

Date of Examination

____/____/____

YOUR COLLEGE NAME

Test Booklet Code

Q3



Time: 3hrs. 15 Min

NEET-GT-02
NEET UG - (2025)

Maximum Marks :720

Important Instructions

1. The test is of 3 **hours 15minutes** 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.
2. **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 these page/marking responses on Answer Sheet
5. On completion of the test, the candidate must hand over the Answer Sheet to the Invigilator before leaving the Room/Hall. The candidates are allowed to take away this Test booklet with them
6. The CODE for this Booklet is Q3. Make sure that the CODE printed on the Original Copy of the Answer Sheet is the same as that on this Test Booklet. In case of discrepancy, the candidate should immediately report the matter to the Invigilator for replacement of both the Test Booklet and the Answer sheet.
7. The candidates should ensure that the Answer Sheet is not folded. 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. Use of Electronic/Manual Calculator is prohibited.
11. The candidates are governed by all Rules and Regulations of the examination with regard to their conduct in Examination Room/ Hall cases of unfair means will be dealt with per Rules and Regulations of examination.
12. No part of the Test Booklet and Answer Sheet shall be detached under any circumstances.
13. The candidates will write the Correct Test Booklet Code as given in the Test Booklet/ Answer Sheet in the Attendance Sheet

Name of candidate (in capitals): _____

Roll Number: _____ Invigilator's Signature: _____

PHYSICS Section – A (Q. No. 1 to 35)

- A sinusoidal voltage $V_0 \sin \omega t$ is applied across a series combination of resistance R and inductance L . The amplitude of the current in this circuit is:
 - $\frac{V_0}{(R + \omega L)}$
 - $\frac{V_0}{\sqrt{R^2 + \omega^2 L^2}}$
 - $\frac{V_0}{R}$
 - $\frac{V_0}{\sqrt{R^2 - \omega^2 L^2}}$
- Photovoltaic devices like the solar cells
 - convert optical radiation into electricity
 - are always forward biased
 - convert electrical energy into light
 - regulate voltage
- The magnetic flux across a loop of resistance 10Ω is given by $\phi = 5t^2 - 4t + 1$ weber. How much current is induced in the loop after 0.2 sec?
 - 0.02 A
 - 0.04 A
 - 0.2 A
 - 0.4 A
- A current $I = 10 \sin(100\pi t)$ is passed in the first coil, which induces a maximum emf of 5π volt in second coil. The mutual inductance between the coils is:
 - 15mH
 - 10 mH
 - 25mH
 - 5 mH
- If number of nucleons increases, then binding energy per nucleon of the nucleus
 - remains constant with mass number
 - continuously decreases with mass number
 - continuously increases with mass number
 - first increases and then decreases with mass number
- The energy released when 1 a.m.u. of mass is completely converted into energy is
 - 391 MeV
 - 931 MeV
 - 1 MeV
 - 797 MeV
- An object is placed at 10 cm in front of a spherical concave mirror and its image is formed at 30 cm in front of the mirror. The focal length of the mirror is:
 - +7.5 cm
 - 7.5 cm
 - + 6.5 cm
 - 6.5 cm
- The equation of a circle is given by $x^2 + y^2 = a^2$, where a is the radius. If the equation is modified to change the origin other than $(0, 0)$, then find out the correct dimensions of A and B in a new equation: $(x - At)^2 + \left(y - \frac{t}{B}\right)^2 = a^2$. The dimensions of t is given as $[T^{-1}]$.
 - $A = [L^{-1}T]$, $B = [LT^{-1}]$
 - $A = [L^{-1}T^{-1}]$, $B = [LT^{-1}]$
 - $A = [LT]$, $B = [L^{-1}T^{-1}]$
 - $A = [L^{-1}T^{-1}]$, $B = [LT]$
- A point particle of mass 0.1 kg is executing SHM with amplitude of 0.1 m. When the particle passes through the mean position, its kinetic energy is $8 \times 10^{-3} \text{ J}$. If the initial phase of oscillation is 45° , the equation of motion of this particle is:
 - $y = 0.1 \sin\left(4T + \frac{\pi}{3}\right)$
 - $y = 0.4 \sin\left(6T + \frac{\pi}{4}\right)$
 - $y = 0.1 \sin\left(4T + \frac{\pi}{4}\right)$
 - $y = 0.1 \sin\left(3T + \frac{\pi}{4}\right)$
- A string of length L is stretched by $L/20$ and the speed of transverse waves along it is v . The speed of wave when it is stretched by $L/10$ will be: (assume that Hooke's law is applicable)
 - $\sqrt{2}v$
 - $v/\sqrt{2}$
 - $4v$
 - $2v$
- The dimensions of permittivity ϵ_0 is:
 - $[M^{-1}L^3A^{-2}T^{-4}]$
 - $[M^{-1}L^{-3}A^2T^4]$
 - $[M^{-1}L^{-1}A^2T^2]$
 - $[M^{-1}L^{-3}A^2T^{-4}]$
- The following equations represent progressive transverse waves:

$$Z_1 = A \cos(\omega t - kx); Z_2 = A \cos(\omega t + kx);$$

$$Z_3 = A \cos(\omega t + ky) \text{ and } Z_4 = A \cos(2\omega t - 2ky).$$

A stationary wave will be formed by superposing:

- (1) z_1 and z_4 (2) z_3 and z_4
(3) z_2 and z_3 (4) z_1 and z_2

13. Which colour of the light has the longest wavelength?

- (1) Red (2) Violet
(3) Blue (4) Green

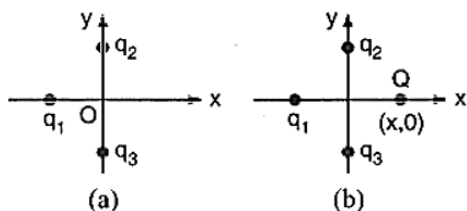
14. An oil drop carrying a charge of 2 electrons has a mass of 3.2×10^{-17} kg. It is falling freely in air with terminal speed. The electric field required to make the drop move upwards with the same speed is:

- (1) 8×10^3 V/m (2) 4×10^3 V/m
(3) 3×10^3 V/m (4) 2×10^3 V/m

15. A proton and an α - particle enter into region of uniform electric field. The ratio of force on the proton to that on the α - particle is:

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

16. In figure, two positive charges, q_2 and q_3 fixed along the y - axis exert a net electric force in the +x direction on a charge q_1 fixed along the x - axis. If a positive charge Q is added at (x, 0), the force on q_1



- (1) shall point along the negative x - axis
(2) shall decrease along the positive x - axis
(3) shall increase along the positive x - axis
(4) shall increase but the direction changes because of the interaction of Q with q_2 and q_3

17. An object 2.5 cm high is placed at a distance of 10 cm from a concave mirror of radius of curvature 30 cm. The size of the image is:

- (1) 5.6 mm (2) 10.5 mm
(3) 9.2 mm (4) 7.5 mm

18. When a light ray enters a refracting medium, it is found that the magnitude of the angle of refraction is equal to half the angle of reflection. If n is the refractive index of the medium, then the angle of incidence is:

- (1) $\cos^{-1}(\frac{n}{2})$ (2) $2 \cos^{-1}(\frac{n}{2})$
(3) $\sin^{-1}(\frac{n}{2})$ (4) $2 \sin^{-1}(\frac{n}{2})$

19. The momentum of each photon in a given radiation is 3.3×10^{-29} kg - metre/sec. The frequency of radiation is:

(Given: $h = 6.6 \times 10^{-34}$ joule - sec)

- (1) 3×10^3 H (2) 7.5×10^{12} Hz
(3) 1.5×10^{13} Hz (4) 6×10^{10} Hz

20. An electron with speed v and a photon with speed c have the same de Broglie wavelength. If the kinetic energy and momentum of electrons is E_e and P_e and that of photon is E_{ph} and P_{ph} respectively, then the correct option is:

- (1) $\frac{P_e}{P_{ph}} = \frac{2c}{v}$ (2) $\frac{E_e}{E_{ph}} = \frac{2c}{v}$
(3) $\frac{P_e}{P_{ph}} = \frac{v}{2c}$ (4) $\frac{E_e}{E_{ph}} = \frac{v}{2c}$

21. A prism of angle 30° is silvered at one side. A ray of light incident at an angle 45° is reflected back. The refractive index is:

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

22. An ideal gas is compressed to half its initial volume by means of several processes. Which of the processes results in the maximum work done on the gas?

