Test Booklet Code

H6

AAYAM

No.: 07052023

This booklet contains 48

Do not open this booklet until you are aksed to do

Important Instructions :

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 ORIGINAL copy carefully with blue/black ball point pen only.
2. The test is of 3 Hours 20 minutes 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 consists 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 sucject.**

   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 Bill Point Pen only for writing particulars on this page/marking responses on Answer Sheet.
5. Rough work is to be done in the space provided for this purspose in the Booklet only.
6. On completion of the test, the candidate must hand over the Answer Sheet (ORIGNAL and OFFICE Copy) to the Invigilator before leaving the Room/Hall. The candidates are allowed to take away this Test Booklet with them.
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7. The CODE for this Booklet is A11. 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.
8. 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.
9. Use of white fluid for correction is NOT permissible on the Answer Sheet.
10. Each candidate must show on-demand his/her Admit Card to the Invigilator.
11. No candidate, without special permission of the centre Superintendent or Invigilator, would leave his/her seat.
12. The candidates should not leave the Examination Hall without handing over their Answer Sheet to the Invigilator o 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.
13. Use of Electronic/Manual Calculator is prohibited.
14. The candidates are governed by all Rules and Regulations of the examination with regard to their conduct in the Examination Room/Hall. All cases of unfair means will be dealt with as per the Rules and Regulations of this examination.
15. No part of the Test Booklet and Answer Sheet shall be detached under any circumstances.
16. The candidates will write the Correct Test Booklet Code as given in the Test Booklet/Answer Sheet in the Attendance Sheet.
17. Compensatory time of one hour five minutes will be provided for the examination of three hours and 20 minutes duration, whether such candidate (having a physical limitation to write) uses the facility of scribe or not.

Name of the Candidate (in Capitals) : _____

Roll Number : in figure : _____ in words : _____

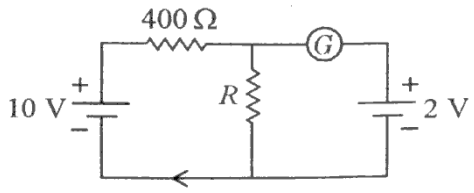
Centre of Examination (in Capitals) : _____

Candidate's Signature :_____ Invigilator's Signature:_____

Facsimile signature stamp of Centre Superintendent :_____

Physics : Section - A (1–35)

1. If the galvanometer G does not show any deflection in the circuit shown, the value of R is given by :



(1) 100 Ω (2) 400 Ω

(3) 200 Ω (4) 50 Ω

2. let a wire be suspended from the ceiling (rigid support) and stretched by a weight W attached at its fre end. The longitudinal stress at any point of cross–sectional are A of the wire is :

(1) W/2.A (2) zero

(3) 2W/A **(4) W/A**

3. The work functions of Caesium (Cs), Potassium (K) and Sodium (Na) are 2.14 eV, 2.30 eV and 2.75 eV respectively. If incident electromagnetic radiation ha an incident energy of 2.20 eV, which of these photosensitive surfaces may emit photoelectrons ?

(1) K only (2) Na only

(3) Cs only (4) Both Na and K

4. The venturi–meter works on :

(1) The principle of parallel was

(2) The principle of perpendicular axes

(3) Huygen's principle

(4) Bernoulli's principle

5. The potential energy of a long spring when strethched by 2 cm is U. If the spring is stretched by 8 cm, potential energy stored in it will be

(1) 8U **(2) 16U**

(3) 2U (4) 4U

6. The temperature of a gas is -50^0C. To what temperature the gas should be heated so that the rms speed is increased by 3 times ?

(1) 3097 K (2) 223 K

(3) 669^0 C **(4) 3295^0 C**

7. The amount of energy required to forma soap bubble of radius 2 cm from a soap solution is nearly : (surface tensoin of soap solution = 0.03 N m^{-1})

(1) 3.01×10^{-4} J (2) 50.1×10^{-4} J

(3) 30.16×10^{-4} J (4) 5.06×10^{-4} J

8. The ratio of radius of gyration of a solid sphere of mass M and radius R about its own axis to the radius of gyration of the thin hollow sphere of same mass and radius about its axis is :

(1) 2 : 5 (2) 5 : 2

(3) 3 : 5 (4) 5 : 3

(None of these)

9. A bullet if fired from a gun at the speed of 280 ms^{-1} in the direciotn 30^0 above the horizontal. The maximum height attained by the bullet is (g = 9.8 ms^{-2}, sin 30^0 = 0.5) :

(1) 1000 m (2) 3000 m

(3) 2800 m (4) 2000 m

10. In a plane electromagnetic wave travelling in free space, the elctric field component oscillates sinusoidally at a frequency of 2.0×10^{10} Hz and amplitude 48 Vm^{-1}. Then the amplitude of oscillating magnetic field is : (Speed of light in free space = 3×10^8 ms^{-1})

(1) 1.6×10^{-7}T (2) 1.6×10^{-6}T

(3) 1.6×10^{-9}T (4) 1.6×10^{-8}T

11. The net magnetic flux through any closed surface is :

(1) Infinity (2) Negative

(3) Zero (4) Positive

12. A Carnot engine has an efficiency of 50% when its source is at a temperature 327^0 C. The temperature of the sink is :

(1) 100^0C (2) 200^0C

(3) 27^0C (4) 15^0C

13. A full wave rectifier circuit consits of two p–n juction diodes, a centre tapped transformer, capacitor and load resitance. Which of these components remove the ac ripple from the rectified output ?

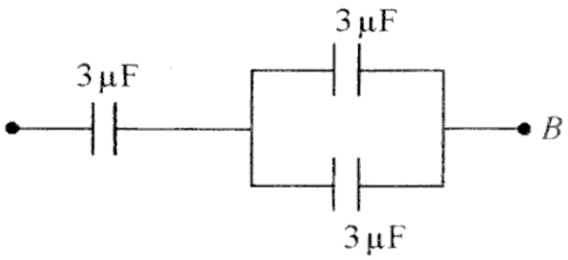
(1) Capacitor

(2) Load resistance

(3) A centre tapped transformer

(4) p–n junction diodes

14. The equivalent capacitance of the system shown in the following circuit is



(1) 6 μF (2) 9 μF

(3) 2 μF (4) 3 μF

15. In a series LCR circuit, the inductance L is 10 mH, capacitance C is 1 μF and resistance R is 100 Ω . The frequency at which resonance occurs is :

(1) 1.59 rad/s

(2) 1.59 kHz

(3) 15.9 rad/s

(4) 15.9 kHz

16. If $\oint_S \vec{E} \cdot \vec{dS} = 0$ over a surface, then :

(1) All the charges must necessarily be inside the surface.

(2) The electric field inside the surface is necessarily uniform.

(3) The number of flux lines entering the surface must be equal to the number of flux lines leaving it.

(4) The magnitude of electric field on the surface is cosntant.

17. An electric dipole is placed at an angle of 30^0 with an electric field of intensity $2\times10^5 \text{N C}^{-1}$. It experiences a torque equal to 4 N m. Calculate the magnitude of charge on the diple, if the dipole length is 2 cm.

(1) 4 mC **(2) 2 mC**

(3) 8 mC (4) 6 mC

18. A football player is moving southward and suddenly turns eastwards with the same speed to avoid and opponent. The force that acts on the player while turing is :

(1) along north–east

(2) along south–west

(3) along east–ward

(4) along north–ward

19. The magnetic energy stored in an inductor of inductance 4 μh carrying a current of 2 A is :

(1) 8 m J **(2)** 8 μJ

(3) 4 μJ (4) 4 m J

20. Resistance of a carbon resistor determined from colour codes is $(22000 \pm 5\%)\Omega$. The colour of third bond must be

(1) Orange (2) Yellow

(3) Red (4) Green

21. Light travels a distance x in time t_1 in air and 10x in time t_2 in another denser medium. What is the critical angle for this medium ?

(1) $\sin^{-1}\left(\frac{t_2}{10t_2}\right)$ **(2)** $\sin^{-1}\left(\frac{10t_1}{t_2}\right)$

(3) $\sin^{-1}\left(\frac{t_2}{t_1}\right)$ (4) $\sin^{-1}\left(\frac{10t_2}{t_1}\right)$

22. For Young's double slit experiment, two statements are given below.

Statement I : If screen is moved away from the plane of slits, angular separation of the fringes remains constant.

Statement II : If the monochromatic source is replaced by another monochromatic source of larger wavelength, the angular sepration of fringes decreases.

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

(1) Statement I is true but Statement II is false.

(2) Statement I is false but Statement II is true.

(3) Both Statement I and Statement II are true.

(4) Both Statement I and Statement II are false.

23. The half of the radioactive substance is 20 minutes. In how much time, the activity of substance drops to $\left(\frac{1}{16}\right)^{th}$ of its initial value ?

(1) 60 minutes **(2) 80 minutes**

(3) 20 minutes (4) 40 minutes

24. The errors in the measurement which arise due to unpredictable fluctuations in tempeature and voltage supply are :

(1) Least count error

(2) Random errors

(3) Instruments errors

(4) Personal errros

25. The angular acceleration of a body, moving along the circumference of a circle, is :

(1) Along the tangent to its position

(2) Along the axis of rotation

(3) Along the radius, away from centre

(4) Along the radius towards the centre

26. An ac source is connected to a capacitor C, due to decrease in its operating frequency :

(1) Displacement current decreases.

