E-TECH ACADEMY (NEET & IIT-JEE)

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Sec : YODDHA 2.0 NEET BOOSTER TEST-01 Date : 30-09-2023
Time : 3:20mins Max. Marks: 720

IMPORTANT INSTRUCTION

1. The answer sheet is inside this Test Booklet. When you are directed to open the Test booklet, take out the answer sheet and fill in the particulars on OFFICE copy carefully with blue/black ball point pen only.
2. The test is of 3 hours duration and the Test booklet contains **200 multiple-choice questions** (four options with a single correct answer) from **Physics, Chemistry & Biology (Botany & Zoology).** 50 questions in each subject are divided into **two Sections (A and B)** as per details given below.
   Section A shall consist of **35 Questions** in each subject (Question Nos. **1 to 35, 51 to 85, 101 to 135 and 151 to 185**). All questions are compulsory.
   Section B shall consist of **15** questions in each subject (Questions Nos. **36 to 50, 86 to 100, 136 to 150 and 186 to 200**). In **Section B,** a candidate needs to attempt any **10** questions out of **15** in each subject. Candidate 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 question, the first ten questions answer by the candidate shall be evaluated.
3. Each questions carries **4 marks**. For each correct response, the candidate will get **4 marks**. For each incorrect response, **1 mark** will be deducted from the total score. 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. Rough work is to be done on the space provided for this purpose in the Test Booklet only.
6. One completion of the test, the candidate must hand over the Answer Sheet (ORIGINAL and OFFICE copy) to the invigilator before leaving the Room/Hall. The candidates are allowed to take away this Test Booklet with them.
7. 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 number anywhere else except in the specified space in the test Booklet/Answer Sheet.
8. Use of white fluid for correction is NOT permissible on the Answer Sheet.
9. No candidate, without special permission of the centre Superintendent or Invigilator, would leave his/her seat.
10. The candidate should not leave the Examination Hall without handing over their Answer Sheet to the Invigilator on duty and sign. (With time) the Attendance Sheet twice. Cases, where a candidate has not signed the attendance sheet second time, will be deemed not to have handed over the Answer Sheet and dealt with as an Unfair Means case.
11. The candidates 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

Exam Syllabus

Physics : **Basic Maths & Vectors, Units and Measurement, Kinematics 1D & 2D**
Chemistry : **Mole Concept, Nomenclature, Structure of Atom & Periodic Table**
Botany : Cell Cycle and Cell Division, Cell the unit of life, Mineral Nutrition & BiologicalClassification
Zoology : **Living World, Animal Kingdom, Biomolecules & Body Fluids and Circulation**

Part-1 : Physics : Section-A (1-35)

1. Consider the following statements and select the correct option

I. Every measurement by any measuring instrument has some error

II. Every calculated physical quantity that is based on measured values has some error

III. A measurement can have more accuracy but less precision and vice-versa

1) I and II 2) II and III
3) II and III 4) I, II and III

2. Surface tension of a liquid is 70 dyne/cm. Its value in SI is

1) 70 N/m 2) 7×10^{-2} N/m
3) 7×10^{2} N/m 4) 7×10^{3} N/m

3. The value of resistance is 10.845 Ω and the value of current is 3.23 A. The potential difference is 35.02935 volt. Its value in significant number would be

1) 35V 2) 35.0V 3) 35.03V 4) 35.029V

4. Error in the measurement of radius of a sphere is 1%. Then error in the measurement of volume is

1) 1% 2) 5% 3) 3% 4) 8%

5. A thin copper wire of length *l* metre increases in length by 2% when heated through 10°C. What is the percentage increase in area when a square copper sheet of length *l* metre is heated through 10°C?

1) 4% 2) 8% 3) 16% 4) 12%

6. A physical quantity z depends on four observables a, b, c and d, as $z = \frac{a^2 b^{\frac{2}{3}}}{\sqrt{c} d^3}$. The percentages of error in the measurement of a, b, c and d are 2%, 1.5%, 4% and 2.5% respectively. The percentage of error in z is :

1) 12.25% 2) 16.5% 3) 13.5% 4) 14.5%

7. Which is dimensionless?

1) Force/acceleration 2) Velocity/acceleration
3) Volume/area 4) Energy/work

8. The length of one rod l_1 = 3.323 cm and the other is l_2 = 3.321 cm. Both rods were measured with one measuring instrument with least count 0.001 cm Then (l_1-l_2)is

1) (0.002 ±0.001) cm 2) (0.002 ± 0.000) cm
3) (0.002 ± 0.002) cm 4) None of these

9. Distance travelled by a particle at any instant 't' can be represented as S = A (t + B) + Ct². The dimensions of B are