- (1) Isobaric (2) Isochoric
(3) Adiabatic (4) Isothermal

23. The maximum average velocity of water required for streamline flow of liquid passing through a tube of radius 1.25 cm should be: (Coefficient of viscosity of water is 1×10^{-3})

- (1) 0.08 ms^{-1} (2) 0.008 ms^{-1}
(3) 0.8 ms^{-1} (4) 8 ms^{-1}

24. A body cools from 80°C to 60°C in 2 minutes. The time it takes to cool from 60°C to 40°C , when the temperature of the surroundings is 10°C , will be:

(1) 4 min (2) 3.037 min
(3) 6 min (4) 2 min

25. When the charge is given to a soap bubble, it shows:

(1) sometimes an increase and sometimes a decrease in size
(2) a decrease in size
(3) an increase in size
(4) no change in size

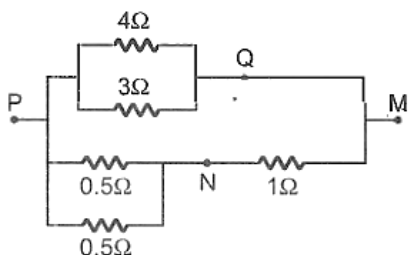
26. A stone is thrown vertically up from the ground. It reaches a maximum height of 50 m in 10 sec. After what time it will reach the ground from maximum height position?

(1) 10 sec (2) 5 sec
(3) 1.2 sec (4) 25 sec

27. A car travels from A to B at a speed of 20 km/h and returns at a speed of 30 km/h. The average speed of the car for the whole journey is:

(1) 24 km/h (2) 25 km/h
(3) 50 km/h (4) 5 km/h

28. In the adjoining circuit, the current through the 4Ω resistor is 1 amp when the point v and M are connected to a DC voltage source. The potential difference between the points M and N is:



(1) 1.5 volt (2) 1.0 volt
(3) 0.5 volt (4) 3.2 volt

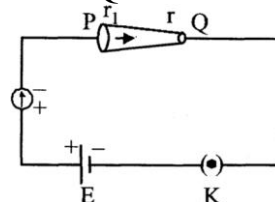
29. Two projectiles are thrown with same initial velocity making an angle of 45° and 30° with the horizontal respectively. The ratio of their respective ranges will be

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

30. If the earth shrinks such that its mass does not change but radius decreases to one quarter of its original value, then one complete day will take:

(1) 48 hrs (2) 96 hrs
(3) 6 hrs (4) 1.5 hrs

31. In the given figure, a battery of emf E is connected across a conductor PQ of length l and different area of cross - sections having radii r_1 and r_2 ($r_2 < r_1$). Choose the correct option as one moves from P to Q:



(1) All of these
(2) Electron current decreases.
(3) Electric field decreases.
(4) Drift velocity of electron increases

32. A voltmeter of range 2V and resistance 300Ω cannot be converted into ammeter of range:

(1) 100 mA (2) 1 mA
(3) 1 A (4) 10 mA

33. The Gravitational PE of a body of mass m at the Earth's surface is $-mgR_e$. Its gravitational potential energy at a height R_e from the Earth's surface will be: (R_e is the radius of the Earth)

(1) $2mgR_e$ (2) $-\frac{1}{2} mgR_e$
(3) $\frac{2}{3} \frac{GMm}{R_e}$ (4) $-2mgR_e$

34. Distance of the centre of mass of a solid uniform cone from its vertex is z_0 . If the radius of its base is R and its height is h , then z_0 is equal to

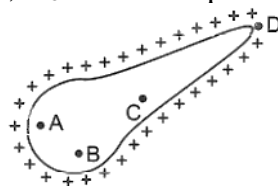
(1) $\frac{5h}{8}$ (2) $\frac{3h^2}{8R}$
(3) $\frac{h^2}{4R}$ (4) $\frac{3h}{4}$

35. When a sphere rolls without slipping, the ratio of its kinetic energy of translation to its total kinetic energy is:

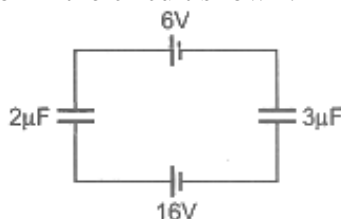
(1) 1 : 2 (2) 1 : 7
(3) 5 : 7 (4) 1 : 1

PHYSICS Section – A (Q. No. 36 to 50)

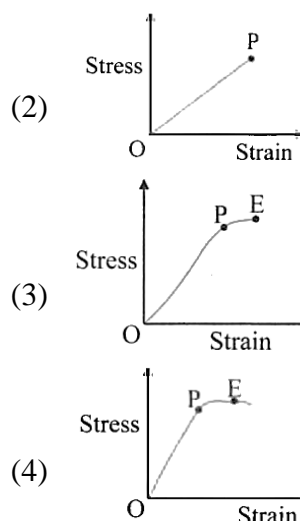
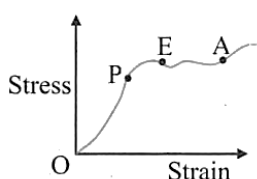
36. For the isolated charged conductor shown in the figure, the potentials at points A, B, C and D are V_A , V_B , V_C and V_D respectively. Then:



- (1) $V_D > V_C > V_B > V_A$
 (2) $V_D = V_C = V_B = V_A$
 (3) $V_A = V_B > V_C > V_D$
 (4) $V_D > V_C > V_B = V_A$
37. Two waves are said to be coherent if they have:
 (1) same phase and different amplitude
 (2) same frequency but different amplitude
 (3) different frequency, phase and amplitude
 (4) same frequency, phase and amplitude
38. What is the potential difference across $2\mu\text{F}$ capacitor in the circuit shown?

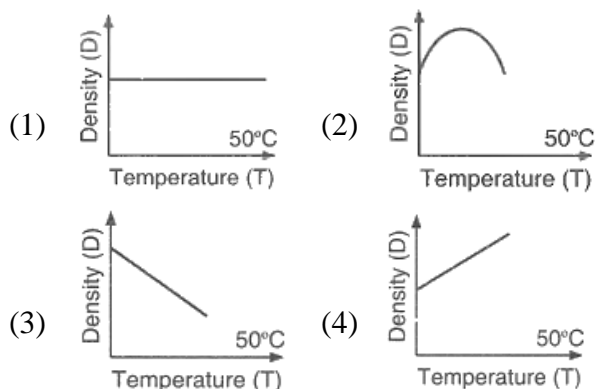


- (1) 12 V (2) 6 V
 (3) 4 V (4) 18 V
39. A solid block is studied under the application of increasing force. As the force is applied, the dimensions of the block change. After a certain value of force is crossed, it shows the non-linear change in length and surface area with respect to force. But it still can regain its original dimensions if force is removed. After a certain time, it suddenly collapses and fractures. These observations are most appropriately depicted in the plot



- (2) The magnetic moment of a current (I) carrying circular coil of radius (r) and number of turns (n) varies as
 (1) $\frac{1}{r}$ (2) r^2
 (3) $\frac{1}{r^2}$ (4) r
41. A 72Ω galvanometer is shunted by a resistance of 8Ω . The percentage of the total current which passes through the galvanometer is:
 (1) 0.1% (2) 0.25%
 (3) 10% (4) 25%
42. If the temperature of a black body increases from -73°C to 327°C , then the ratio of emissive power at these two temperatures is:
 (1) 1 : 9 (2) 9 : 1
 (3) 81 : 1 (4) 1 : 81
43. An alternating voltage is represented as: $E = 20 \sin 300t$. The average value of voltage over one cycle will be:
 (1) zero (2) $\frac{20}{\sqrt{2}}$ volt
 (3) 10-volt (4) $20\sqrt{2}$ volt
44. A cylinder with fixed capacity of 67.2 L contains helium gas at STP. The amount of heat needed to raise the temperature of the gas by 20°C is [Take $R = 8.31 \text{ J/mol} \cdot \text{K}$]
 (1) 374 J (2) 748 J
 (3) 700 J (4) 350 J

45. Which one of the figures gives the temperature dependence of the density of water correctly?



46. A bar magnet has a magnetic moment of 200 Am². The magnet is suspended in a magnetic field of 0.30 N A⁻¹ m⁻¹. The torque required to rotate the magnet from its equilibrium position through an angle of 30°, will be