(2) Capacitive reactance remains constant.

(3) Capacitive reactance decreases.

(4) Displacement current increaes.

27. The ratio of frequencies of fundamental harmonic produced by an open pipe to that of closed piple having the same length is :

(1) 1 : 3

(2) 3 : 1

(3) 1 : 2

(4) 2 : 1

28. In hydrogen spectrum, the shortest wavelength in the Balner series is λ . The shortest wavelength in the Bracket series is :

(1) 9λ (2) 16λ

(3) 2λ **(4)** 4λ

29. Given below are two statements :

Statement I : Photovoltaic devices can convert optical radiation into electricity.

Statement II : Zener diode is designed to operate under reverse bias in breakdown region.

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

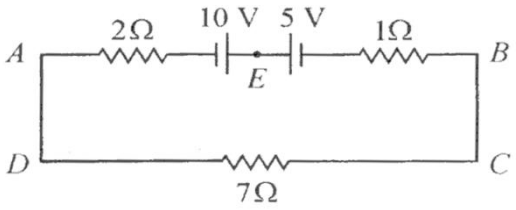
(1) Statement I is correct but Statement II is incorrect.

(2) Statement I is incorrect but Statement II is incorrect.

(3) Both Statement I and Statement II are correct.

(4) Both Statement I and Statement II are incorrect.

30. The magnitude and direction of the current in the following circuit is



(1) $\frac{5}{9}$ A from A to B through E

(2) 1.5 A from B to A through E

(3) 0.2 A from B to A through E

(4) 0.5 A from A to B through E

31. Two bodies of mass m and 9m are placed at a distance R. The gravitational potential on the line joinng the bodies where the gravitational field equals zero, will be (G = gravitational constant)

(1) $-\frac{16\ Gm}{R}$ (2) $-\frac{20\ Gm}{R}$

(3) $-\frac{8\ Gm}{R}$ (4) $-\frac{12\ Gm}{R}$

32. A metal wire has mass (0.4 ± 0.002) g, radius (0.3 ± 0.001) mm and length (5 ± 0.02) cm. The maximum possible percentage error in the measurement of density will nearly be :

(1) 1.6 % (2) 1.4 %

(3) 1.2 % (4) 1.3 %

33. A vehicle travels half the distance with speed ϑ nd the remaining distance with speed 2ϑ. Its average speed is :

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

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

34. A 12 V, 60 W lamp is connected to the secondary of a step down transformer, whose primary is connected to ac mains of 220 V. Assuming the transformer to be ideal, what is the current in the primary winding ?

(1) 3.7 A (2) 0.37 A

(3) 0.27 A (4) 2.7 A

35. The minimum wavelength of X–rays produced by an electron accelerated through a potential difference of V volts is proportional to :

(1) $\frac{1}{\sqrt{V}}$ (2) V^2

(3) $\sqrt{V}$ **(4)** $\frac{1}{V}$

Physics : Section - B (36–50)

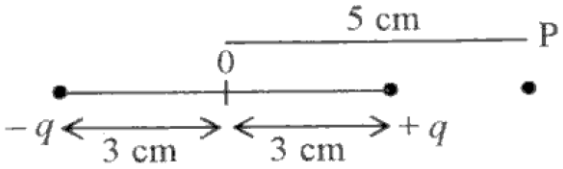
36. The resistance of platinum wire at 0^0C is 2Ω and 6.8Ω at 80^0C. The temperature coefficient of resistance of the wire is :

(1) $3\times10^{-2}\ {}^{o}C^{-1}$ (2) $3\times10^{-1}\ {}^{o}C^{-1}$

(3) $3\times10^{-4}\ {}^{o}C^{-1}$ (4) $3\times10^{-3}\ {}^{o}C^{-1}$

37. An electric dipole is placed as shown in the figure :

The electric potential (in 10^2V) at point P due to the dipole is (ϵ_0 = permittivity of free space and $\frac{1}{4\pi\epsilon_0} = K$) :



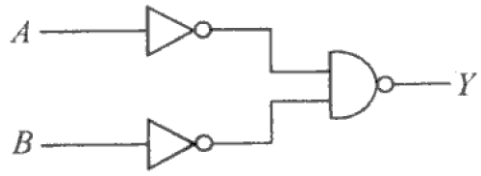
(1) $\left(\frac{8}{5}\right)$qK

(2) $\left(\frac{8}{3}\right)$qK

(3) $\left(\frac{3}{8}\right)$qK

(4) $\left(\frac{5}{8}\right)$qK

38. For the folloiwng logic circuit, the truth table is :



(1)

A	B	Y
0	0	1
0	1	0
1	0	1
1	1	0

(2)

A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1

(3)

A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0

(4)

A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1

39. A very long conducting wire is bent in a semi–circular shape from A to B as shown in figure. The magnetic field at point P for steady current configuration is given by :

(1) $\frac{\mu_0 i}{4R}\left[1-\frac{2}{\pi}\right]$ **pointed away from page**

(2) $\frac{\mu_0 i}{4R}\left[1-\frac{2}{\pi}\right]$ point into the page

(3) $\frac{\mu_0 i}{4R}$ pointed into the page

(4) $\frac{\mu_0 i}{4R}$ pointed away from the page

40. Two thin lenses are of same focal lengths (f), but one is convex, and the other one is concanve. When they are placed in contact with each other, the equivalent focal length of the combination will be :

(1) f/2 **(2) infinite**

(3) zero (4) f/4

41. The radisu of inner most orbit of hydrogen atom is 5.3×10^{-11}m. What is the radius of third allowed orbit of hydrogen atom ?

(1) 1.591.59 $\mathring{A}$ **(2)** 4.77 $\mathring{A}$

(3) 0.53 $\mathring{A}$ (4) 1.06 $\mathring{A}$

42. Calculate the maximum acceleration of a moving car so that a body lying on the floor of the car remains stationary. The coefficient of static friction beteween the body and the floor is 0.15 (g = 10 ms^{-2}).

(1) 1.5 ms^{-2} (2) 50 ms^{-2}

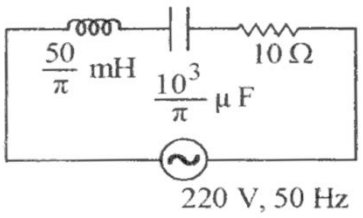
(3) 1.2 ms^{-2} (4) 150 ms^{-2}

43. A satellite is orbitting just above the surface of the earth with period T. If d is the density of the earth and G is the universal cosntant of gravitation, the quantity $\frac{3\pi}{Gd}$ represents :

(1) T_3 (2) $\sqrt{T}$

(3) T **(4) T^2**

44. The net impedance of circuit (as shown in figure) will be :



(1) $5\sqrt{5}\ \Omega$ (2) 25 Ω

(3) $10\sqrt{2}\ \Omega$ (4) 15 Ω

45. 10 resistors, each of resistance R are connected in series to a battery of emF E and negligible internal resistance. Then those are connected in parallel to the same battery, the current is increased n times. The value of n is

(1) 1

(2) 1000

(3) 10

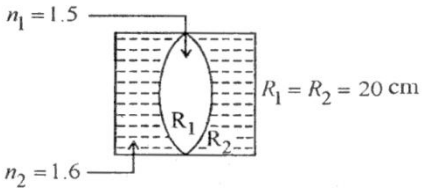
(4) 100

46. A horizontal bridge is built across a river. A student on the bridge throws a small hall vertically upwards with a velocity 4 ms^{-1}. The ball strikes the water surface water after 4s. The height of bridge above water surface is (Take g = 10 ms^{-2}) :

(1) 64 m (2) 68 m

(3) 56 m (4) 60 m

47. In the figure shown here, what is the equivalent focal length of the combination of lenses (Assume that all layers are thin) ?



(1) –100 cm (2) –50 cm

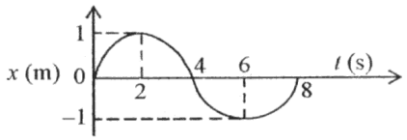
(3) 40 cm (4) –40 cm

48. A wire carrying a current I along the positive x–axis has length L. It is kept in magnetic field $\vec{B} = (2\hat{i} + 3\hat{j} - 4\hat{k})T$. The magnitude of the magnetic force acting on the wire is :

(1) 5 IL (2) $\sqrt{3}$ IL

(3) 5 IL (4) $\sqrt{5}$ IL

49. The x–t graph of a particle performing simple harmonic motion is shown in the figure. The acceleration of the particle at t = 2 s is :



(1) $\frac{\pi^2}{16} ms^{-2}$ **(2)** $-\frac{\pi^2}{16} ms^{-2}$

(3) $\frac{\pi^2}{8} ms^{-2}$ (4) $-\frac{\pi^2}{8} ms^{-2}$

50. A bullet from a gun is fired on a rectangular wooden block with velocity u. When bullet travels 24 cm through the block along its length horizontally, velocity of bullet becomes $\frac{u}{3}$. Then it further penetrates into the block in the same direction before coming to rest exactly at the other end of the block. The total length of the block is :

(1) 28 cm (2) 30 cm

(3) 27 cm (4) 24 cm

Chemistry : Section A (Q. 51 to 85)

51. Given below are two statements :

Statements I : A unit formed by the attachment of a base to 1' position of sugar is known as nucleoside

Statements II : When nuclesoside is linked to phosphorous acid at 5'-position of sugar moiety, we get nucleotide.