1) $[M^0L^1T^{-1}]$ 2) $[M^0L^0T^1]$
3) $[M^0L^{-1}T^{-2}]$ 4) $[M^0L^2T^{-2}]$

10. The density of a material in the shape of a cube is determined by measuring three sides of the cube and its mass. If the relative errors in measuring the mass and length are respectively 1.5% and 1%, the maximum error in determining the density is:

1) 2.5% 2) 3.5% 3) 4.5% 4) 6%

11. A screw gauge with a pitch of 0.5 mm and a circular scale with 50 divisions is used to measure the thickness of a thin sheet of Aluminium. Before starting the measurement, it is found that when the two jaws of the screw gauge are brought in contact, the 45th division coincides with the main scale line and the zero of the main scale is barely visible. What is the thickness of the sheet if the main scale reading is 0.5 mm and the 25th division coincides with the main scale line?

1) 0.70 mm 2) 0.50 mm

3) 0.75 mm 4) 0.80 mm

12. Which of the following can be zero, when a particle is in motion for some time?

1) Distance 2) Displacement

3) Speed 4) None of these

13. Consider the following statements and select the correct statement(s)?

I. If l_1 = 0.6 cm ; l_2 = 0.60 cm and l_3 = 0.600 cm, then l_3 is the most accurate measurement.

II. l_3 = 0.600 cm has the least error so it is most accurate.

III. The number 2.746 rounded off to three significant figures is 2.75.

IV. The number 2.743 rounded off to three significant figures is 2.74.

1) I and IV only 2) II and IV only

3) I and II only 4) A11 are correct

14. A body moves in straight line with velocity v_1 for 1/3rd time and for remaining time with v_2. Find average velocity.

1) $\frac{v_1}{3}+\frac{2v_2}{3}$ 2) $\frac{v_1}{3}+\frac{v_2}{3}$ 3) $\frac{2v_1}{3}+\frac{v_2}{3}$ 4) $v_1+\frac{2v_2}{3}$

15. The displacement x of a particle along a straight line at time t is given by: $x=a_0+\frac{a_1 t}{2}+\frac{a_2}{2}t^2$. The acceleration of the particle is

1) $\frac{a_2}{3}$ 2) $\frac{2a_2}{3}$ 3) $\frac{a_1}{2}$ 4) $a_0+\frac{a_2}{3}$

16. A particle moves 2m east then 4m north then 5 m west. The distance is

1) 11m 2) 10m 3) -11m 4) 5 m

17. The instantaneous velocity of a particle moving in a straight line is given as $v=\alpha t+\beta t^2$, where α and β are constants. The distance travelled by the particle between 1s and 2s is:

1) $3\alpha+7\beta$ 2) $\frac{3}{2}\alpha+\frac{7}{3}\beta$

3) $\frac{\alpha}{2}+\frac{\beta}{3}$ 4) $\frac{3}{2}\alpha+\frac{7}{2}\beta$

18. The distance travelled by a particle starting from rest and moving with an acceleration $\frac{4}{3}ms^{-2}$, in the third second is:

1) 6m 2) 4m 3) $\frac{10}{3}m$ 4) $\frac{19}{3}m$

19. The slope of velocity-time graph for motion with uniform velocity is equal to

1) final velocity 2) initial velocity

3) zero 4) none of these

20. A stone is dropped into a well in which the level of water is h below the top of the well. If v is velocity of sound, the time T after which the splash is heard is given by

1) $T=2h/v$ 2) $T=\sqrt{\left(\frac{2h}{g}\right)}+\frac{h}{v}$

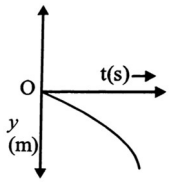
3) $T=\sqrt{\left(\frac{2h}{v}\right)}+\frac{h}{g}$ 4) $T=\sqrt{\left(\frac{h}{2g}\right)}+\frac{2h}{v}$

21. The displacement of a particle is given by $y=a+bt+ct^2-dt^4$. The initial velocity and acceleration are respectively

1) b, -4d 2) -b, 2c

3) b, 2c 4) 2c, -4d

22. The equation represented by the graph below is



1) $y=\frac{1}{2}gt$ 2) $y=\frac{-1}{2}gt$

3) $y=\frac{1}{2}gt^2$ 4) $y=\frac{-1}{2}gt^2$

23. A stone thrown vertically upwards with a speed of 5 m/sec attains a height H_1. Another stone thrown upwards from the same point with a speed of 10 m/sec attains a height H_2. The correct relation between H_1 and H_2 is

1) $H_2 = 4\ H_1$ 2) $H_2 = 3\ H_1$

3) $H_1 = 2H_2$ 4) $H_1 = H_2$

24. A moves with 65 km/h while B is coming back of A with 80 km/h. The relative velocity of B with respect to A is

1) 80 km/h 2) 60 km/h

3) 15 km/h 4) 145 km/h

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

1) 1 m/s 2) 0.5 m/s

3) 0.25 m/s 4) 0.433 m/s

26.