- (1) $60\sqrt{3}$ N m (2) 60 N m
(3) $30\sqrt{3}$ N m (4) 30 N m

47. A body of mass 2 kg is projected at 20 m/s at an angle 60° above the horizontal. Power due to the gravitational force on the block at its highest point is:

- (1) 50 W (2) $100\sqrt{3}$ W
(3) 200 W (4) 0

48. An iron rod is placed parallel to the magnetic field of intensity 2000 A/m. The magnetic flux through the rod is 6×10^{-4} Wb and its cross-sectional area is 3 cm². The magnetic permeability of the rod in Wb/Am is:

- (1) 10^{-3} (2) 10^{-2}
(3) 10^{-4} (4) 10^{-1}

49. Two bodies of mass m and 4m have equal kinetic energy. What is the ratio of their momentum?

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

50. Dimensions of Planck's constant are same as the dimensions of the product of

- (1) Force, displacement and time
(2) Force and time
(3) Force and velocity
(4) Force and displacement

CHEMISTRY Section – A (Q. No. 51 to 85)

51. Which of the following has the shortest Cr—C bond length?

- (1) [Cr(PPh₃)₃(CO)₃]
(2) [Cr(NH₃)₃(CO)₃]
(3) [Cr(PF₃)₃(CO)₃]
(4) [Cr(CO)₆]

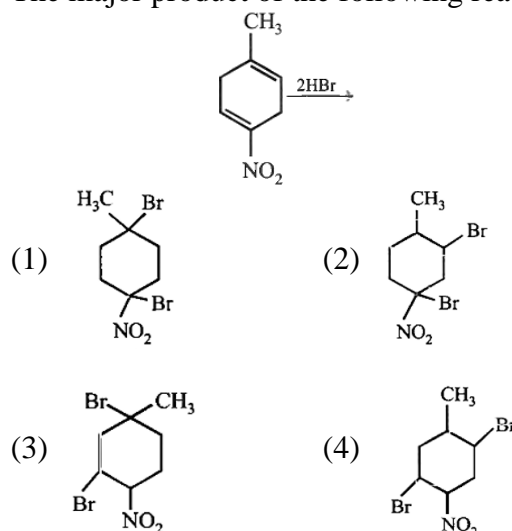
52. A measured temperature on Fahrenheit scale is 200° F. What will this reading be on Celsius scale?

- (1) 40° C (2) 30° C
(3) 94° C (4) 93.3° C

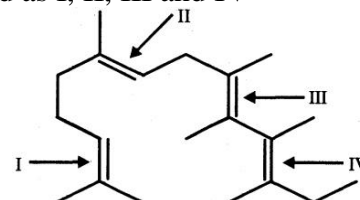
53. Which one of the following is an inner orbital complex as well as diamagnetic in behaviour? (Atomic numbers: Zn = 30, Cr = 24, Co = 27, Ni = 28)

- (1) [Co(NH₃)₆]³⁺ (2) [Ni(NH₃)₆]²⁺
(3) [Cr(NH₃)₆]³⁺ (4) [Zn(NH₃)₆]²⁺

54. The major product of the following reaction is:



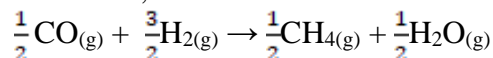
55. In the following structure, the double bonds are marked as I, II, III and IV



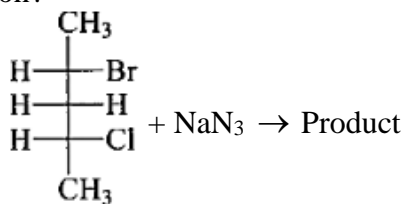
Geometrical isomerism is not possible at site(s):

- (1) I and III (2) III and IV
(3) III (4) I

56. For the following reaction,
 $K_c = 1.3 \times 10^{22}$, at 25°C .
 $\text{CH}_4(\text{g}) + \text{H}_2\text{O}(\text{g}) \rightleftharpoons \text{CO}(\text{g}) + 3\text{H}_2(\text{g})$
 Find the value of K_p at the same temperature for the reaction,



- (1) 3.9×10^4 (2) 3.6×10^{-13}
 (3) 8.7×10^{-12} (4) 1.3×10^{-2}
57. The ortho para directing group among the following is:
 (1) NHCOCH_3 (2) COOH
 (3) CN (4) COCH_3
58. The solubility product for a salt of the type AB is 4×10^{-8} . What is the molarity of its saturated solution?
 (1) $16 \times 10^{-16} \text{ mol/L}$
 (2) $2 \times 10^{-4} \text{ mol/L}$
 (3) $2 \times 10^{-16} \text{ mol/L}$
 (4) $4 \times 10^{-4} \text{ mol/L}$
59. Which of the following describes the correct sequence for decreasing Lewis acid nature?
 (1) $\text{BBR}_3 > \text{BCl}_3 > \text{BF}_3$
 (2) $\text{BBR}_3 > \text{BF}_3 > \text{BCl}_3$
 (3) $\text{BF}_3 > \text{BCl}_3 > \text{BBR}_3$
 (4) $\text{BCl}_3 > \text{BF}_3 > \text{BBR}_3$
60. What is the principal product of the following reaction?



- (1) $\begin{array}{c} \text{CH}_3 \\ | \\ \text{N}_3-\text{C}-\text{H} \\ | \\ \text{H}-\text{C}-\text{H} \\ | \\ \text{H}-\text{C}-\text{Cl} \\ | \\ \text{CH}_3 \end{array}$ (2) $\begin{array}{c} \text{CH}_3 \\ | \\ \text{H}-\text{C}-\text{N}_3 \\ | \\ \text{H}-\text{C}-\text{H} \\ | \\ \text{H}-\text{C}-\text{Cl} \\ | \\ \text{CH}_3 \end{array}$
- (3) $\begin{array}{c} \text{CH}_3 \\ | \\ \text{H}-\text{C}-\text{N}_3 \\ | \\ \text{H}-\text{C}-\text{H} \\ | \\ \text{Cl}-\text{C}-\text{H} \\ | \\ \text{CH}_3 \end{array}$ (4) $\begin{array}{c} \text{CH}_3 \\ | \\ \text{N}_3-\text{C}-\text{H} \\ | \\ \text{H}-\text{C}-\text{H} \\ | \\ \text{Cl}-\text{C}-\text{H} \\ | \\ \text{CH}_3 \end{array}$

61. A solution contain 62 g of ethylene glycol in 250 g of water is cooled upto -10°C . If K_f for water is $1.86 \text{ K kg mol}^{-1}$, then the amount of water (in g) separated as ice is

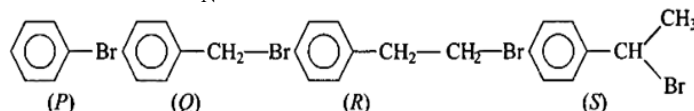
- (1) 48 (2) 16
 (3) 32 (4) 64

62. K_H value for $\text{Ar}(\text{g})$, $\text{CO}_2(\text{g})$, $\text{HCHO}(\text{g})$ and $\text{CH}_4(\text{g})$ are 40.39, 1.67, 1.83×10^{-5} and 0.413 respectively.