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

(1) Statement I is true but Statement II is false.

(2) Statement I is false but Statement II is true.

(3) Both Statement I and Statement II is true.

(4) Both Statement I and Statement II is false.

52. The conductivity of centimolar solution of KCl at 25°C is 0.0210 ohm^{-1} cm^{-1} and the resistance of the cell containing the solution at 25°C is 60 ohm. The value of cell constant is -

(1) 1.26 cm^{-1} (2) 3.34 cm^{-1}

(3) 1.34 cm^{-1} (4) 3.28 cm^{-1}

53. The correct order of energies of molecular orbitals of N_2 molecule, is :

(1) $\sigma 1s < \sigma^* ls < \sigma 2s < \sigma^* 2s < \sigma 2p_z < \sigma^* 2p_z < (\pi 2p_x = \pi 2p_y) < (\pi^* 2p_x = \pi^* 2p_y)$

(2) $\sigma 1s < \sigma^* ls < \sigma 2s < \sigma^* 2s < (\pi 2p_x = \pi 2p_y) < (\pi^* 2p_x = \pi^* 2p_y) < \sigma 2p_z < \sigma^* 2p_z$

(3) $\sigma 1s < \sigma^* ls < \sigma 2s < \sigma^* 2s < (\pi 2p_x = \pi 2p_y) < \sigma 2p_z < (\pi^* 2p_x = \pi^* 2p_y) < \sigma^* 2p_z$

(4) $\sigma 1s < \sigma^* ls < \sigma 2s < \sigma^* 2s < \sigma 2p_z < (\pi 2p_x = \pi 2p_y) < (\pi^* 2p_x = \pi^* 2p_y) < \sigma^* 2p_z$

54. The number of σ bonds, π bonds and lone pair of electrons in pyridine, respectively are :

(1) 11, 3, 1 (2) 12, 2, 1

(3) 11, 2, 0 (4) 12, 3, 0

55. The element expected to form largest ion to achieve the nearest noble gas configuration is :

(1) N (2) Na

(3) O (4) F

56. Given below are two statements : one is labeled as Assastion A and the other is labeled as Reason R :

Assertion A **:** Helium is used to dilute oxygen in diving apparatus.

Reasons R : Helium has high solubility in O_2. In the ligh of the above statements, choose the correct answer from the options given below :

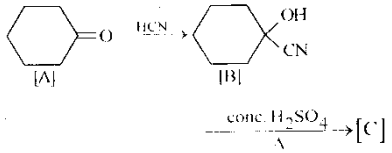
(1) A is true but R is false.

(2) A is false but R is true.

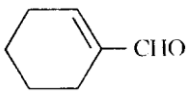
(3) Both A and R are true and R is the correct explanation of A.

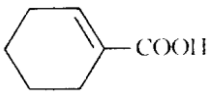
(4) Both A and R are true and R is not the correct explanation of A.

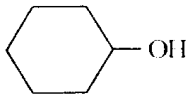
57. Complete the following reaction :

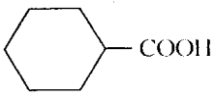


[C] is ____ .

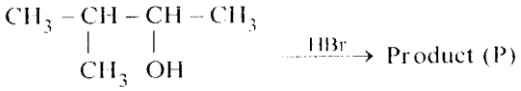
(1) 

(2) 

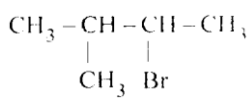
(3) 

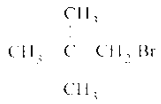
(4) 

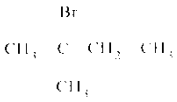
58. Consider the following reaction and identify the product (P).

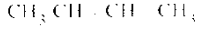


3 – Methylbutan – 2 – ol

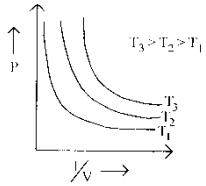
(1) 

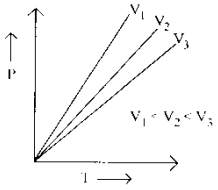
(2) 

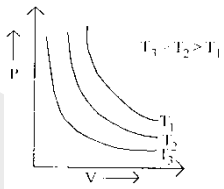
(3) 

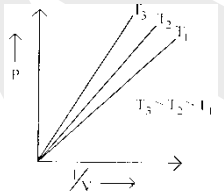
(4) 

59. Which amongst the following options is correct graphical representation of Boyle's Law?

(1) 

(2) 

(3) 

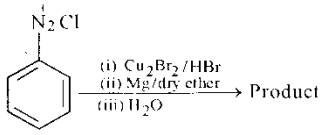
(4) 

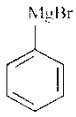
60. Taking stability as the factor, which one of the following represents correct relationship?

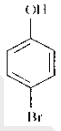
(1) $AlC > AlCl_3$ (2) $TlI > TlI_3$

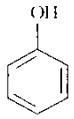
(3) $TlCl_3 > TlCl$ **(4)** $InI_3 > InI$

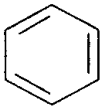
61. Identify the product in the following reaction :



(1) 

(2) 

(3) 

(4) 

62. Homoleptic complex from the following complexes is :

(1) Pentaamminecarbonatocobalt (III) chloride

(2) Triamminetriaquachromium (III) chloride

(3) Potassium trioxalatoaluminate (III)

(4) Diamminechloridonitrito – N – platinum (II)

63. Inttermolecular forces are forces of attraction and repulsion between interacting particles that will include :

A. dipole – dipole forces.

B. dipole – induced dipole forces.

C. hydrogen bonding.

D. covalent bonding.

E. dispersion forces.

Choose the most appropriate answer from the options given below :

(1) A, B , C, E are correct.

(2) A, C, D, E are correct.

(3) B, C, D, E are correct.

(4) A, B, C, D are correct.

64. The stability of Cu^{2+} is more than Cu^{+} salts in aqueous solution due to -

(1) hydration energy.

(2) second ionization enthalpy.

(3) first ionization enthalpy.

(4) enthalpy of atomization.

65. Match List – I with List – II

	List – I		**List – II**
A.	Coke	**I.**	Carbon atoms are sp^3 hybridised.
B.	Diamond	**II.**	Used as a dry lubricant
C.	Fullerene	**III.**	Used as a reducing agent
D.	Graphite	**IV.**	Cage like molecules

Choose the correct answer from the options given below :

(1) A – III, B – I, C – IV, D - II

(2) A – III, B – IV, C – I, D - II

(3) A – II, B – IV, C – I, D - III

(4) A – IV, B – I, C – II, D - III

66. Which of the following statements are not correct?

A. Hydrogen is used to reduce heavy metal oxides to metals.

B. Heavy water is used to study reaction mechanism.

C. Hydrogen is used to make saturated fats from oils.

D. The H-H bond dissociation enthalpy is lowest as compared to a single bond between two atoms of any element.

E. Hydrogen reduces oxides of metals that are more active than iron.

Choose the most appropriate answer from the options given below :

(1) D, E only (2) A, B, C only

(3) B, C, D, E only (4) B, D only

67. The right option for the mass of CO_2 produced by heating 20 g of 20% pure limestone is

(Atomic mass of Ca = 40)

$\left[CaCO_3 \xrightarrow{1200K} CaO + CO_2\right]$

(1) 2.64 g (2) 1.32 g

(3) 1.12 g **(4) 1.76 g**

68. Given below are two statements : one is labeled as Assertion A and the other is labeled as Reason R :

Assertion A : In equation $\Delta_rG = -nFE_{cell}$, value of Δ_rG delpends on n.

Reason R : E_{cell} is an intensive property and Δ_rG is an extensive property.

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

(1) A is true but R is fasle.

(2) A is false but R is true.

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

(4) Both A and R are true and R is not the correct explanation of A.

69. Select the correct statements form the following :

A. Atoms of all elements are composed of two fundamental particles.

B. The mass of the electron is 9.10939×10^{-31} kg.

C. All the isotopes of a given element show same chemical properties.

D. Protons and electrons are collectively known as nucleons.

E. Dalton's atomic theory, regarded the atom as an ultimate particle of matter.

Choose the correct answer from the options given below :

(1) A and E only **(2) B, C and E only**

(3) A, B and C only (4) C, D and E only

70. For a certain reaction, the rate = $k[A]^2[B]$, when the initial concentration of A is tripled keeping concentration of B constant, the initial rate would

(1) increase by a factor of nine.

(2) increase by a factor of three.

(3) decrease by a factor of nine.

(4) increase by a factor of six.

71. Given below are two statements : one is labeled as Assertion A and the other is labeled as Reason R :

Assertion A : A reaction can have zero activiation energy.