Column I	Column II
(A) Cause increase in velocity	(1) Linear motion
(B) Negative acceleration	(2) Zero
(C) Motion exhibited by body moving in a straight line	(3) Distance
(D) Area under a speed time graph	(4) Acceleration
(E) Velocity of an upward throwing body at the peak point	(5) Retardation

1) (A)→(4); (B)→(5);C→(1);(D)→(3);(E)→(2)

2) (A)→(2); (B)→(1);C→(3);(D)→(4);(E)→(5)

3) (A)→(5); (B)→(2);C→(3);(D)→(1);(E)→(4)

4) (A)→(2); (B)→(4);C→(1);(D)→(3);(E)→(5)

27. Two balls are projected at an angle θ and (90 - θ) to the horizontal with the same speed. The ratio of their maximum vertical heights is

1) 1:1 2) tan θ : 1

3) 1 : tanθ 4) $\tan^2\theta$: 1

28. A body projected at an angle with the horizontal has a range 300 m. If the time of flight is 6 s, then the horizontal component of velocity is

1) 30 ms^{-1} 2) 50 ms^{-1}

3) 40 ms^{-1} 4) 45 ms^{-1}

29. At the top of the trajectory of a projectile, the acceleration is

1) maximum 2) minimum

3) zero 4) constant (g)

30. The ranges and heights for two projectiles projected with the same initial velocity at angles 42° and 48° with the horizontal are R_1 R_2 and H_1, H_2 respectively. Choose the correct option :

1) R1>R_2 andH_1=H_2

2) R_1 = R_2 and H_1< H_2

3) R_1<R_2 and H_1<H_2

4) R_1 = R_2 and H_1= H_2

31. The velocity $\vec{v}$ of a particle moving in the xy - plane is given by $\vec{v}=\left(6t-4t^2\right)\hat{i}+8\hat{j}$,with $\vec{v}$ in m/s and t(>0) in second.

Match the following columns :

Column-I	Column-II	
(A) Acceleration magnitude is 10 m/s^2 at a time	(1)	3/4 s
(B) Acceleration zero at time	(2)	never
(C) velocity zero at time	(3)	1 s
(D) The speed 10 m/s at a time	(4)	2 s

1) (A)→(4); (B)→(1);C→(2);(D)→(3)

2) (A)→(2); (B)→(4);C→(3);(D)→(1)

3) (A)→(3); (B)→(2);C→(4);(D)→(1)

4) (A)→(2); (B)→(4);C→(1);(D)→(3)

32. A projectile is given an initial velocity of $\left(\hat{i}+2\hat{j}\right)$ m/s where $\hat{i}$ is along the ground and $\hat{j}$ is along the vertical. If g = 10 m/s^2 the equation of its trajectory is

1) y = 2x-5x^2 2) y = x-5x^2

3) 2y = 2x - 5x^2 (d) 4y = 2x - 25 x^2

33. A projectile is thrown in the upward direction making an angle of 60° with the horizontal direction with a velocity of 147 ms^{-1}. Then the time after which its inclination with the horizontal is 45°, is

1) 15 s 2) 10.98 s 3) 5.49 s 4) 2.745 s

34. The time of flight of a projectile on an upward inclined plane depends upon

1) angle of inclination of the plane

2) angle of projection

3) the value of acceleration due to gravity

4) all of the above.

35. If u is the initial velocity of a projectile and v is the velocity at any instant, then the maximum horizontal range R_m is equal to

1) $R_m=\frac{u^2\sin 2\theta}{g}$ 2) $R_m=\frac{v^2}{g}$

3) $R_m=\frac{v^2\sin 2\theta}{g}$ 4) $R_m=\frac{u^2}{g}$

Part-2 : Physics : Section-B (36-50)

Answer Any Ten Questions

36. The equation of a projectile is $y=\sqrt{3}x-\frac{gx^2}{2}$. The angle of projection is given by

1) $\tan\theta=\frac{1}{\sqrt{3}}$ 2) $\tan\theta=\sqrt{3}$ 3) $\frac{\pi}{2}$ 4) zero

37. The resultant of the two vectors having magnitude 2 and 3 is 1. What is the magnitude of their cross product

1) 6 2) 3 3) 1 4) 0

38. An object originally at the point (2, 5, 1) cm is given a displacement $8\hat{i}-2\hat{j}+\hat{k}$ cm . The co-ordinates of the new position are

1) (10, 3, 2) cm 2) (8, -2,+ 1) cm

3) (0, 0, 0) 4) data not correct.