Arrange these gases in the order of their increasing solubility:

- (1) $\text{HCHO} < \text{CO}_2 < \text{CH}_4 < \text{Ar}$
 (2) $\text{Ar} < \text{CO}_2 < \text{CH}_4 < \text{HCHO}$
 (3) $\text{Ar} < \text{CH}_4 < \text{CO}_2 < \text{HCHO}$
 (4) $\text{HCHO} < \text{CH}_4 < \text{CO}_2 < \text{Ar}$

63. Rate of $\text{S}_{\text{N}}1$ reaction is:

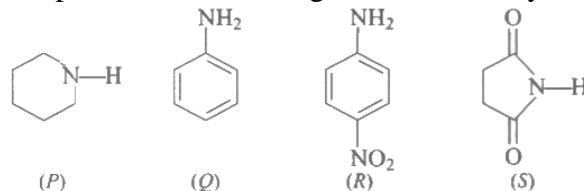


- (1) $\text{S} > \text{Q} > \text{R} > \text{P}$ (2) $\text{P} > \text{Q} > \text{R} > \text{S}$
 (3) $\text{S} > \text{R} > \text{P} > \text{Q}$ (4) $\text{S} > \text{R} > \text{Q} > \text{P}$

64. Which of the following reactions is an example of a redox reaction?

- (1) $\text{XeF}_2 + \text{PF}_5 \rightarrow [\text{XeF}]^+ + \text{PF}_6^-$
 (2) $\text{XeF}_4 + \text{O}_2\text{F}_2 \rightarrow \text{XeF}_6 + \text{O}_2$
 (3) $\text{XeF}_6 + 2\text{H}_2\text{O} \rightarrow \text{XeO}_2\text{F}_4 + 4\text{HF}$
 (4) $\text{XeF}_6 + \text{H}_2\text{O} \rightarrow \text{XeOF}_4 + 2\text{HF}$

65. Arrange the following nitrogen containing compounds in decreasing order of basicity:



- (1) $\text{R} > \text{Q} > \text{P} > \text{S}$ (2) $\text{S} > \text{R} > \text{Q} > \text{P}$
 (3) $\text{P} > \text{Q} > \text{S} > \text{R}$ (4) $\text{P} > \text{Q} > \text{R} > \text{S}$

66. In XeO_3F_2 , the number of bond pair(s), π - bond(s) and lone pair(s) on Xe atom respectively are:

- (1) 4, 2, 2 (2) 5, 2, 0
 (3) 5, 3, 0 (4) 4, 4, 0

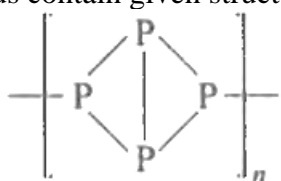
67. Which of the following statements is not correct?

- (1) Aliphatic amines are stronger bases than ammonia.
- (2) Aromatic amines are stronger bases than ammonia.
- (3) The alkyl group in alkyl ammonium ion more stabilizes the ion relative to the amine.
- (4) The aryl group in the aryl ammonium ion less stabilizes the ion relative to the amine.

68. A ball of mass 200 g is moving with a velocity of 10 m sec^{-1} . If the error in measurement of velocity is 0.1 %, the uncertainty in its position is:

- (1) $3.3 \times 10^{-27} \text{ m}$
- (2) $5.3 \times 10^{-25} \text{ m}$
- (3) $3.3 \times 10^{-31} \text{ m}$
- (4) $2.64 \times 10^{-32} \text{ m}$

69. Which of the following allotropic form of phosphorus contain given structure?



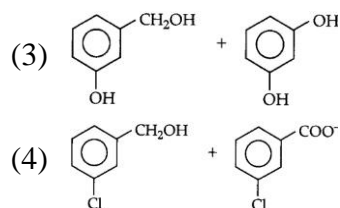
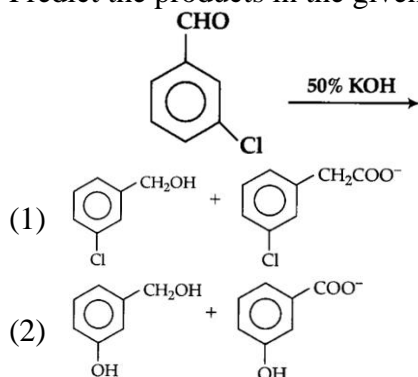
- (1) White phosphorus
- (2) Black phosphorus
- (3) Red phosphorus
- (4) Yellow phosphorus

70. For given energy, $E = 3.03 \times 10^{-19} \text{ Joules}$ corresponding wavelength is:

$$(h = 6.626 \times 10^{-34} \text{ Jsec}, c = 3 \times 10^8 \text{ m/sec})$$

- (1) 6.56 nm
- (2) 656 nm
- (3) 3.4 nm
- (4) 65.6 nm

71. Predict the products in the given reaction:



72. Formonitrile on treatment with ethyl magnesium chloride in presence of dry ether and subsequent hydrolysis gives _____.

- (1) propanone
- (2) butan - 2 - one
- (3) butanal
- (4) propanal

73. The group of molecules having identical shape is

- (1) PCl_5 , IF_5 , XeO_2F_2
- (2) BF_3 , PCl_3 , XeO_3
- (3) ClF_3 , XeOF_2 , XeF_3^+
- (4) SF_4 , XeF_4 , CCl_4

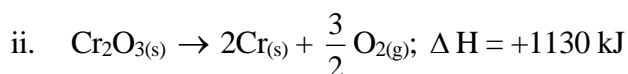
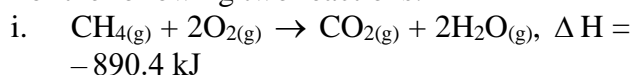
74. The reaction $\text{CH}_3\text{CONH}_2 \xrightarrow{\text{NaOBr}}$, gives:

- (1) CH_3NH_2
- (2) CH_3OBr
- (3) CH_4
- (4) CH_3Br

75. All of the following lists include at least one ionic compound except:

- (1) NO_2 , NaNO_2 , KNO_3
- (2) H_2S , SO_2 , SF_6
- (3) NaCl , MgCl_2 , SCl_2
- (4) CF_4 , CaF_2 , HF

76. For the following two reactions:



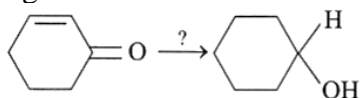
Which among the following statements is CORRECT?

- (1) Reaction (i) is exothermic and (ii) is endothermic
- (2) Both reactions are endothermic
- (3) Both reactions are exothermic
- (4) Reaction (i) is endothermic and (ii) is exothermic

77. The number of $p\pi - d\pi$ bonds in SO_3 molecule is:

- (1) 3
- (2) 2
- (3) 0
- (4) 1

78. For the adiabatic expansion of an ideal gas:
 (1) $TV^\gamma = \text{constant}$ (2) All of these
 (3) $TV^{\gamma-1} = \text{constant}$ (4) $PV^{1-\gamma} = \text{constant}$
79. The places that were left empty by Mendeleev were for:
 (1) aluminium and silicon
 (2) gallium and germanium
 (3) molybdenum and tungsten
 (4) arsenic and antimony
80. The ionization energy will be higher when the electron is removed from _____ if other factors being equal.
 (1) s - orbital (2) p - orbital
 (3) f - orbital (4) d - orbital
81. Among the following the most stable compound is
 (1) trans - 1, 3 - cyclohexanediol
 (2) - 1, 3 - cyclohexenediol
 (3) - 1, 2 - cyclohexanediol
 (4) - 1, 2 - cyclohexenediol
82. Rate of dehydration of alcohols follows the order:
 (1) $\text{CH}_3\text{OH} > 1^\circ > 2^\circ > 3^\circ$
 (2) $2^\circ > 1^\circ > \text{CH}_3\text{OH} > 3^\circ$
 (3) $2^\circ > 3^\circ > 1^\circ > \text{CH}_3\text{OH}$
 (4) $3^\circ > 2^\circ > 1^\circ > \text{CH}_3\text{OH}$
83. Predict the nature of reducing agent in the following reaction.



- (1) LiAlH_4 (2) H_2/Pt
 (3) NaBH_4 (4) LiAlH_4 and H_2/Pt
84. From the following data collected for the reaction $2\text{NO} + 2\text{H}_2 \rightarrow \text{N}_2 + 2\text{H}_2\text{O}$, calculate the concentration of NO when the concentration of H_2 is $6.2 \times 10^{-3} \text{ M}$ and the reaction rate is $3.7 \times 10^{-5} \text{ M/s}$.