Reason R : The minimum extra amount of energy absorbed by reactant molecules so that their energy becomes equal to threshold value, is called activiation energy.

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

(1) A is true but R is false.

(2) A is false but R is true.

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

(4) Both A and R are the true and R is not the correct explanation of A.

72. Which of the following reactions will not give primary amine as the product?

(1) $CH_3NC \xrightarrow[(ii)\ H_3O^{\oplus}]{(i)\ LiAlH_4} Product$

(2) $CH_3CONH_2 \xrightarrow[(ii)\ H_3O^{\oplus}]{(i)\ LiAlH_4} Product$

(3) $CH_3CONH_2 \xrightarrow{Br_2,\ KOH} Product$

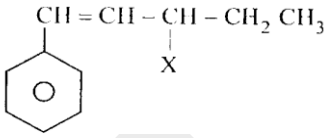
(4) $CH_3CN \xrightarrow[(ii)\ H_3O^{\oplus}]{(i)\ LiAlH_4} Product$

73. Some tranquilizers are listed below. Which one from the following belongs to barbiturates?

(1) Valium **(2) Veronal**

(3) Chlordiazepoxide (4) Meprobamate

74. The given compound



is an example of

(1) allylic halide (2) vinylic halide

(3) Benzylic halide (4) aryl halide

75. Weight (g) of two moles of the organic compound, which is obtained by heating sodium ethanoate with sodium hydroxide in presence of calcium oxide is :

(1) 30 (2) 18

(3) 16 **(4) 32**

76. a compound is formed by two elements A and B. The element B forms cubic close packed structure and atoms of A occupy 1/3 of tetrahedral voids. If the formula of the compound is A_xB_y, then the value of x + y is in option

(1) 3 (2) 2

(3) 5 (4) 4

77. Amongst the given options which of the following molecules / ion acts as a Lewis acid?

(1) BF_3 (2) OH^-

(3) NH_3 (4) H_2O

78. In Lassaigne's extract of an organic compound, both nitrogen and sulphur are present, which gives blood red colour with Fe^{3+} due to the formation of -

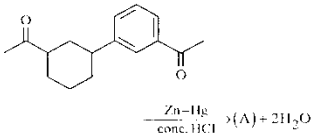
(1) $[Fe(CN)_5NOS]^{4-}$

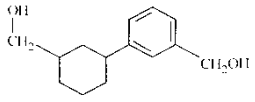
(2) $[Fe(SCN)]^{2+}$

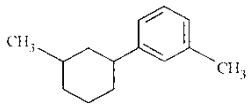
(3) $Fe_4[Fe(CN)_6]_3 . x\ H_2O$

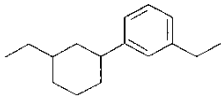
(4) NaSCN

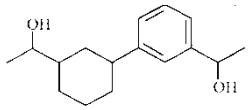
79. Identify product (A) in the following reaction :



(1) 

(2) 

(3) 

(4) 

80. Given below are two statements : one is labeled as Assertion A and the other is labeled as Reason R :

Assertion A : Metallic sodium dissolves in liquid ammonia giving a deep blue solution, which is paramagnetic.

Reason R : The deep blue solution is due to the formation of amide.

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

(1) A is true but R is false.

(2) A is false but R is true.

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

(4) Both A and R are the true and R is not the correct explanation of A.

81. Which one of the following statements is correct?

(1) The bone is human body is an inert and unchanging substance.

(2) Mg plays roles in neuromuscular function and interneuronal transmission.

(3) The daily requirement of Mg and Ca in the human body is estimated to be 0.2 – 0.3 g.

(4) All enzymes that utilize ATP in phosphate transfer require Ca as the cofactor.

82. The relation between n_m, (n_m = the number of permissible values of magnetic quantum number (m)) for a given value of azimuthal quantum number (l), is

(1) $n_m = 2l^2 + 1\,d$ (2) $n_m = l + 2$

(3) $l = \frac{n_m - 1}{2}$ (4) $l = 2n_m + 1$

83. Amongst the following the total number of species not having eight electrons around central atom in its outer most shell, is

NH_3, $AlCl_3$, $BeCl_2$, CCl_4, PCl_5

(1) 4 (2) 1

(3) 3 (4) 2

84. Which one is an example of heterogenous catalysis?

(1) Decomposition of ozone in presence of nitrogen monoxide.

(2) Combination between dinitrogen and dihydrogen to form ammonia in the presence of finely divided iron.

(3) Oxidation of sulphur dioxide into shulphur trioxide in the presence of oxides of nitrogen.

(4) Hydrolysis of sugar catalysed by H^+ ions.

85. Which amongst the following molecules on polymerization produces neoprene?

(1) $H_2C = CH - C \equiv CH$

(2) $H_2C = \underset{\displaystyle CH_3}{\underset{|}{C}} - CH = CH_2$

(3) $H_2C = CH - CH = CH_2$

(4) $H_2C = \underset{\displaystyle Cl}{\underset{|}{C}} - CH = CH_2$

Chemistry : Section B (Q. 86 to 100)

86. On balancing the given redox reaction,

$$aCr_2o_7^{2-} + bSO_3^{2-} + cH^+(aq) \rightarrow$$

$$2aCr^{3+}(aq) + bSO_4^{2-}(aq) + \frac{c}{2}H_2O(l)$$

$$2aCr^{3+}(aq) + bSO_4^{2-}(aq) + \frac{c}{2}H_2O(l)$$

The coefficients a, b and c are found to be, respectively -

(1) 1, 8, 3 (2) 8, 1, 3

(3) 1, 3, 8 (4) 3, 8, 1

87. The reaction that does not take place in a blast furnacr between 900 K to 1500 K temperature range during exteration of iron is :

(1) $C + CO_2 \rightarrow 2CO$

(2) $CaO + SiO_2 \rightarrow CaSiO_3$

(3) $Fe_2O_3 + CO \rightarrow 2FeO + CO_2$

(4) $FeO + CO \rightarrow Fe + CO_2$

88. What fraction of one edge centred octahedral void lies in one unit cell of fcc?

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

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

89. Which amongst the following options is the correct relation between change in enthalpy and change in internal energy?

(1) $\Delta H - \Delta U = -\Delta nRT$

(2) $\Delta H + \Delta U = -\Delta nR$

(3) $\Delta H = \Delta U = -\Delta n_g RT$

(4) $\Delta H = \Delta U = +\Delta n_g RT$

90. Match List – I with Lit – II :

List – I		List – II	
A.	Peroxodisul phuric acid	I.	Two S-OH, Four S=O, One S-O-S
B.	Sulphuric acid	II.	Two S-OH, One S=O
C.	Pyrosulphuric acid	III.	Two S-OH, Four S=O, One S-O-O-S
D.	Sulphurous acid	IV.	Two S-OH, Two S=O

Choose the correct answer from the options given below :

(1) A – I, B – III, C – IV, D - II

(2) A – III, B – IV, C – II, D - I

(3) A – I, B – III, C – II, D - IV

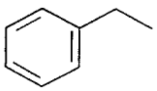
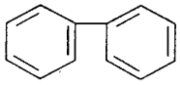
(4) A – III, B – IV, C – I, D - II

91. Identify the final product [D] obtained in the following sequence of reactions.

$$CH_3CHO \xrightarrow[ii)\ H_3O^+]{i)\ LiAlH_4} [A] \xrightarrow[\Delta]{H_2SO_4} [B]$$

$$\xrightarrow{HBr} [C] \xrightarrow[Na/dry\ ether]{} [D]$$

(1) C_4H_{10} (2) $HC \equiv C^{\ominus}\ Na^+$

(3)  (4) 

92. Which complex compound is most stable?

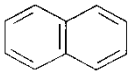
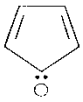
(1) $[CoCl_2(en)_2]NO_3$

(2) $[Co(NH_3)_6]_2(SO_4)_3$

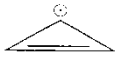
(3) $[Co(NH_3)_4(H_2O)Br](NO_3)_2$

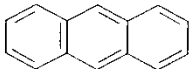
(4) $[Co(NH_3)_3(NO_3)_3]$

93. Consider the following compounds / species :

i.  ii. 

iii.  iv. 

v.  vi. 

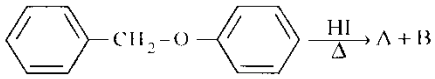
vii. 

The number of compounds / species which obey Huckel's rule is ____ .

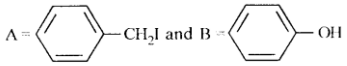
(1) 2 (2) 5

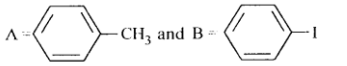
(3) 4 (4) 6

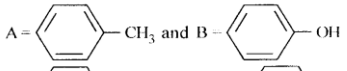
94. Consider the following reaction :

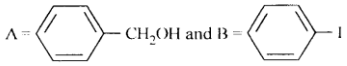


Identify products A and B.