39. 14. The angles which a vector $\hat{i}+\hat{j}+\sqrt{2}\hat{k}$ makes with X. Y and Z axes respectively are

1) 60°, 60°, 60° 2) 45°, 45°. 45°

3) 60°, 60°, 45° 4) 45°, 45°, 60°

40. Two forces of magnitude F have a resultant of the same magnitude F. The angle between the two forces is

1) 45° 2) 120° 3) 150° 4) 60°

41. A truck travelling due north with 20m/s turns towards west and travels at the same speed. Then the change in velocity is –

1) 40 m/s north-west

2) $20\sqrt{2}$ m/s north-west

3) 40 m/s south-west

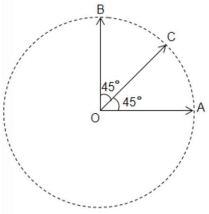
4) $20\sqrt{2}$ m/s south-west

42. Coordinates of a moving particle are given by $x = ct^2$ and $v = bt^2$. The speed of the particle is given by

1) 2t (c + b) 2) $2t\sqrt{c^2-b^2}$

3) $t\sqrt{c^2+b^2}$ 4) $2t\sqrt{c^2+b^2}$

43. The three vectors OA, OB and OC have the same magnitude R. Then the sum of these vectors have magnitude –



1) R 2) $\sqrt{2}R$ 3) 3R 4) $\left(1+\sqrt{2}\right)R$

44. A particle moves from a point $\left(-2\hat{i}+5\hat{j}\right)$ to $\left(4\hat{j}+3\hat{k}\right)$ when a force of $\left(4\hat{i}+3\hat{j}\right)$ N is applied. How much work has been done by the force?

1) 8 J 2) 11 J 3) 5 J 4) 2 J

45. If $f(x)= x^2 - 2x + 4$, then f(x) has:

1) a minimum at x=1.

2) a maximum at x=1.

3) no extreme point.

4) no minimum.

46. A vector $\vec{A}$ is directed along 30° west of north direction and another vector $\vec{B}$ along 15° south of east. Their resultant cannot be in _direction.

1) North 2) East

3) North-East 4) South

47. The unit vector perpendicular to $\hat{i}-2\hat{j}+\hat{k}$ and $3\hat{i}+\hat{j}-2\hat{k}$ is

1) $\frac{5\hat{i}+3\hat{j}+7\hat{k}}{\sqrt{83}}$ 2) $\frac{3\hat{i}+5\hat{j}+7\hat{k}}{\sqrt{83}}$

3) $\frac{5\hat{i}+3\hat{j}-7\hat{k}}{\sqrt{83}}$ 4) $\frac{3\hat{i}-5\hat{j}+7\hat{k}}{\sqrt{83}}$

48. If for two vectors $\vec{A}$ and $\vec{B}$, $\vec{A}\times\vec{B} = 0$, then the vectors:

1) are perpendicular to each other.

2) are parallel to each other.

3) act at an angle of 60°.

4) act at an angle of 30°.

49. What is the torque of a force $\vec{F}=\left(2\hat{i}-3\hat{j}+4\hat{k}\right)$ newton acting at a point $\vec{r}=\left(3\hat{i}+2\hat{j}+3\hat{k}\right)$ metre about the origin? (Given: $\vec{\tau}=\vec{r}\times\vec{F}$)

1) $6\hat{i}-6\hat{j}+12\hat{k}$ 2) $17\hat{i}-6\hat{j}-13\hat{k}$

3) $-6\hat{i}+6\hat{j}-12\hat{k}$ 4) $-17\hat{i}+6\hat{j}-13\hat{k}$

50. The angle between vectors $\left(\vec{A}\times\vec{B}\right)$ and $\left(\vec{B}\times\vec{A}\right)$ is

1) Zero 2) π 3) π/4 4) π/2

Part-1 : Chemistry : Section-A (51-85)

51. General electronic configuration of actinoids is $(n-2)f^{1-14}(n-1)d^{0-2}ns^2$. Which of the following actinoids have one electron in 6d orbital?

a) U (Atomic no. 92)

b) Np (Atomic no.93)

c) Pu (Atomic no. 94)

d) Am (Atomic no. 95)