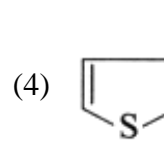
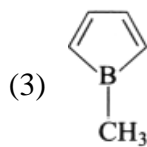
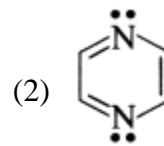
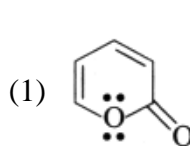
Experiment	$[\text{NO}]\text{M}$	$[\text{H}_2]\text{ (M)}$	Initial rate (M/s)
1	5×10^{-3}	2×10^{-3}	1.25×10^{-5}
2	1×10^{-2}	2×10^{-3}	5.00×10^{-5}
3	1×10^{-2}	4×10^{-3}	1.00×10^{-4}

- (1) $9.2 \times 10^{-1} \text{ M}$ (2) $4.9 \times 10^{-3} \text{ M}$
 (3) $2.4 \times 10^{-5} \text{ M}$ (4) $1.6 \times 10^{-2} \text{ M}$

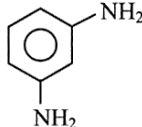
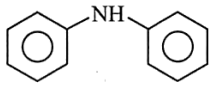
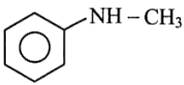
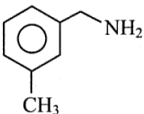
85. $\text{B}_3\text{N}_3\text{H}_6$ + solution of hydrochloric acid \rightarrow ?
 Select CORRECT about above reaction.
 (1) $\text{B}_3\text{N}_3\text{H}_6$ show addition reaction and produce $\text{B}_3\text{N}_3\text{H}_9\text{Cl}_3$ in which Cl is bonded to boron
 (2) $\text{B}_3\text{N}_3\text{H}_6$ show addition reaction and produce $\text{B}_3\text{N}_3\text{H}_9\text{Cl}_3$ in which Cl is bonded to nitrogen
 (3) $\text{B}_3\text{N}_3\text{H}_6$ show substitution reaction and produce $\text{B}_3\text{N}_3\text{Cl}_6$
 (4) No reaction

CHEMISTRY Section – B (Q. No. 86 to 100)

86. Chemical reaction occurs as a result of collisions between reacting molecules. Therefore, the reaction rate is given by:
 (1) total number of collisions occurring in a unit volume per second
 (2) total number of effective collisions
 (3) fraction of molecules which possess energy less than the threshold energy
 (4) fraction of molecules which possess energy more than the threshold energy
87. In diborane, the two H - B - H angles are nearly
 (1) $60^\circ, 120^\circ$ (2) $95^\circ, 150^\circ$
 (3) $90^\circ, 120^\circ$ (4) $120^\circ, 180^\circ$
88. Find out anti aromatic compound among the following:

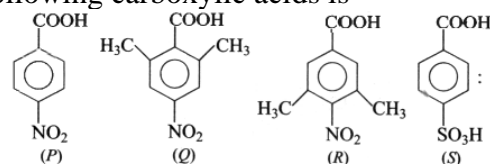


89. The correct order of atomic radii is
 (1) $\text{Ce} > \text{Eu} > \text{Ho} > \text{N}$ (2) $\text{Ho} > \text{N} > \text{Eu} > \text{Ce}$
 (3) $\text{Eu} > \text{Ce} > \text{Ho} > \text{N}$ (4) $\text{N} > \text{Ce} > \text{Eu} > \text{Ho}$

90. The IUPAC name of $(\text{CH}_3)_2\text{CH} - \text{CH} = \text{CH} - \text{CH} = \underset{\text{C}_2\text{H}_5}{\text{CH}} - \text{CH} - \text{CH}_3$ is
- 1, 1-dimethyl-6-ethylhepta-2,4-diene
 - 2-methyl-7-ethylocta-3,5-diene
 - 2,7-dimethylnona-3,5-diene
 - 2,7-dimethyl-2-ethylheptadiene
91. In which of the following pairs are both the ions coloured in aqueous solution?
(At. no.: Sc = 21, Ti = 22, Ni = 28, Cu = 29, Co = 27)
- Sc^{3+} , Co^{2+}
 - Ni^{2+} , Cu^{+}
 - Sc^{3+} , Ti^{3+}
 - Ni^{2+} , Ti^{3+}
92. Which one of the following elements shows maximum number of different oxidation states in its compounds?
- Gd
 - La
 - Am
 - Eu
93. DNA molecule is formed of:
- pentose sugar, phosphoric acid, pyrimidines and purines
 - pentose sugar, pyrimidines and purines
 - chloridepentose sugar, phosphoric acid and pyrimidines
 - pentose sugar, phosphoric acid and purines
94. Number of stereo-centers present in linear and cyclic structures of glucose are respectively.
- 5 and 5
 - 4 and 4
 - 5 and 4
 - 4 and 5
95. A metal solution treated with potassium ferrocyanide in the presence of NH_4OH gives white or bluish-white precipitate. The metal ion is _____.
- Zn^{2+}
 - Mn^{2+}
 - Fe^{3+}
 - Cu^{2+}
96. Which of the following will give both carbylamine and azo dye tests positive?
- 
 - 
 - 
 - 

97. Paper chromatography has mobile and stationary phases respectively.
- liquid and liquid
 - solid and liquid
 - gas and liquid
 - liquid and gas
98. Formation of which of the following complex indicates presence of sulphur in the organic compound when sodium nitroprus side is added to sodium extract of the compound?
- $\text{Na}_2[\text{Fe}(\text{NO})(\text{CN})_5]$
 - $\text{Na}_4[\text{Fe}(\text{CN})_5\text{NOS}]$
 - $\text{Fe}_4[\text{Fe}(\text{CN})_6]_3$
 - $\text{Fe}(\text{CNS})$
99. Number of electrons involved in the reduction of $\text{Cr}_2\text{O}_7^{2-}$ ion in acidic solution to Cr^{3+} is:
- 2
 - 3
 - 6
 - 4

100. The correct order of decreasing acid strength of following carboxylic acids is



- $\text{P} > \text{Q} > \text{R} > \text{S}$
- $\text{S} > \text{Q} > \text{P} > \text{R}$
- $\text{S} > \text{R} > \text{Q} > \text{P}$
- $\text{S} > \text{R} > \text{P} > \text{Q}$

BOTANY Section – A (Q. No. 101 to 135)

101. Identify the incorrect statement.
- Net primary productivity is the available biomass for the consumption to autotrophs.
 - Primary productivity depends on the inhabiting plant species, environmental factors, nutrient availability and photosynthetic capacity of plants.
 - Gross primary productivity minus respiration loss is the Net Primary Productivity (NPP).
 - The annual net primary productivity of the whole biosphere is approx. 170 billion tonnes of organic matter.
- Statement (b) is incorrect.
 - Statement (a) is incorrect.
 - Statement (d) is incorrect.
 - Statement (c) is incorrect.
102. Which of the following is example of class Sphenopsida?
- Selaginella
 - Lycopodium
 - Adiantum
 - Equisetum

103. Due to which pigment red algae are capable of surviving in deep - sea?
 (1) Carotenes (2) Chlorophyll - d
 (3) Phycoerythrin (4) Phycocyanin
104. The system of classification based on the floral structure, root modification and leaf venation etc., is called as:
 (1) Artificial system
 (2) Both Artificial system and Arbitrary system
 (3) Natural system
 (4) Arbitrary system
105. Which of the following is membrane bound vesicular structures formed by the process of packaging in the Golgi apparatus?
 (1) Ribosomes (2) Vacuoles
 (3) ER (4) Lysosomes
106. Which of the following present in chloroplasts?
 (1) Carotenoid
 (2) Amyloplasts
 (3) Chlorophyll
 (4) Both Chlorophyll and Carotenoid
107. Cell theory was proposed by
 (1) T.J. Schleiden and M.J. Schwann in 1838 only.
 (2) M.J. Schleiden and Theodore Schwann in 1838 and 1839 respectively.
 (3) M.J. Schleiden and Theodore Schwann in 1939 only.
 (4) Theodore Schwann and M.J. Schleiden in 1938 only.
108. During non -cyclic photophosphorylation, when electrons are lost from the reaction centre at PS II, what is the source which replaces these electrons?
 (1) Light (2) Water
 (3) Oxygen (4) Carbon dioxide
109. In photosynthesis, the light - independent reactions take place at:
 (1) Stromal matrix (2) Photosystem - II
 (3) Thylakoid lumen (4) Photosystem - I
110. A process that makes important difference between C_3 and C_4 plants is:
 (1) Photorespiration (2) Photosynthesis
 (3) Glycolysis (4) Transpiration
111. Stomata of CAM plants:
 (1) Never open
 (2) Open during the night and close at day
 (3) Are always open
 (4) Open during the day and close at night
112. Moll's half leaf experiment is to prove that:
 (1) CO_2 is necessary for photosynthesis
 (2) O_2 is released during photosynthesis
 (3) Chlorophyll is necessary
 (4) Organic substance is produced
113. DNA replication in bacteria occurs
 (1) just before transcription
 (2) during S phase
 (3) within nucleolus
 (4) prior to fission
114. Conidia are the asexual spores which are produced in:
 (1) Phycomycetes (2) Ascomycetes
 (3) Basidiomycetes (4) Deuteromycetes
115. What is the mode of nutrition in monera?
 (1) Photosynthetic (2) Heterotrophic
 (3) All of these (4) Chemosynthetic
116. Match the entities in column I with their character in column II:
- | Column I | Column II |
|---------------------|---|
| (a) Protozoans | (i) Red tides |
| (b) Slime molds | (ii) Diatomaceous earth |
| (c) Euglenoids | (iii) They are believed to be primitive relative of animals |
| (d) Chrysophytes | (iv) Pigments are identical to those present in higher plants |
| (e) Dinoflagellates | (v) Spores are dispersed by air currents |
- (1) (a)-(iii), (b)-(v), (c)-(iv), (d)-(ii), (e)-(i)
 (2) (a)-(iii), (b)-(v), (c)-(i), (d)-(iv), (e)-(ii)
 (3) (a)-(iii), (b)-(v), (c)-(iv), (d)-(i), (e)-(ii)
 (4) (a)-(ii), (b)-(iii), (c)-(v), (d)-(i), (e)-(iv)