(1) 

(2) 

(3) 

(4) 

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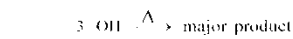
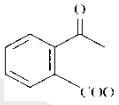
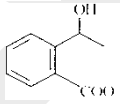
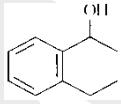
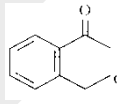


(1)  (2) 

(3)  (4) 

96. Given below are two statements :

Statements I : The nutrient deficient water bodies lead to eutrophication.

Statements II : Eutrophication leads to decrease in the level of oxygen in the water bodies.

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

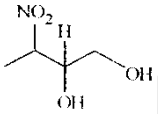
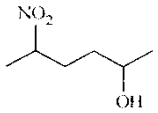
(1) Statement I is true but Statement II is false.

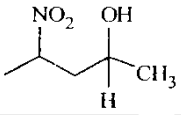
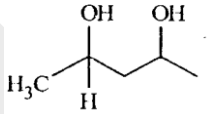
(2) Statement I is false but Statement II is true.

(3) Both Statement I and Statement II is true.

(4) Both Statement I and Statement II is false.

97. Which amongst the following will be most readily dehydrated under acidic conditions?

(1)  **(2)** 

(3)  (4) 

98. Which of the following statements are incorrect?

A. All the trasnsition metlas except scandium form MO oxides which are ionic.

B. The highest oxidation number correspoinding to the group number in transition metal oxides is attained in Sc_2O_3 to Mn_2O_7.

C. Basic character increases from V_2O_3 to V_2O_4 to V_2O_5.

D. V_2O_4 dissolves in acids to give VO_4^{3-} salts.

E. CrO is basic but Cr_2O_3 is amphoteric.

Choose the correct answer from the options given below :

(1) C and D only (2) B and C only

(3) A and E only (4) B and D only

99. Pumic stone is an example of

(1) solid sol (2) foam

(3) sol (4) gel

100. The equilibrium concentrations of the species in the reaction $A + B \rightleftharpoons C + D$ are 2, 3, 10 and 6 mol L^{-1}, respectively at 300 K. ΔG^o for the reaction is

(R = 2 cal / mol K)

(1) – 1381.80 cal (2) – 13.73 cal

(3) 1372.60 cal (4) – 137.26 cal

Botany: Section - A (Q. No. 101 to 135)

101. Identify the pair of heterosporouspteridopjytes among the following:

(1) Pslilotum and Salvinia

(2) Equisetum and Salvinia

(3) Lycopodium and Selaginella

(4) Selaginella and Salvinia

102. The reaction centre in PS II has an absorption maxima as

(1) 660 nm

(2) 780 nm

(3) 680 nm

(4) 700 nm

103. Identify the correct statements:

A. Detrivores perform fragmentation.

B. The humus is further degraded by some microbes during mineralization.

C. Water soluble inorganic nutrients go down into the soil and get precipitated by a precess called leaching.

D. The detritus food chain begins with living organisms.

E. Earthworms break down detritus into smaller particles by a process called catabolism

Choose the correct answer from the options given below:

(1) C, D, E only (2) D, E, A only

(3) A, B, C only (4) B, C, D only

104. Family Fabacceaedifferes from Solanaceae and Liliaceae. With respect to the stamens, pick out the characteristics specific to family Fabacease but not found in Solanaceae or Liliaceae.

(1) Monoadelphous and Monothecous anthers

(2) Epiphyyllus and Dithecous anthers

(3) Diadelphous and Dithecous anthers

(4) Polyadelphous and epiopetalous stamens

105. Given belwo are two statements:

Statement I: The forces generated bu transpiration can lift a xylem-sized column of water over 130 meters height.

Statements II: Transpiration cools leaf sufaces sometimes 10 to 15 degress, by evaporative cooling.

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

(1) Monoadelphous and Monothecous anthers

(2) Epiphyllus and Dithecous anthers

(3) Diadelphous and Dithecous anthers

(4) Polyadelphous and epipetalous stamens

106. Given below are two statements: One is labelled as Assertiona and the other is labelled as Reason R:

Assortion A: Late wood has fewer xylary elements with narrow vessels.

Reason R: Cambiun is less active in winters.

In the light of the above statements, choose the correct answer from the optuions given below:

(1) A is true but R is fale

(2) A is false but R is fale

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

(4) Both A and R are true but R is NOT the correct explanation of A

107. In the equation

GPP – R = NPP

GPP is Gross Primary Productivity

NPP is Net Primary Productivity

R here is_____

(1) Respiration loss

(2) Reproductive allocation

(3) Photosynthetically active radiation

(4) Respiratory quotient

108. What is the function of tassels in the corn cob?

(1) To disperse pollen grains

(2) To protect seeds

(3) To attract insects

(4) To trap pollen grains

109. Which hormone promotes internode/petiole elongation in deep water rice?

(1) Ethylene (2) 2, 4-D

(3) GA_3 (4) Kinetin

110. The phenomenon of pleiotropism refers to

(1) asignle gene affecting multiple phenotypic expression

(2) morethan two genes affecting a single character

(3) presencefo several alleles of a single gene controlling a single crossover.

(4) presence of two alleles, each of the two genes controlling a single trait.

111. What is the role of RNA polymerase III in the process of transcription in Eukaryote?

(1) Transcription of precursor of mRNA

(2) Transcription of only snRNAs

(3) Transcription of rRNAs (28S, 18S and 5.8S)

(4) Transcription of tRNA, 5 srRNA and sn RNA

112. Expressed Sequence Tags (ESTs) regers to

(1) All genes whether expressed or unexpressed

(2) Certain important expressed genes.

(3) All genes that are expressed as RNA

(4) All genes that are expressed as protiens.

113. Unequivocal proof that DNA is the genetic material was first proposed by

(1) Avery, Macleiod and McCarthy

(2) Wilkis and Franklin

(3) Frederick Griffith

(4) Alfred Hershey and Martha Chase

114. Among 'the Evil Quarter', which one is considered the most important cause driving extinction of species?

(1) Alien species invasions

(2) Co-extinctions

(3) Habitat loss and fragmentation

(4) Over exploitation for economic gain

115. The thickness of ozone I a column of air in the atmosphere is division of centromere?

(1) Decameter (2) Kilobase

(3) Dobson uits (4) Decibels

116. Which of the following stages of meiosis involves division of centromere?

(1) Anaphase II (2) Telophase

(3) Metaphase I (4) Metaphase II

117. Spraying of which of the following phytohormone on juvenile conifers helps in hastening the maturity period, that leads to early seed production?

(1) Zeatin

(2) Abscisic Acid

(3) Indole-3-butyric Acid

(4) Gibberellic Acid

118. The process of appearance of recombination nodules occurs at which sub stage of prophase I in meiosis?

(1) Diplotene (2) Diakinesis

(3) Zygotene **(4) Pachytene**

119. Give below are tw statements:

Statement I: Endarch and exarch are the terms often used for describing the position of secondary xylem in the plant body.

Statement II: Exarch condition is the most common feature of the root ststem.

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

(1) Statement I is correct but Statement II is false

(2) Statement I is incorrect but Statement II are true

(3) Both Statement I and Statement II are true

(4) Both Statement I and Statement II are false

120. Upon exposure to UV radiation, DNA staied with ethidium bromide will show

(1) Bridge yellow colour

(2) Bridge orange colour

(3) Bride red colour

(4) Bridge blue colour

121. Frequency of recombination between gene pairs on same chromosome as a measure of the distance between genes to map their position on chromosome, was used for the first time by

(1) Alfred Sturtevant

(2) Henking

(3) Thomas Hunt Morgan

(4) Sutton and Boveri

122. In gene gu method used to introduce alien DNA into host calls, microparticlesof_____metal are used

(1) Tungsten or gold (2) Silver

(3) Copper (4) Zinc

123. In tissue culture experiments, leaf mesophyll cells are put in a culture medium to form callus.

This phenomenon may be called as:

(1) Development (2) Senescence

(3) Differentiation **(4) Dedifferentiation**

124. Which micronutrient is required for splitting of water molecule photosynthesis?

(1) magnesium (2) copper

(3) manganese (4) molybdenum

125. Large, colourful, fragrant flwers with nectar are seen in:

(1) bat pollinated plants

(2) wind pollinated plant

(3) insect pollinated plant

(4) bird pollinated plant

126. Given below are two statements: ne is labelled as Assertion A and the other is labelled as Reason R:

Assertion A: The first stage of gametphyte in the life cycle of mss is protonema stage.

Reason R: Protonema develops directly frm spores produced in capsule.

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

(1) A is correct but R is not correct

(2) A is not correct but R is correct

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

(4) Both A and R are correct but R is NOT the correct explanation of A

127. Cellulse does not form blue colour with iodine because

(1) It does not contain compex helices and hence connot hold iodine melecules

(2) It breakes down when iodine reacts with it

(3) It is a diaccharide

(4) It is a helical molecule.

