, VIII, V

184. A drop of each of the following is placed separately on four slides. Which of them will not coagulate?

- (1) Blood serum
- (2) Sample from the thoracic duct of lymphatic system
- (3) Whole blood from pulmonary vein
- (4) Blood plasma

185. The chemical substance released by activated spermatozoa that acts on the

ground substances of the follicle cells is
known as

- (1) Progesterone
- (2) Hyaluronidase
- (3) Gonadotropin
- (4) Relaxin



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SECTION : B

186. Which of the following is an example of negative feedback loop in humans?

- (1) Secretion of tears after falling of sand particles into the eye.
- (2) Salivation of mouth at the sight of delicious food
- (3) Secretion of sweat glands and constriction of skin blood vessels when it is too hot
- (4) Constriction of skin blood vessels and contraction of skeletal muscles when it is too cold

187. During the propagation of a nerve impulse, the action potential results from the movement of:

- (1) K^+ ions from extracellular fluid to intracellular fluid
- (2) Na^+ ions from intracellular fluid to extracellular fluid
- (3) K^+ ions from intracellular fluid to extracellular fluid
- (4) Na^+ ions from extracellular fluid to intracellular fluid

188. Which one of the following is the correct description of a certain part of a normal human skeleton?

- (1) First vertebra is axis which articulates with the occipital condyles.
- (2) The 9th and 10th pairs of ribs are called the floating ribs.
- (3) Parietal bone and the temporal bone of the skull are joined fibrous joint.
- (4) Glenoid cavity is a depression to which the thigh bone articulates

189. Antiparallel strands of a DNA molecule means that

- (1) the phosphate groups of two DNA strands, at their ends, share the same position
- (2) the phosphate groups at the start of two DNA strands are in opposite position (pole)
- (3) one strand turns clockwise

(4) one strand turns anti-clockwise

190. Which one of the following statements is correct with respect to kidney function regulation?

- (1) When someone drinks lot of water, ADH release is suppressed.
- (2) Exposure to cold temperature blood flow stimulates formation of Angiotensin II.
- (3) An increase in glomerular blood flow stimulates formation of Angiotensin II.
- (4) During summer when body loses lot of water by evaporation, the release of ADH is suppressed.

191. Match List - I with List - II

- | List I | List II |
|--|---|
| (a) Adaptive radiation Selection of | (i) resistant varieties due to excessive use of herbicides and Pesticides |
| (b) Convergent evolution | (ii) Bones of forelimbs in Man and Whale |
| (c) Divergent evolution | (iii) Wings of Butterfly and Bird |
| (d) Evolution by anthropogenic | (iv) Darwin Finches Action |

Choose the correct answer from the options given below.

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

192. From his experiments, S.L. Miller produced amino acids by mixing the following in a closed flask

- (1) CH_4 , H_2 , NH_3 and water vapor at $600^\circ C$
- (2) CH_3 , H_2 , NH_3 and water vapor at $600^\circ C$

(3) CH₄, H₂, NH₃ and water vapor at 800°C

(4) CH₃, H₂, NH₄ and water vapor at 800°C

193 Match List-I with List-II

List -I

List -II

(a) Filariasis

(i) Haemophilus influenzae

(b) Amoebiasis

(ii) Trichophyton

(c) Pneumonia

(iii) Wuchereria bancrofti

(d) Ringworm

(iv) Entamoeba histolytica

Choose the correct answer from the options given below

(a) (b) (c) (d)

(1) (ii) (iii) (i) (iv)

(2) (iv) (i) (iii) (ii)

(3) (iii) (iv) (i) (ii)

(4) (i) (ii) (iv) (iii)

194. Match List-I with List-II.

List I

List II

(a) Vaults through Cervix is blocked

(i) Entry of sperm

(b) IUDs deferens

(ii) Removal of Vas

(c) Vasectomy sperms within the Uterus

(iii) Phagocytosis of

(d) Tubectomy fallopian tube

(iv) Removal of

Choose the correct answer from the options given Below

(a) (b) (c) (d)

(1) (iii) (i) (iv) (ii)

(2) (iv) (ii) (i) (iii)

(3) (i) (iii) (ii) (iv)

(4) (ii) (iv) (iii) (i)

195. Match the following columns and select the correct option.

Column-I

Column-II

(a) Placenta

(i) Androgens

(b) Zona pellucida Chorionic Gonadotropin (hCG)

(ii) Human

(c) Bulbo-urethral glands

(iii) Layer of the

(d) Leydig cells (iv) Lubrication of the Penis

(a) (b) (c) (d)

(1) (iii) (ii) (iv) (i)

(2) (ii) (iii) (iv) (i)

(3) (iv) (iii) (i) (ii)

(4) (i) (iv) (ii) (iii)

196. The partial pressures (in mm Hg) of oxygen (O₂) and carbon dioxide (CO₂) at alveoli (the site of diffusion) are:

(1) pO₂ = 159 and pCO₂ = 0.3

(2) pO₂ = 104 and pCO₂ = 40

(3) pO₂ = 40 and pCO₂ = 45

(4) pO₂ = 95 and pCO₂ = 40

197. Match List-I with List-II.

List-I

List II

(a) Protein

(i) C = C double bonds

(b) Unsaturated fatty acid

(ii) Phosphodiester Bonds

(c) Nucleic acid

(iii) Glycosidic bonds

(d) Polysaccharide

(iv) Peptide bonds

Choose the correct answer from the options given below.

(a) (b) (c) (d)

(1) (iv) (iii) (i) (ii)

(2) (iv) (i) (ii) (iii)

(3) (i) (iv) (iii) (ii)

(4) (ii) (i) (iv) (iii)

198. Identify the correct statement with reference to human digestive system.

(1) Ileum is a highly coiled part

(2) Vermiform appendix arises from duodenum

(3) Ileum opens into small intestine

(4) Serosa is the innermost layer of the alimentary canal

199. Following are the statements about prostomium of earthworm.

(1) It serves as a covering for mouth.

(2) It helps to open cracks in the soil into which it can crawl.

(3) It is one of the sensory structures.

(4) It is the first body segment.

Choose the correct answer from the options given below.

- (1) (b) and (c) are correct
- (2) (a), (b) and (c) are correct
- (3) (a), (b) and (d) are correct
- (4) (a), (b), (c) and (d) are correct

200. Which of the following statements are true/false?

- (i) In Torpedo, the electric organs are capable of generating strong electric shock to paralyze the prey.
 - (ii) Bony fishes use pectoral, pelvic, dorsal anal and caudal fins in swimming.
 - (iii) Amphibian skin is moist and has thick scales.
 - (iv) Birds are poikilothermic animals.
 - (v) The most unique mammalian characteristic is the presence of milk producing mammary glands by which the young ones are nourished.
- (1) (i), (ii) and (iii) are true; (iv), (v) are false
 - (2) (i), (ii) and (v) are true; (iii) and (iv) are false
 - (3) (i), (iv) and (v) are true; (ii) and (iii) are false
 - (4) (i), (ii) and (iv) are false; (iii) and (v) are true

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