117. Lichens are the associations of:

- (1) Fungus and algae
- (2) Algae and bacterium
- (3) Fungus and virus
- (4) Bacteria and fungus

118. The plants which can withstand with narrow and broad range of temperature tolerance respectively are:

- (1) Stenothermal and eurythermal
- (2) Stenothermal and monothermal
- (3) Monothermal and stenothermal
- (4) Stenothermal and mesothermal

119. If a colourblind woman marries with a normal man, the offspring will be:

- (1) All daughters normal and all son will be colourblind
- (2) All normal
- (3) All daughters will be colourblind and all sons will be normal
- (4) All colourblind

120. When a cross between a pure tall plant with green pod and a pure short plant with the yellow pod. How many short plants are produced in F_2 generation out of 16?

- (1) 3
- (2) 9
- (3) 4
- (4) 1

121. The monosomic condition in human beings depicted as XO is referred to as:

- (1) Criminal syndrome
- (2) Down's syndrome
- (3) Turner's syndrome
- (4) Klinefelter's syndrome

122. Which of the following crosses will give tall and dwarf pea plants in the same proportion?

- (1) $TT \times tt$
- (2) $TT \times Tt$
- (3) $tt \times tt$
- (4) $Tt \times tt$

123. Inheritance of skin colour in human is an example of:

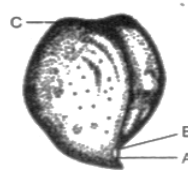
- (1) Polygenic inheritance
- (2) Point mutation
- (3) Co - dominance
- (4) Chromosomal aberration

124. **Assertion:** Statins is a blood - cholesterol lowering agents.

Reason: It inhibiting the enzyme responsible for synthesis of cholesterol.

- (1) Assertion and reason both are correct statements and reason is correct explanation for assertion.
- (2) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
- (3) Assertion is correct statement but reason is wrong statement.
- (4) Assertion is wrong statement but reason is correct statement.

125. Given diagram of a seed A, B and C represents:



- (1) Dicot, A - Radicle, B - Plumule, C - Cotyledon
- (2) Dicot, A - Micropyle, B - Hilum, C - Seed coat
- (3) Monocot, A - Micropyle, B - Hilum, C - Seed coat
- (4) Dicot, A - Hilum, B - Micropyle, C - Seed coat

126. Collenchyma is present in:

- (1) Xerophytes
- (2) Hydrophytes
- (3) Herbaceous plants
- (4) Lianas

127. Reverse transcription is:

- (1) RNA synthesized from DNA
- (2) DNA synthesized from RNA
- (3) DNA synthesized from RNA 3' to 5' end
- (4) RNA synthesized from DNA 3' to 5' end

128. What would happen if in a gene encoding a polypeptide of 50 amino acids, 25th codon (UAU) is mutated to UAA?

- (1) A polypeptide of 25 amino acids will be formed.
- (2) Two polypeptides of 24 and 25 amino acids will be formed.
- (3) A polypeptide of 49 amino acids will be formed.
- (4) A polypeptide of 24 amino acids will be formed.

129. Which of the following differences are incorrect between leading and lagging' strands of DNA?

Leading strand	Lagging strand
A. It does not requires DNA ligase for its growth	DNA ligase is required for joining Okazaki fragments
B. Formation of leading strand is slower	Formation of lagging strand is quite rapid
C. Its template opens in 5' → 3' direction	Its template opens in 3' → 5' direction
D. Formation of leading strand begins immediately at the beginning of replication	Formation of lagging strand begins a bit later than that of leading strand

- (1) B and C (2) B, C, and D
(3) A, B, and C (4) A and D

130. **Assertion (A):** India included in one of the 12 mega diversity countries of the world.

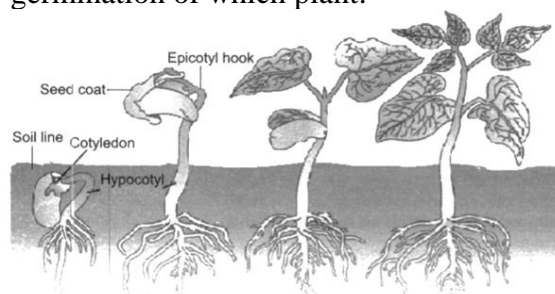
Reason (R): Probably more than 1,00,000 plant species and more than 3,00,000 animal species yetto be discovered and described from India.

- (1) Both A and R are true and R is the correct explanation of A.
(2) Both A and R are true but R is not the correct explanation of A.
(3) A is true but R is false.
(4) A is false but R is true.

131. Study the following statements regarding plant hormones and choose the correct option.

- Cytokinins are formed primarily in roots.
 - Auxin and cytokinin are antagonistic in apical dominance.
 - Kinetin (a modified DNA purine) was discovered from herring sperm.
 - Zeatin is auxin.
 - Zeatin was firstly extracted from herring.
- (1) (ii) and (v) (2) (iv) and (v)
(3) Only (iii) (4) (i), (ii) and (iii)

132. The given diagram shows the stages of seed germination of which plant:



- (1) Germination and seedling development in wheat
(2) Germination and seedling development in oat
(3) Germination and seedling development in rice
(4) Germination and seedling development in bean

133. The growth hormone responsible for apical dominance is:

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

134. Match the following columns.

Column I	Column II
A. Symbiotic nitrogen-fixing bacteria	(i). Mosquitoes
B. Dragonflies	(ii). Rhizobium
C. Bacillus thuringiensis	(iii). Azotobacter
D. Free-living n^2 -fixing bacteria	(iv). Butterfly, caterpillars

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

135. Which one of the following microbes forms symbiotic association with plants and helps them in their nutrition?

- (1) Trichoderma (2) Azotobacter
(3) Glomus (4) Aspergillus

BOTANY Section – B (Q. No. 136 to 150)

136. How will you represent a stable population?

- (1) As a pyramid with broad base.
- (2) A structure showing larger proportion of young individuals.
- (3) A pyramid showing large proportion of older individuals.
- (4) As a bell-shaped polygon.

137. Which of the following is an ectoparasite?

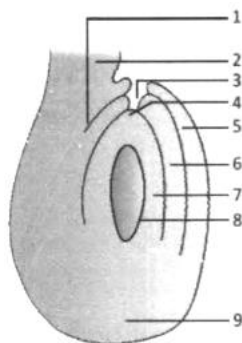
- (1) Lice on humans is an ectoparasite.
- (2) Mosquito
- (3) Cuckoo and crow
- (4) Mistletoe

138. Which one of the following statements is not true?

- A. Tapetum helps in the dehiscence of anther.
- B. Exine of pollen grains is made up of sporopollenin.
- C. Pollen grains of many species cause severe allergies.
- D. Stored pollen in liquid nitrogen can be used in the crop breeding programmes.

- (1) (D) (2) (A)
- (3) (B) (4) (C)

139. A diagrammatic view of a typical anatropous ovule is given above. In which of the following all five parts labelled as 1, 3, 5, 7 and 9 are correctly identified?