128. Given below are two statements: ne is labelled as Assertion A and the other is labelled as Reason R:

Assertion A: ATP is used at two steps in glycolysis

Reason R: First ATP is used in coverting glucose into glucose-6-phosphate and second ATP is used in conversion of fructose-6-phosphate into fructose-1-6diphosphate the correct answer from the options given below:

(1) A is true but R is false

(2) A is false but R is true

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

(4) Both A and R are true but R is NOT the correct explanation of A

129. The historic Conventio on Biological Diversity, 'The Earth Summit' was held in Rio de Janeiro I the year:

(1) 1986 (2) 2002

(3) 1985 **(4) 1992**

130. Movement and accumulation of ions acrss a membrane against their concentration gradient can be explained by:

(1) Passive Trasport **(2) Active Transport**

(3) Osmosis (4) Facilitated Diffusion

131. Axile placentation is observed in

(1) Tomoto, Dianthus and Pea

(2) China rse, Petunia ad Lemon

(3) Mustard, Cucumber and Primrose

(4) China rose, Beans and Lupin

132. During the purification process for recombinant DA technology, addition of chilled ethanol precipitates out

(1) Histoes (2) Polysaccharides

(3) RNA **(4) DA**

133. Among eukaryotes, replication of DNA takes place in_

(1) G_1 Phase (2) G_2 Phase

(3) M Phase **(4) S Phase**

134. How many ATP and $NADPH_2$ are required for the synthesis of one molecule of Glucose during Calvin cycle?

(1) 12 ATP and 16 $ADPH_2$

(2) 18 ATP and 16 $ADPH_2$

(3) 12 ATP and 12 $ADPH_2$

(4) 18 ATP and 12 $ADPH_2$

135. In angiosperm, the haploid, diploid and triploid structures of a fertilized embryo sac sequentially are:

(1) Synerigids, Zygote and Primary endosperm nucleus

(2) Synerigds, antipodals and Polar nuclei

(3) Synergids, Primary endosperm nucleus and zygote

(4) Antipodals, synergids, and primary endosperm nucleus

Botany: Section - A (Q. No. 136 to 150)

136. Match List I with List II:

List I (Interaction)		**List II (Species A and B)**	
A.	Mutualism	I.	+(A,), O(B)
B.	Commensalism	II.	-(A), O(B)
C.	Amensalism	III.	+(A), -(B)
D.	Parasitism	IV.	+(A), +(B)

Choose the correct answer from the options given below:

(1) A-IV, B-II, C-I, D-II

(2) A-III, B-I, C-IV, D-II

(3) A-IV, B-II, C-I, D-III

(4) A-IV, B-I, C-II, D-III

137. Match List I with List II:

	List I		**List II**
A.	Iron	I.	Synthesis of auxin
B.	Zinc	II.	Component of nitratereductase
C.	Boron	III.	Acticator of catalse
D.	Molybdenum	IV.	Cell elongation and differentiation

(1) A-III, B-I, C-IV, D-II

(2) A-II, B-IV, C-I, D-III

(3) A-III, B-II, C-I, D-IV

(4) A-II, B-III, C-IV, D-I

138. Identify the coorectstatemets:

A. Lenticels are the lens-shaped openings permitting the exchange of gases.

B. Bark formed early in the season is called had bark

C. Bark is a technical term that refers to all tissues exterior to vascular cambium

D. Phellogen is single-layered in thickness.

Choose the correct answer from the options given below:

(1) A, B, and D only (2) B and C only

(3) B, C and E only **(4) A and D only**

139. Which of the following cmbinations is required for chemiosmosis?

(1) proton pump, electron gradient, ATP synthase

(2) proton pump, electron gradient, NADP synthase

(3) membrans, proton pump, proton gradient, ATP synthase

(4) membrans, proton pump, proton gradient, NADP synthase

140. Main steps I the formation f Recombinant DNA are given below. Arrange these steps in a correct sequence.

A. Insertion f recombinant DNA into the host cell

B. Cutting of DNA at specific location by restriction enzyme.

C. Isolation of desired DNA fragment.

D. Amplificatio of gene of interest using PCR.

Coose the crrect answer from the options given below:

(1) C, B, D, A (2) B, D, A, C

(3) B, C, A, D (4) C, A, B, D

141. Given below are two statements: ne is labelled as Assertion A and the other is labelled as Reason R:

Assertion A: In gymnosperms the pollegrais are released from the microsporangium and carried by air currets.

Reason R: Air currents carry the pollen grains to the mouth of the archegonia where the male gametes are discharged and pollen tube is not formed

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

(1) A is true but R is false

(2) A is false but R is true

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

(4) Both A and R are true but R is NOT the correct explanation of A

142. Molenate inhibits the growth of pathogenic becteria by inhibiting the activity of

(1) Lipase

(2) Dinitrogenase

(3) Succinic dehydrogenase

(4) Amylase

143. Which of the following statements are correct about Klinefelter's Syndrome?

A. This disorder was first described by Langdon Down (1866)

B. Such an individual has overall masculine development. However, the feminine development is retarted

C. The affected individual is short statured,

D. Physical, phychomotor and mental development is retarded.

E. Such individuals are sterile.

Cose the correct answer from the options given below:

(1) B and E only (2) A and E only

(3) A and B only (4) C and D only

144. Match List I with List II:

	List I		**List II**
A.	Oxidative decarboxylation	I.	Citrate synthase
B.	Glycolysis	II.	Pyruvate dehydrogenase
C.	Oxidation phosphorylation	III.	Electron transport system
D.	Tricarboxylic Acid cycle	IV.	EMP pathway

(1) A-III, B-I, C-II, D-IV

(2) A-II, B-IV, C-III, D-I

(3) A-III, B-IV, C-II, D-I

(4) A-II, B-IV, C-I, D-III

145. Which one of the following statements is NOT correct?

(1) Water hyacinth grows abundanyl in eutrophic water bodies and leads to an imbalance in the ecosystem dynamics of the water body.

(2) The amount of some toxic substances of industrial waste water increases in the organisms at successive trophic levels.

(3) The micro-organisms involved in a sewage pullulated water body consume a lot of oxygen causing the death of aquatic organisms.

(4) Algal blooms caused by excess of organic matter in water improve water quanlity and promote fisheries

146. Match List I with List II:

	List I		**List II**
A.	M Phase	I.	Proteins are synthesized
B.	G_2Phase	II.	Iacctive Phase
C.	Quiescent stage	III.	Interval between mitosis and initiatio of DNA replication
D.	G_1 Phase	IV.	Equational division

(1) A-IV, B-I, C-II, D-III

(2) A-II, B-IV, C-I, D-III

(3) A-III, B-II, C-IV, D-I

(4) A-IV, B-II, C-I, D-III

147. Given below are two statements: One is labelled as Assertion A and the other is labelled as Reason R:

Asserion A: A flower is defined as modified shoot wherein the shoot apical meristem changes to floral meristem.

Reason R: Internode of the shoot gets condensed to produce different floral appendages laterally at successive nodes instead of leaves

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

(1) A is true but R is false

(2) A is false but R is true

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

(4) Both A and R are true but R is NOT the correct explanation of A

148. Match List I with List II:

	List I		**List II**
A.	Cohesion	I.	More attraction in liquid phase
B.	Adhesion	II.	Mutual attraction among water
C.	Surface tension	III.	Water loss in liquid phase
D.	Guttation	IV.	Attraction towards polar surfaces

Choose the correct answer from the options given below:

(1) A-III, B-I, C-IV, D-II

(2) A-II, B-I, C-IV, D-III

(3) A-II, B-IV, C-I, D-III

(4) A-IV, B-III, C-II, D-I

149. Given below are two statements:

Statement I: Gause's 'Competitive Exclision Principle' states that two closely related species competing for the same resources cannot co-exist indefinitely and competitively inferior one will be eliminated eventually.

Statement II: In general, carnivores are more adversely affected by competition than herbivores.

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

(1) Statement I is correct but Statement II is false

(2) Statement I is incorrect but Statement II is false

(3) Both Statement I and Statement II are true

(4) Both Statement I and Statement II are false

150. How many different proteins does the ribosome consist of

(1) 40 (2) 20

(3) 80 (4) 60

Zoology: Section - A (151-185)

151. Which one of the following techniques does not serve the purpose of early diagnosis of a disease for its early treatement?

(1) Polymerase Chain Reaction (PCR) technique

(2) Enzyme Linked Immuno-Sorbent Assay (ELISA) technique

(3) Recombinant DNA Technology

(4) Serum and Urine analysis

152. Given below are two statements:

Statement I: Vas deferens receives a duct from seminal vescicle and opens into urethra as the ejaculatory duct.

Statement II: The cavity of the cervix is called cervical canal which along with vagina forms birth canal.

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

(1) Statement I is correct but Statement II is false.

(2) Statement I is incorrect but Statement II is true.

(3) Both Statement I and Statement II are true.

(4) Both Statement I and Statement II are false.

153. Match List – I with List – II.

	List – I		**List – II.**
A.	Taenia	I.	Nephridia
B.	Paramoecium	II.	Contractile vacuole
C.	Periplaneta	III.	Flame cells
D.	Pheretima	IV.	Urecose gland

Choose the correct answer from the options given below:

(1) A-III, B-II, C-IV, D-I

(2) A-II B-I, C-IV, D-III

(3) A-I, B-II, C-III, D-IV

(4) A-I, B-II, C-IV, D-III

154. Which one of the following common sexually transmitted diseases is completely curable when detected early and treated properly?