Choose the correct option

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

52. The element with the highest first ionisation potential is :

1) Boron 2) Carbon

3) Nitrogen 4) Oxygen

53. The ion with highest radius is ?

1) Na^+ 2) N^{3-} 3) F^- 4) Al^{3+}

54. In the series C, N, O and F, the electronegativity?

1) Decreases from C to F

2) Increases from C to F

3) Remains constant

4) Decreases from C to O and then in

55. The correct order of atomic size is ?

1) Be > C > F > Ne

2) Be < C < F < Ne

3) Be > C > F < Ne

4) F < Ne < Be < C

56. Elements of the same group in the period table are characterised by the same?

1) Ionisation potential

2) Electronegativity

3) Electron affinity

4) Number of valence electrons

57. The decreasing order of second ionisation potential of K, Ca and Ba (Z : K = 19, Ca = 20, Ba = 56)

1) K > Ca > Ba 2) Ca > Ba > K

3) Ba > K > Ca 4) K > Ba > Ca

58. The process requiring the absorption of energy is ?

1) $F \rightarrow F^-$ 2) $H \rightarrow H^-$

3) $Cl \rightarrow Cl^-$ 4) $O \rightarrow O^{2-}$

59. Pd has exceptional electronic configuration $4d^{10}\ 5s^0$. It belongs to

1) 4^{th} group 2) 6^{th} group

3) 10^{th} group 4) None of these

60. Assertion : The first ionisation energy of *Be* is greater than boron

Reason : 2*p* orbitals have lower energy than 2*s* orbitals.

1) If both assertion and reason are true and the reason is the correct explanation of the assertion.

2) If both assertion and reason are true but reason is not the correct explanation of the assertion.

3) If assertion is true but reason is false.

4) If the assertion and reason both are false.

61. Match List-I with List-II and select the correct answer using the codes given below.

	List I (Successive IE)			**List II (Elements)**	
	IE_1	IE_2	IE_3		
		(kJ mol^{-1})			
1.	1312	-----	-----	A.	H
2.	520	7297	14810	B.	Li
3.	900	1758	14810	C.	Be
4.	800	2428	3660	D.	B

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

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

62. $_6C^{11}$ and $_5B^{11}$ are called

1) Nuclear isomers 2) Isobars

3) Isotopes 4) Fission products

63. The energy of an exicted electron of a H-atom is – 3.4 eV. What is the angular momentum of electron?

1) $\frac{h}{\pi}$ 2) $\frac{h}{2\pi}$ 3) $\frac{2h}{\pi}$ 4) $\frac{3h}{\pi}$

64. Principal, azimuthal and magnetic quantum numbers are respectively related to

1) size, shape and orientation

2) shape, size and orientation

3) size, orientation and shape

4) None of these

65. Bohr's model of the atom can explain

1) The spectrum of H-atom only

2) The spectrum of hydrogen molecule

3) The spectrum of atom or ion containing one electron only

4) The solar spectrum

66. According to Pauli's exclusion principle :

1) No two electrons can have the same energy in an orbital

2) No two electrons can have the parallel spin in an orbital

3) As far as possible the electrons fill in different orbitals

4) Electron try to occupy the orbital of lower energy

67. If the radius of first orbit of H-atom is 5 pm, the radius of third orbit Li^{2+} will be

1) 106 pm 2) 23 pm 3) 32 pm 4) 15 pm

68. Heisenberg uncertainty principle can be explained as

1) $\Delta x \geq \frac{\Delta P \times h}{4\pi}$ 2) $\Delta x \times \Delta P \geq \frac{h}{4\pi}$

3) $\Delta x \times \Delta P \geq \frac{h}{2\pi}$ 4) $\Delta P \geq \frac{\pi h}{\Delta x}$

69. Which of the d-orbital lies in the xy-plane?

1) d_{xz} only 2) d_{xy} only

3) $d_{x^2-y^2}$ only 4) d_{xy} & $d_{x^2-y^2}$ only

70. If n = 6, the correct sequence of filling of electrons will be

1) $ns \rightarrow np \rightarrow (n-1)d \rightarrow (n-2)f$

2) $ns \rightarrow (n-2)f \rightarrow (n-1)d \rightarrow np$

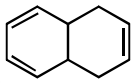
3) $ns \rightarrow (n-1)d \rightarrow (n-2)f \rightarrow np$

4) $ns \rightarrow (n-2)f \rightarrow np \rightarrow (n-1)d$

71. Which sub-shell is not permissible

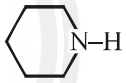
1) 2d 2) 4f 3) 6p 4) 3s

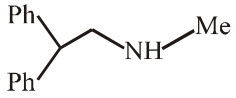
72. The number of sp^2–sp^2 hybrid σ bonds in the following compound is :

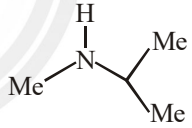


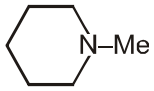
1) 3 2) 4 3) 5 4) 6

73. Identify the 3° amines?

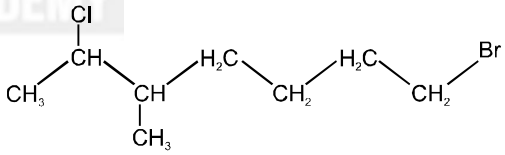
1) 

2) 