- (1) 1 - Hilum, 3 - Micropyle, 5 - Inner integument, 7 - Nucellus, 9 - Chalaza
- (2) 1 - Funicle, 3 - Micropyle, 5 - Outer integument, 7 - Embryo sac, 9 - Chalaza
- (3) 1 - Funicle, 3 - Micropyle, 5 - Nucellus, 7 - Embryo sac, 9 - Chalaza
- (4) 1 - Hilum, 3 - Micropyle, 5 - Outer integument, 7 - Nucellus, 9 - Chalaza

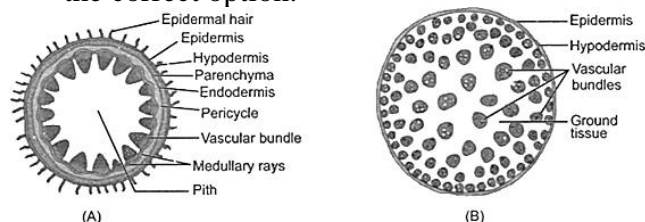
140. Cleistogamous flowers are

- (1) cross - pollinated
- (2) Both water- pollinated and cross - pollinated
- (3) self - pollinated
- (4) water – pollinated

141. Casparian strips are the characteristics of

- (1) Pericycle (2) Endodermis
- (3) Pith (4) Cortex

142. Identify given diagrams (A), (B), and choose the correct option.



- (1) (a) - Monocot - stem, (b) - Dicot - stem
- (2) (a) - Monocot - root, (b) - Dicot - root
- (3) (a) - Dicot - root, (b) - Monocot - root
- (4) (a) - Dicot - stem, (b) - Monocot - stem

143. Among the following characters, which one was not considered by Mendel in his experiments on pea?

- (1) Seed - Green or Yellow
- (2) Pod - Inflated or Constricted
- (3) Trichomes - Glandular or non - glandular
- (4) Stem - Tall or Dwarf

144. The daughters born to haemophilic father and normal mother could be

- (1) Carrier (2) All of these
- (3) Haemophilic (4) Normal

145. **Assertion:** Regulation of lac operon by a repressor is referred to as negative regulation.

Reason: Regulatory proteins can act both positively (activators) and negatively (repressors)

- (1) Assertion and reason both are correct statements and reason is correct explanation for assertion.
- (2) Assertion and reason both are correct statements but the reason is not a correct explanation for assertion.
- (3) Assertion is correct statement but reason is wrong statement.
- (4) Assertion is wrong statement but reason is correct statement.

146. Which of the following processes is used in the conversion of pyruvic acid to Acetyl CoA?

- (1) Oxidative dehydrogenation
- (2) Oxidative decarboxylation
- (3) Oxidative phosphorylation
- (4) Oxidative dehydration

147. The last or terminal cytochrome in the respiratory chain is:

- (1) Cyt a_3
- (2) Cyt b
- (3) Cyt c
- (4) Cyt a_1

148. Floridian starch is similar to structure of

- (1) Starch
- (2) Amylopectin
- (3) Protein
- (4) Lipids

149. Arrange the following events of meiosis in correct sequence:

- A. Crossing over
- B. Synapsis
- C. Terminisation of chiasmata
- D. Disappearance of nucleolus

- (1) (B), (C), (D), (A)
- (2) (B), (A), (D), (C)
- (3) (A), (B), (C), (D)
- (4) (B), (A), (C), (D)

150. Which of the following statements is correct?

- a. Animals can show mitotic divisions in both haploid and diploid cells.
- b. After S phase the number of chromosomes becomes double, i.e., $2n$ to $4n$.
- c. During the G_2 phase, proteins are synthesised in preparation for mitosis while cell growth continues.
- d. S or synthesis phase marks the period during which RNA synthesis takes place.

- (1) Statement c is correct.
- (2) Statement b is correct.
- (3) Statement a is correct.
- (4) Statement d is correct.

ZOOLOGY Section – A (Q. No. 151 to 185)

151. Tobacco consumption is known to stimulate secretion of adrenaline and noradrenaline. The component causing this could be:

- (1) Nicotine
- (2) Tannic acid
- (3) Catechin
- (4) Curaimin

152. Major factors that causes cancer are

- (1) MHC genes.
- (2) oncogenes and tumour suppressor genes.
- (3) cellular oncogenes and α -interferons.
- (4) oncogenes and polymorphonuclear leucocytes

153. Morphine is extracted from the:

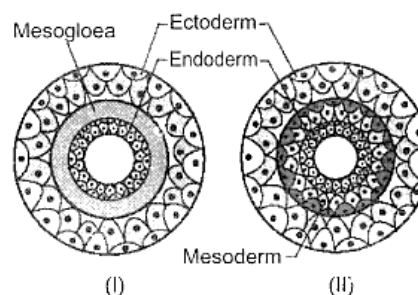
- (1) Amazonian coca
- (2) Inflorescences of the plant *Cannabis saliva*
- (3) *Erythroxylon coca*
- (4) Latex of poppy plant *Papaver somniferum*

154. Match the entities in Column I with their character in Column II.

Column I	Column II
(a) <i>Aplysia</i>	(i). Chiton
(b) <i>Dentalium</i>	(ii). Starfish
(c) <i>Chaetopleura</i>	(iii). Sea urchin
(d) <i>Asterias</i>	(iv). Sea hare
(e) <i>Echinus</i>	(v). Tusk shell

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

155. Given diagram shows the germ layer. Which of the following option is correct regarding germ layer and their examples?



- (1) I - Diploblastic - Platyhelminthes,
II - Triploblastic - Ctenophora
- (2) I - Diploblastic - Annelida,
II - Triploblastic - Arthropoda
- (3) I - Diploblastic - Coelenterata,
II - Triploblastic - Arthropoda
- (4) I - Diploblastic - Coelenterates,
II - Diploblastic - Ctenophora

156. Water vascular system is found in:
 (1) Echinodermata (2) Chordata
 (3) Arthropoda (4) Annelida
157. Open type of circulatory system found in:
 (1) Locusta (2) Balanoglossus
 (3) Saccoglossus (4) All of these
158. Choose the correct option/s for Hemichordata from given statements.
 i. The body is cylindrical and is composed of an anterior proboscis, a collar, and a long trunk.
 ii. The circulatory system is of open type.
 iii. Respiration takes place through gills.
 iv. Excretory organ is proboscis gland.
 v. They are dioecious, fertilisation is external and development is indirect.
 (1) (i), (ii), (iv) and (v)
 (2) All of these
 (3) (i), (iii) and (iv)
 (4) (iii), (iv) and (v)
159. Genus represents
 (1) A collection of plants or animals
 (2) Group of Differentially related species of plants or animals
 (3) An individual plant or animal
 (4) Group of closely related species of plants or animals
160. The amount of oxygen in tidal volume is approximately:
 (1) 100 ml (2) 500 ml
 (3) 3 liter (4) 1 liter
161. The ventilation movements of the lungs in mammals are governed by
 (1) Both diaphragm and costal muscles
 (2) muscular walls of lung
 (3) diaphragm
 (4) costal muscles
162. Air is breathed through:
 (1) Nose → Larynx → Pharynx → Bronchus → Alveoli → Bronchioles
 (2) Nostrils → Pharynx → Larynx → Trachea → Bronchi → Bronchioles → Alveoli
 (3) Trachea → Lungs → Larynx → Pharynx → Alveoli
 (4) Nose → Mouth → Lungs
163. The type of linkage present in carbohydrates is:
 (1) Phosphate bonds (2) Peptide
 (3) Glycosidic (4) Amide
164. **Assertion (A):** At least 60 percent of sperms produced must have a normal shape and size and at least 40 percent of them must show vigorous motility.
Reason (R): It is necessary for sperm viability.
 (1) Both A and R are true and R is the correct explanation of A.
 (2) Both A and R are true but R is not the correct explanation of A.
 (3) A is true but R is false.
 (4) A is false but R is true.
165. Three of the following statements about enzymes are correct and one is wrong. Which one is wrong?
 a. Enzymes require optimum pH for maximal activity.
 b. Enzymes are denatured at high temperature but in certain exceptional organisms they are effective even at temperatures 80° - 90°C.
 c. Enzymes are highly specific.
 d. Most enzymes are proteins but some are lipids.
 (1) Statement a is correct.
 (2) Statement d is correct.
 (3) Statement c is correct.
 (4) Statement b is correct.
166. The K_m value of the enzyme is the value of the substrate concentration at which the reaction reaches to:
 (1) zero (2) $\frac{V_{max}}{2}$
 (3) $4V_{max}$ (4) $2V_{max}$
167. Role of spleen in man is:
 (1) To control blood pressure
 (2) To help liver
 (3) Blood formation
 (4) To help kidneys

168. Which one is an unsaturated fatty acid?

- (1) Palmitic acid
- (2) Butyric acid
- (3) Linoleic acid
- (4) propanoic acid

169. Consider the following 3 statements regarding cockroach and mark the correct:

- i. The Head is formed by the fusion of 6 segments.
- ii. Mouth - parts are biting and chewing type.
- iii. The crop is the part of mid - gut.
- (1) Only i and ii are correct
- (2) Only iii is correct
- (3) Only ii is correct
- (4) Only ii and iii are correct

170. The phase of menstrual cycle in humans that can last for 7 - 8 days, is

- (1) Follicular phase (2) secretoryphase
- (3) luteal phase. (4) menstruation.