(1) Hepatitis-B (2) HIV Infection

(3) Genital herpes **(4) Gonorrhoea**

155. Givne below are two statements: one is labelled as AssertionA and the other is labeled as Reason R.

Assertion A: Amniocentesis for sex determination is one of the strategies of Reproductive and Child Health Care Programme.

Reason R: Ban on amniocentesis checks increasing menance of female foeticide.

In the flight of the above statements, choose the correct answer from the options given below:

(1) A is true but R is false.

(2) A is false but R is true.

(3) Both A and R are true and R is the correct explanationof A.

(4) Both A and R are true and R is NOT the correct explanation of A.

156. Given below are two statements:

Statement I: In prokaryotes, the positively charged DNA is held with some negatively charged proteins in a region called nucleoid.

Statement II: In eukaryotes, the negatively charged DNA is wrapped around the positively charged DNA is wrapped around the positively charged histone octamer to form nucleosome.

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

(1) Statement I is correct bu Statement II is false.

(2) Statement I and Statement II are true.

(3) Both Statement I and Statement II are true.

(4) Both Statement I and Statement II are false.

157. Match List I with List II.

	List I		List II
A	Heroin	I.	Effect on cardiovascular system
B.	Marijuana	II.	Slow down body Function
C.	Cocain	III.	Painkiller
D.	Morphine	IV.	Interfere with transport of dopamine

Choose the correct answer from the options given below:

(1) A-IV, B-III, C-II, D-I

(2) A-III, B-IV, C-I, D-II

(3) A-II, B-I, C-IV, D-III

(4) A-I, B-II, C-III, D-IV

158. Given below are two statements: one is labeled as Assertion A and the other is labeled as Reason R.

Assertion A: Endometrium is necessary for impulanation of blastocyst.k

Reason R: In the absence of fertilization, the corpus luteumdegenrates that causes disintegration of endometrium.

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

(1) A is true but R is false.

(2) A is false but R is true.

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

(4) Both A and R are true but R is NOT the correct explanation of A.

159. Select the correct group/set of Australian Marsupials exhibiting adaptive radiation.

(1) Mole, Flying squirrel, Tasmanian tiger cat

(2) Lemur, Anteater, Wolf

(3) Tasmanian wolf, Bobcat, Marsupial mole

(4) Numbat, Spotted cuscus, Flying phalanger

160. Which of the following statements is correct?

(1) Presence of large amount of nutrients in water restricts 'Algal Bloom'

(2) Algal Bloom decreases fish mortality

(3) Eutrophication refers to increase in domestic sewage and waste water in lakes.

(4) Biomagnification refers to increase in concentration of the toxicant at successive trophic levels.

161. Which of the following are NOT considered as the part of endomembrane system?

A. Mitochondira

B. Endoplasmic Reticulu

C. Chloroplasts

D. Golgi complex

E. Peroxisomes

Choose the most appropriate answer from the options given below:

(1) A and D only

(2) A, D and E only

(3) B and only

(4) A, C and E only

162. Which of the following is not a cloning vector?

(1) pBR322 **(2) Probe**

(3) BAC (4) YAC

163. Which of the following statements are correct regarding female reproductive cycle?

A. In non-primate mammalse cyclical changes during reproduction are called oestrus cycle.

B. First menstrual cycle begins at puberty and is called menopause.

C. Lack of menstruation may be indicative of pregnancy.

D. Cyclic menstruation extends between menarche and menopause.

Choose the most appropriate answer from the options givne below:

(1) A, B and C only **(2) A, C and D only**

(3) A and D only (4) A and B only

164. Match List with List II.

	List – I		**List – II**
A.	P – wave	I.	Beginning of systole
B.	Q – wave	II.	Repolarisation of ventricles
C.	QRS complex	III.	Depolaration of atria
D.	T – wave	IV.	Depolaration of ventricles

Choose the correct answer from the options given below:

(1) A-II, B-IV, C-I, D-III

(2) A-I, B-II, C-III, D-IV

(3) A-III, B-I, C-IV, D-II

(4) A-IV, B-III, C-II, D-I

165. Match List I with List II.

List – I (Interacting species)		**List – II (Name of Interaction)**	
A.	A Leopard and a Lion in a forest/grassland	I.	Competition
B.	A cuckoo laying egg in a Crow's nest	II.	Brood
C.	Fungi and root of a higher plant in Mycorrtizae	III.	Mutualism
D.	A cattle egret and a Cattle in a field	IV.	Commensalism

Choose the correct answer from the options givne below:

(1) A-III, B-IV, C-I, D-II

(2) A-II, B-III, C-I, D-IV

(3) A-I, B-II, C-III, D-IV

(4) A-I, B-II, C-IV, D-III

166. Given bleow are two statements:

Statement I: A protein is imagined as a line, the left end represented by first amino acid (C-terminal) and the right end represented by last amino acid (N-terminal)

Statement II: Adult human haemoglobin, consists of 4 subunits (two subunits of α type and two subunits of β type.)

In the ligt of the above statements, choose the correct answer from the options given below:

(1) Statement I is true but Statement II is false.

(2) Statement I is false but Statement II is true.

(3) Both Statement I and Statement II are true.

(4) Both Statement I and Statement II are false.

167. Given below are two statements:

Statement I: RNA mutates at a faster rate.

Statement II: Viruses having RNA genome and shorter life span mutate and evolve faster.

In the liht of the above statements, choose the correct answer from the options given below:

(1) Statement I is true but Statement II is false.

(2) Statement I is false but Statement II is true.

(3) Both Statement I and Statement II are true.

(4) Both Statement I and Statement II are false.

168. Radial symmetry is NOT found in adults of phylum_____.

(1) Coelenterata (2) Echinodermata

(3) Ctenophora **(4) Hemichordata**

169. Given below are statements: one is labeled as

Assertion A and the other is labeled as Reason R.

Assertion A: Nephrons are of two types: Cortical &Juxta medullary, based on their relative position in cortex and medulla.

Reason R: Juxta medullary nephrouns have short loop of Henlewhereas, cortical nephrons have longer loop of Henle.

In the lighe of the above statements, choose the correct answer from the options given below:

(1) A is true but R is false.

(2) A is false but R is true.

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

(4) Both A and R are true but R is NOT the correct explanation of A.

170. Once the undigested and unabsorbed substances enter the caecum, their backflow is prevented by –

(1) Gastro – oesophageal sphincter

(2) Pylric sphincter

(3) Sphincter of Oddi

(4) Ileo – caecal valve

171. Match List I with List II.

A.	CCK	I.	Kindney
B.	GIP	II.	Heart
C.	ANF	III.	Gastric gland
D.	ADH	IV.	Pancreas

Choose the correct answer from the options given below.

(1) A-II, B-IV, C-I, D-III

(2) A-IV, B-II, C-III, D-I

(3) A-IV, B-III, C-II, D-I

(4) A-III, B-II, C-IV, D-I

172. Broad palm with single palm crease is visible in a person suffering from –

(1) Klinefelter's syndrome

(2) Thalassemia

(3) Down's syndrome

(4) Truner's syndrome

173. Match List – I with List – II.

List – I		List – II	
A.	Ringworm	I.	Haemophilusinfluenzae
B.	Filariasis	II.	Trichophyton
C.	Malaria	III.	Wuchereriabancrofti
D.	Pneumonia	IV.	Plasmodium vivax

Choose the correct answer from the options given below.

(1) A-III, B-II, C-I, D-IV

(2) A-III, B-II, C-IV, D-I

(3) A-II, B-III, C-IV, D-I

(4) A-II, B-III, C-I, D-IV

174. Given below are statements:

Statements I: Ligaments are dense irregular tissue.

Statements II: Cartilage is dense regular tissue. In the light of the above statements, choose the correct answer from the options givne below.

(1) Statement I is true but Statement II is false.

(2) Statement I is false but Statement II is true.

(3) Both Statement I and Statement II are true.

(4) Both Statement I and Statement II are false.

175. Match List – I with List – II.

	List – I		**List – II.**
A.	Gnene 'a'	I.	β -galactosidase
B.	Gane 'y'	II.	Transacetylase
C.	Gene 'i'	III.	Permease
D.	Gene 'z'	IV.	Repressor protein

Choose the correct answer from the options given below.

(1) A-III, B-IV, C-I, D-II

(2) A-III, B-I, C-IV, D-II

(3) A-II, B-I, C-IV, D-III

(4) A-II, B-III, C-IV, D-I

176. Given below are two statements:

Statement I: Electrostatic precipitator is most widely used in thermal power plant.

Statement II: Electrostatic precipitator in thermal power plant removes ionizing radiations

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

(1) Statement I is correct but Statement II is incorrect.

(2) Statement I is incorrect but Statement II is correct.

(3) Both Statement I and Statement II are correct

(4) Both Statement I and Statement II are incorrect

177. Match List – I with List – II with respect to human eyhe.

List – I		List – II	
A.	Fovea	I.	Visible coloured portion of eyen that regulates diameter of pupil
B.	Iris	II.	External layer of eye formed of dnese connective tissue.
C.	Blind spot	III.	Point of greatest visual acuity of resolution.
D.	Sclera	IV.	Point where optic nerve leaves the eyeball and photoreceptor cells are absent.