3) 

4) 

74. IUPAC name of following compound is :

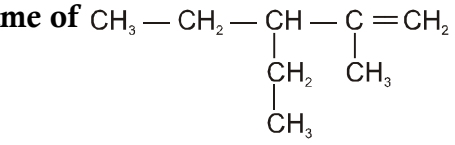


1) 2-Chloro-3-methyl-7-bromoheptane

2) 7-Bromo-2-chloro-7-methylheptane

3) 1-Bromo-5-methyl-6-chloroheptane

4) 1-Bromo-6-chloro-5-methyl heptane

75. IUPAC name of  **is :**

1) 2-Methyl-3-ethyl-1-pentene

2) 3-Ethyl-4-methyl-4-pentene

3) 3-Ethyl-2-methyl-1-pentene

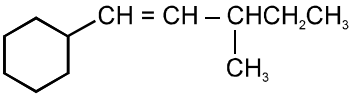
4) 3-Methyl-2-ethyl-1-pentene

76. $CH_2 = CH -$ is called as :

1) Isoethyl 2) Ethenyl or vinyl

3) s-ethyl 4) Ethene

77. IUPAC name of the compound



is :

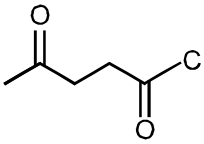
1) 1-Cyclohexyl-3-methylpent-1-ene

2) 3-Methyl-5-cyclohexylpent-1-ene

3) 1-Cyclohexyl-3-ethylbut-1-ene

4) 1-Cyclohexyl-3,4-dimethylbut-1-ene

78. The correct IUPAC name of compound



is :

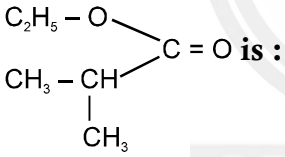
1) 1-Chloropentane-1, 4-dione

2) 4-Chlorocarbonylbutan-2-one

3) 4-Oxopentanoyl chloride

4) 3-Oxobutanecarbonyl chloride

79. The IUPAC name of



is :

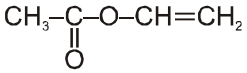
1) Ethoxymethanone

2) Ethyl 2-methylpropanoate

3) Ethoxypropanone

4) 2-Methylethoxypropanone

80. Common name of the given compound

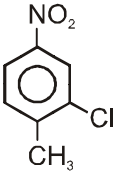


is :-

1) vinyl acetate 2) acryl acetate

3) methyl acrylate 4) Vinyl ethanoate

81.



has the IUPAC name-

1) 4-Methyl-5-Chloro-1-nitrobenzene

2) 1-Methyl-4-nitro-6-Chloro benzene

3) 2-Chloro-1-methyl-4-nitrobenzene

4) 1-Chloro-2-methyl-5-nitrobenzene

82. The largest number of molecules is present in 1 g of

1) CO_2 2) H_2O 3) C_2H_5OH 4) N_2O_5.

83. The empirical formula of a compound of molecular mass 120 is CH_2O. The molecular formula of the compound is :

1) $C_2H_4O_2$ 2) $C_4H_8O_4$

3) $C_3H_6O_3$ 4) all of these

84. If 1.5 moles of oxygen combine with Al to form Al_2O_3, the weight of Al used in the reaction is:

1) 27 g 2) 40.5 g 3) 54g 4) 81 g

85. The volume of oxygen necessary for the complete combusion of 20 litre of propane is :

1) 40 litre 2) 60 litre

3) 80 litre 4) 100 litre

Part-2 : Chemistry : Section-B (86-100)

Answer Any Ten Questions

86. The correct order of relative stability of half filled and completely filled shells is ?

1) $p^3 < d^5 < d^{10} < p^6$

2) $d^5 > p^3 > d^{10} > p^6$

3) $d^5 < p^3 < d^{10} < p^6$

4) $p^3 < d^{10} < d^5 < p^6$

87. In which of the following process highest energy is absorbed

1) $Cu \rightarrow Cu^+$ 2) $Br \rightarrow Br^-$

3) $I \rightarrow I^-$ 4) $Li \rightarrow Li^+$

88. $^{238}_{92}U$ (IIIB) changes to $^{234}_{90}Th$ by emission of a-particle, Daughter element will be in

1) III A 2) I B 3) V B 4) III B

89. Match list I with list II & then select the correct answer from the codes given below

List - I		List - II	
(A)	Increasing atomic size	(p)	Cl < O < F
(B)	Decreasing atomic radius	(q)	B > Be > Li
(C)	Increasing electronegativity	(r)	Si < Al < Mg
(D)	Decreasing effective nuclear charge	(s)	N > O > F

	A	B	C	D
1)	r	s	p	q
2)	s	q	r	p
3)	p	r	q	s
4)	q	p	s	r

90. **Assertion:** *F* atom has a less negative electron affinity than Cl atom

Reason : Additional electrons are repelled more effectively by 3*p* electrons in Cl atom than by 2*p* electrons in F atom

1) If both assertion and reason are true and the reason is the correct explanation of the assertion.