171. Which of the following cells during gametogenesis is normally diploid?

- (1) Primary polar body
- (2) Secondary polar body
- (3) Spermatogonia
- (4) Spermatid

172. The given figure represents a stage. of embryonic development. Identify the stage with its feature.



- (1) Ovary, produces female gamete and secretes hormones like oestrogen
- (2) Morula, formed by mitotic division of zygote
- (3) Secondary oocyte, implants on endometrial layer of uterus
- (4) Blastocysts, ready to fertilise with sperm

173. **Assertion (A):** Less iodine intake causes goiter.

Reason (R): Less iodine in the body, decreases thyroxine secretion.

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

(3) A is true but R is false.

(4) A is false but R is true.

174. Ultrafiltrate generated by the glomerulus is having all the constituent of the blood plasma except

- (1) RBC (2) protein
- (3) WBC (4) Glucose

175. Green glands are excretory organs of:

- (1) Crustaceans (2) Spiders
- (3) All of these (4) Mollusca

176. Counter - current mechanism helps to maintain a concentration gradient. This gradient helps in

- (1) inhibition of passage of water between the collecting tubule and medulla and so isotonic urine is formed.
- (2) easy passage of water from collecting tubule to interstitial fluid and thereby concentrating urine.
- (3) easy passage of water from medulla to collecting tubule and thereby concentrating urine.
- (4) easy passage of water from medullary interstitial fluid to collecting tubule and thereby diluting urine.

177. A unipolar neuron is a microscopic structure composed of all the following parts except:

- (1) Cell body (2) Soma
- (3) Dendrites (4) Axon

178. Plasmids are found in:

- (1) Bacteria (2) Bacteriophage
- (3) Yeast (4) Volvox

179. Nodes of Ranvier are:

- (1) The point in which the axon is exposed
- (2) Area in which the axons swell up
- (3) The point in which the axon is disposed
- (4) The contact point found over the non - myelinated nerve fibres

180. Which of the statements are correct about bioreactors?

- It provides all the optimal conditions for achieving the desired product by providing optimal growth conditions like temperature, pH, substrate, salt, vitamin, and oxygen.
 - It is well suited for large - scale production of microorganisms under aseptic conditions for a number of days
- (1) neither (i) nor (ii) (2) Only (i)
(3) Only (ii) (4) (i) and (ii)

181. Which one of the following is regarded as a natural genetic engineer?

- Klebsiella frosteri*
- Neurospora*
- Bacillus subtilis*
- Agrobacterium tumefaciens*

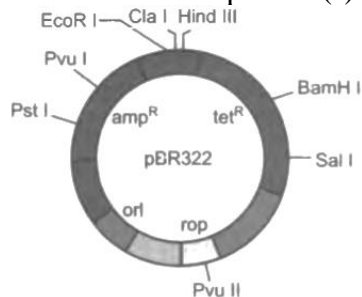
182. In a mixture, DNA fragments are separated by

- polymerase chain reaction
- bioprocess engineering
- restriction digestion
- electrophoresis

183. The taq polymerase enzyme is obtained from:

- Thermus aquaticus*
- Thiobacillus ferrooxidans*
- Pseudomonas putida*
- Bacillus subtilis*

184. The figure below is the diagrammatic representation of the *E. coli* vector pBR322. Which one of the given options correctly identifies its certain component (s)?



- rop - reduced osmotic pressure
- amp^R, tet^R - antibiotic resistance genes
- ori - original restriction enzyme
- Hind III, EcoRI - selectable markers

185. Select the odd one out method of birth control.

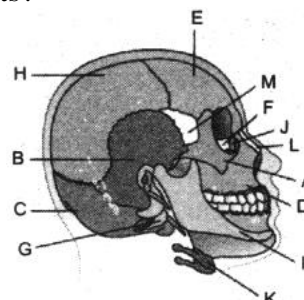
- Periodic abstinence.
- Oral administration of small doses of progestogen.
- Withdrawal
- Lactational amenorrhoea.

ZOOLOGY Section – B (Q. No. 186 to 200)

186. Mark the false statement for a related abbreviation

- ZIFT - Zygote formed in test tube, transferred into the fallopian tube
- GIFT - Only sperms or ovum are transferred into the fallopian tube of female
- ICSI - Sperm directly injected into the ovum
- IUI - Semen directly introduced into uterus

187. Here is a diagram of human skull A, B, C, D represents?



- A - Zygomatic bone, B - Temporal bone, C - Occipital bone, D - Maxilla
 - M - Ethmoid bone, J - Sphenoid bone, C - Occipital bone, D - Premaxilla
 - F - Zygomatic bone, H - Parietal bone, G - Occipital bone, D - Maxilla
 - K - Zygomatic bone, C - Temporal bone, F - Hyoid, D - Premaxilla
- Only B
 - Only A
 - Only C
 - Only D

188. The total number of ear bones in man is:

- 3
- 6
- 2
- 4

189. In gout patients, high level of which of the following is found in blood?

- Urea
- Cholesterol
- Uric acid
- Amino acid

190. **Assertion (A):** Cnidoblasts are present on the tentacles and the body in cnidarians.

Reason (R): Cnidoblasts are used for anchorage, defence and capture of the prey.

- (1) Both A and R are true and R is the correct explanation of A.
- (2) Both A and R are true but R is not the correct explanation of A.
- (3) A is true but R is false.
- (4) A is false but R is true.

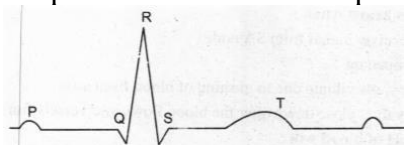
191. AIDS virus has:

- (1) Double stranded RNA
- (2) Single stranded RNA
- (3) Single stranded DNA
- (4) Double stranded DNA

192. Vector of filariasis is:

- (1) Female Anopheles
- (2) Male Anopheles
- (3) None of these
- (4) Both Female Anopheles and Male Anopheles

193. The diagram given here is the standard ECG of a normal person. The P - wave represents the:



- (1) Initiation of the ventricular contraction
- (2) Contraction of both the atria
- (3) Beginning of the systole
- (4) End of systole

194. Doctors use stethoscope to hear the sound; produced during each cardiac cycle. The second sound is heard when:

- (1) Ventricular walls vibrate due to gushing of blood from atria
- (2) AV valves open up
- (3) AV node receives signal from SA node
- (4) Semilunar valves close down after the blood flows into vessels from ventricles

195. Which of the following disease caused by virus?

- (1) Tetanus
- (2) None of these
- (3) Dysentery
- (4) Typhoid

196. Vital capacity of lungs of an average human is:

- (1) 3000 - 4500 ml
- (2) 500 - 1000 ml
- (3) 2000 - 2500 ml
- (4) 1500 - 1800 ml

197. Select the favourable conditions required for the formation of oxyhaemoglobin at the alveoli.

- (1) High pO_2 , high pCO_2 , less H^+ , higher temperature
- (2) Low pO_2 , high pCO_2 , more H^+ , higher temperature
- (3) High pO_2 , low pCO_2 , less H^+ , lower temperature
- (4) Low pO_2 , low pCO_2 , more H^+ , higher temperature

198. Which hormone increase secretion of HCl from parietal cells of stomach?

- (1) GIP
- (2) Enterokinase
- (3) Secretin
- (4) Gastrin

199. A hormone promoting RBCs production is secreted by:

- (1) Liver
- (2) Spleen
- (3) Bone marrow
- (4) Kidney

200. The hormone regulating Leydig cells and their hormone androgen:

- (1) ACTH
- (2) ICSH
- (3) FSH
- (4) TSH

SPACCE FOR ROUGH WORK