Choose the correct answer from the options given below.

(1) A-I, B-IV, C-III, D-II

(2) A-II, B-I, C-III, D-IV

(3) A-III, B-I, C-IV, D-II

(4) A-IV, B-III, C-II, D-I

178. In which blood corpuscles, the HIV undergoes replication and produces progeny viruses?

(1) Basophils (2) Eosinophils

(3) T_H cells (4) B-lymphocytes

179. Which of the following functions is carried out by cytoskeleton in a cell?

(1) Motility (2) Transportation

(3) Nuclear division (4) Protein synthesis

180. Given below are two statements:

Statement I: Low temperature preserves the enzyme in a temporarily inactive state whereas high temperature destroys enzymatic activity because protiens are denatured by heat.

Statement II: Whkken the inhibitor closely resembles the substrate in its molecular strucuture and inhibits the activity of the enzuyme, it is known as competitive inhibitor.

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

(1) Statement I is true but Statement II is false.

(2) Statement I is false but Statement II is true.

(3) Both Statement I and Statement II are true.

(4) Both Statement I and Statement II are false.

181. Match List – I with List – II

List – I		List – II	
A.	Vasectomy	I.	Oral method
B.	Coitus interruptus	II.	Barrier method
C.	Cervical caps	III.	Surgical method
D.	Saheli	IV.	Natural method

Choose the correct answer from the options given below:

(1) A-II, B-III, C-I, D-IV

(2) A-IV, B-II, C-I, D-III

(3) A-III, B-I, C-IV, D-II

(4) A-III, B-IV, C-II, D-I

182. Match List – I with List – II.

List – I (Cells)		**List – II. (Secretion)**	
A.	Peptic cells	I.	Mucus
B.	Goblet cells	II.	Bile juice
C.	Oxyntic cells	III.	Proenzyme pepsinogen
D.	Hepatic cells	IV.	HCl and intrinsic factor for absorption of vitamin B_{12}

Choose the correct answer from the options given below:

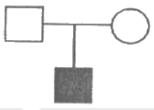
(1) A-III, B-I, C-IV, D-II

(2) A-II, B-IV, C-I, D-III

(3) A-IV, B-III, C-II, D-I

(4) A-II, B-I, C-III, D-IV

183. Which one of the following symbols represents mating between relatives in human pedigree analysis?

(1) 

(2) 

(3) 

(4) 

184. Vital capacity of lung is _____.

(1) IRV + ERV + TV – RV

(2) IRV + ERV + TV

(3) IRV + ERV

(4) IRV + ERV + TV + RV

185. Match List – I with List – II.

List – I (Type of Joint)		**List – I (Found between)**	
A.	Cartilaginous Joint	I.	Between flat skull bones
B.	Ball and Socket Joint	II.	Between adjacent vertebrae in vertebral column
C.	Fibrous Joint	III.	Between carpal and metacarpal of thumb
D.	Saddle Joint	IV.	Between Humerus and Pactoral girdle

Choose the correct answer from the options given below.

(1) A-I, B-IV, C-III, D-II

(2) A-II, B-IV, C-III, D-I

(3) A-III, B-I, C-II, D-IV

(4) A-II, B-IV, C-I, D-III

Zoology: Section - B (186-200)

186. Select the correc statement with reference to chrodates.

A. Presence of a mid-dorsal, solid and double nerve cord.

B. Presence of closed circulatory system.

C. Pressence of paired pharyngeal gillslits.

D. Presence of dorsal heart

E. Triploblastic pseudocoelomate animals.

Choose the correct answer from the options given below.

(1) B, D and E only (2) C, D and E only

(3) A, C and D only **(4) B and C only**

187. Which of the following statements are correct?

A. An excessive loss of body fluid from the body switches off osmoreceptors.

B. ADH facilitates water reabsorption to prevent diuresis.

C. ANF causes vasodilation.

D. ADH causes increase in blood pressure.

E. ADH is responsible for decrease in GFR.

Choose the correct answer from the options given below.

(1) A, B and E only (2) C, D and E only

(3) A and B only **(4) B, C and D only**

188. In cockroach, exretion is brought about by –

A. Phallic gland B. Urecose gland

C. Nephrocytes D. Fat body

E. Collaterial glands

Choose the correct answer from the options given below.

(1) B, C and D only (2) B and D only

(3) A and E only (4) A, B and E only

189. Given below are two statements:

Statement I: During G_0 phase of cell cycle, the cell is metabolically inactive.

Staement II: The centrosome undergoes duplication during S phase of interphase.

In the light of the above statements, choose the most appropriate answer from the options givne below.

(1) Statement I is correct but Statement II is incorrect.

(2) Statement I is incorrect but Statement II is correct.

(3) Both Statement I and Statement II are correct

(4) Both Statement I and Statement II are incorrect

190. Match List – I with List – II.

List – I		**List – II**	
A.	Logistic growth	I.	Unlimited resource
B.	Exponential	II.	Limited resource availability condition
C.	Expanding age pyramid	III.	The percent individuals of pre-reproductive age is largest followed by reproductive and post reproductive age groups
D.	Stable age pyramid	IV.	The percent individuals of pre-reproductives and reproductive age group are same

Choose the correct answer from the options given below.

(1) A-II, B-IV, C-I, D-III

(2) A-II, B-IV, C-III, D-I

(3) A-II, B-I, C-III, D-IV

(4) A-II, B-III, C-I, D-IV

191. Which of the following statements are correct?

A. Basophils are most abundant cells of the total WBCs

B. Basophils secrete histamine, serotonin and herparin

C. Basophils are involvked in inflammatory response

D. Basophils have kidney shaped nucleus

E. Basophils are agranulocytes

Choose the correct answer from the options given below:

(1) B and C only (2) A and B only

(3) D and E only (4) C and E only

192. The parts of human brain that helps in regulation of sexual behavior, expression of excitement, pleasure, rage, fear etc. are:

(1) Brain stem &epithalamus

(2) Corpus callosum and thalamus

(3) Limbic system & hypothalamus

(4) Corpora quadrigemina& hippocampus

193. Which one of the following is NOT an advantage of inbreeding?

(1) Elimination of less desirable genes and accumulation of superior genes takes place due to it.

(2) It decreases the productivity of inbred population, after continuous inbreeding.

(3) It decreases homozygosity.

(4) It exposes harmful recessive genes that are eliminated by selection.

194. The unique mammalian characteristics are:

(1) haris, pinna and indirect developent

(2) pinna, monocondylic skull and mammary glands

(3) hairs, tympanic membrane and mammary glands

(4) hairs, pinna and mammary glands

195. Match List – I with List – II.

	List – I		**List – II.**
A.	Mast cells	I.	Ciliated ephithlium
B.	Inner surface of bronchiole	II.	Areolar connective tissue
C.	Blood	III.	Cuboidal epithelium
D.	Tubular parts of nephron	IV.	Specialised connective tissue

(1) A-II, B-I, C-IV, D-III

(2) A-III, B-IV, C-II, D-I

(3) A-I, B-II, C-IV, D-III

(4) A-II, B-III, C-I, D-IV

196. Select the correct statements:

A. Tetrad formation is seen during Leptotene.

B. During Anaphase, the centromeres split and chromatids separate.

C. Terminalization takes place during Pachytene.

D. Nucleolus, Golgi complex and ER are reformed during Telophase.

E. Crossing over takes place between sister chromatids of homologous chromosome.

Choose the correct answer from the options givne below.

(1) A, C and E only (2) B and E only

(3) A and C only **(4) B and D only**

197. Which of the following is characteristic feature of cockroach regarding sexual dimorphism?

(1) Presence of sclerites

(2) Presence of anal cerci

(3) Dark brown body colour and anal cerci

(4) Presence of anal styles

198. Which one of the following is the sequence on corresponding coding strand, if the sequence on mRNA formed is as follows

5' AUCGAUCGAUCGAUCGAUCG AUCG

AUCTG 3'?

(1) 5' ATCGATCGATCGATCGATCG ATCGATCG 3'

(2) 3' ATCGATCGATCGATCGATCG ATCGATCG 5'

(3) 5' UAGCUAGCUAGCUAGCUA GCUAGC UAGC 3'

(4) 3' UAGCUAGCUAGCUAGCUA GCUAGCUAGC 5'

199. Which of the following are NOT under the control of thyroid hormone?

A. Maintenance of water and electrolyte balance

B. Regulation of basal metaboilic rate

C. Normal rhythm of sleep-wake cycle

D. Development of immune system

E. Support the process of R.B.Cs formation

Choose the correct answser from the options given below.

(1) C and D only (2) D and E only

(3) A and D only (4) B and C only

200. Which of the following statements are correct regarding skeletal muscle?

A. Muscle bundles are held together by collagenous connective tissue layer called fascicle.

B. Sarcoplasmic reticulum of muscle fibre is a store house of calcium ions.k

C. Striated appearance of skeletal muscle fibre is due to distribution pattern of actin and myosin protiens.

D. M line is considered as functional unit of contraction called sarcomere.

Choose the most appropriate answer from the options given below.

(1) A, C and D only (2) C and D only

(3) A, B and C only **(4) B and C only**