2) If both assertion and reason are true but reason is not the correct explanation of the assertion.

3) If assertion is true but reason is false.

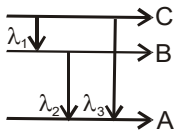
4) If the assertion and reason both are false.

91. Which of the following lanthanoid ions is diamagnetic?

(At nos. Ce = 58, Sm = 62, Eu = 63, Yb = 70)

1) Yb^{2+} 2) Ce^{2+} 3) Sm^{2+} 4) Eu^{2+}

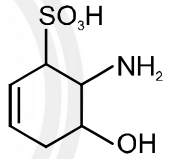
92. Energy levels A, B, C of a certain atom corresponds to increasing values of energy, i.e., $E_A < E_B < E_C$. If l_1, l_2 and l_3 are the wavelengths of radiations corresponding to the transitions C to B, B to A and C to A respectively, which of the following statement is correct :

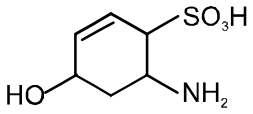


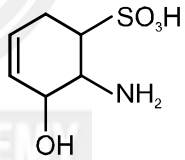
1) $\lambda_3 = \lambda_1 + \lambda_2$ 2) $\lambda_3 = \frac{\lambda_1\lambda_2}{\lambda_1 + \lambda_2}$

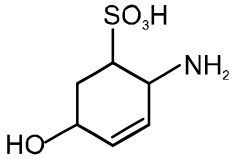
3) $\lambda_1 + \lambda_2 + \lambda_3 = 0$ 4) $\lambda_3^2 = \lambda_1^2 + \lambda_2^2$

93. The correct structure of 6-Amino-4-hydroxycyclohex-2-ene-1-sulphonic acid is :

1) 

2) 

3) 

4) 

94. Total number of atoms in 196 amu H_2SO_4 are

1) 14 N_A 2) 14

3) 7 N_A 4) 7

95. Vapour density of a gas if its density is 0.178 g/L at NTP is :

1) 0.178 2) 2

3) 4 4) 0.089

96. The equation :

$2Al(S) + \frac{3}{2} O_2(g) \rightarrow Al_2O_3(S)$ show that

1) 2 mole of Al reacts with $\frac{3}{2}$ mole of O_2 to produce $\frac{7}{2}$ mole of Al_2O_3

2) 2g of Al reacts with $\frac{3}{2}$ g of O_2 to produce one mole of Al_2O_3

3) 2g mole of Al reacts with $\frac{3}{2}$ litre of O_2 to produce 1 mole of Al_2O_3

4) 2 mole of Al reacts with $\frac{3}{2}$ mole of O_2 to produce 1 mole of Al_2O_3

97. When 100g of ethylene polymerises entirely to polyethene, the weight of polyethene formed as per the equation $n(C_2H_4) \rightarrow (-CH_2-CH_2-)_n$ is:

$n(C_2H_4) \rightarrow (-CH_2-CH_2-)_n$.

1) (n/2)g 2) 100g

3) (100/n)g 4) 100ng

98. 10 g of a sample of a mixture of $CaCl_2$ and NaCl is treated to precipitate all the calcium as $CaCO_3$. This Ca CO_3 is heated to convert all the Ca to CaO and the final mass of CaO is 1.62 g . The percent by mass of $CaCl_2$ in the original mixture is.

1) 32.1 % 2) 16.2 %

3) 21.8 % 4) 11.0 %

99. One mole of potassium chlorate ($KClO_3$) is thermally decomposed and excess of aluminium is burnt in the gaseous product. How many mol of aluminium oxide (Al_2O_3) are formed ?

1) 1 2) 1.5

3) 2 4) 3

100. The weight of lime obtained by heating 200 kg of 95% pure lime stone is :

1) 98.4 kg 2) 106.4 kg

3) 112.8 kg 4) 122.6 kg

PART-1 : Botany : Section-A (101-135)

101. Which is the correct statements from the following:

I. Synapsis of homologous chromosomes takes place during prophase I of meiosis.

II. Division of centromeres takes place during anaphase I of meiosis.

III. Spindle fibres disappear completely in telophase of mitosis.

IV. Nucleoli reappear at telophase I of meiosis.

1) I only 2) III only

3) I and II only 4) I, III and IV only

102. The longest phase of meiosis I is

1) Metaphase I 2) Prophase I

3) Anaphase I 4) Telophase I

103. During meiosis, the crossover occurs between

1) Sister chromatids of homologous chromosomes

2) Non-sister chromatids of homologous chromosomes

3) Sister chromatids of non-homologous chromosomes

4) Non-homologous chromatids of homologous chromosomes

104. G_1 phase is

1) End of mitosis and the start of S-phase

2) End of S-phase and the start of mitosis

3) Start of S-phase and the start of mitosis

4) End of S-phase and the end of mitosis

105. A cell has 23 pairs of chromosomes just after the completion of mitotic telophase. The number of chromatids at the preceding metaphase was

1) 23 2) 46 3) 69 4) 92

106. Terminalization occurs during

1) Mitosis 2) Diakinesis

3) Cytokinesis 4) Meiosis II

107. Tetrad is made of

1) Four non-homologous chromatids

2) Four non-homologous chromosomes

3) Four homologous chromosomes with four chromatids

4) Two homologous chromosomes and each with two chromatids

108. The cellular structure which always disappears during mitosis or meiosis is

1) Plastids

2) Plasma membrane

3) Nucleolus and nuclear envelope.

4) None of these

109. Select the correct statement from the following:

1) In leptotene stage the chromosomes become gradually visible under light microscope.

2) During zygotene the heterologous chromosome shows pairing.

3) Chiasmata is a J-shape structure formed in diplotene.

4) Pachytene is characterized by the formation of synaptonemal complex.

110. Most of the cell organelle duplicates during

1) G_1 phase 2) S-phase

3) G_2 phase 4) M-phase

111. Select the total number of correct statement:

I. Cell-plate formation occurs in plant cell during cytokinesis.

II. During cytokinesis mitochondria and plastid gets distributed between two daughter cells in mitosis.

III. Liquid endosperm in coconut is syncytium.

IV. Furrow formation occurs in Animal cell during cytokinesis

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

112. Assertion: Chiasmata is formed during diplotene.

Reason: Chiasmata are formed due to the deposition of nucleoproteins.

1) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.

2) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.

3) If the assertion is true but the reason is false.

4) If both the assertion and reason are false.

113. Select the incorrect statement:

1) Micro bodies contain various enzyme and are present in both plant and animal cells.

2) Few chromosomes have non-staining secondary constriction of constant location. This give the appearance of a small fragment called the satellite.

3) Nuclei are spherical structures present in nucleoplasm and it is a site for ribosomal RNA synthesis.

4) Every chromosome essentially has a secondary constriction or the centromere on the sides of which disc shaped structures called kinetochores are present.

114. Match the column:

Column I	**Column II**
A. Metacentric chromosomal	1. Middle centromere
B. Sub-metacentric	2. Centromere slightly way from middle

C. Acrocentric	3. Centromere close to its end
D. Telocentric	4. Terminal centromere

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

115. Select the incorrect statement:

1) Cilia and flagella are hair-like outgrowths of the cell membrane.
2) Cilia causes the movement of either the cell or the surrounding medium.
3) Bacterial flagella are structurally similar to eukaryotic flagella.
4) Flagella is responsible for cell movement.

116. Which of the following is true about the internal structure of axoneme?

1) Central sheath is connected to one of the tubule of each peripheral doublets by a radial spoke.
2) Axoneme is not covered by plasma membrane at all.
3) Then are only and radial spokes are found.
4) Peripheral doublets are not connected with each other.

117. The types of ribosome present in eukaryote cell is

1) 70S 2) 80S
3) Both (1) and (2) 4) None of these

118. The contractile vacuole present in amoeba is useful for

1) Ingestion 2) Locomotion
3) Both (1) and (2) 4) Excretion

119. In 30S and 40S ribosomes, 'S' stands for

1) Sub-unit 2) Svedberg's unit
3) Single unit 4) Size

120. Which of the following wall is capable of growth in a plant cell?

1) Primary wall 2) Secondary wall
3) Both (1) and (2) 4) Middle lamella

121. How many of the following are not included in endomembrane system?

Endoplasmic Reticulum, Golgi complex, Lysosome, Mitochondria, Chloroplast, Vacuoles, Peroxisomes

1) 2 2) 3 3) 4 4) 5

122. The functions of cell wall in eukaryotic cells

1) Give shape to cell
2) Prevent from mechanical damage
3) Protects from infection
4) All of these

123. Which of the following represent prokaryotic cell?

1) Blue-green algae 2) PPLO
3) Bacteria 4) All of these

124. The longest cells in human body are

1) Muscle cells 2) Cardiac muscle cells
3) Neurons 4) None of these

125. Who was the German botanist to study the different cells forming plant tissues?

1) Schleiden 2) Schwann
3) Rudolf Virchow 4) None of these

126. Which of the following pigments is essential for the nitrogen fixation by leguminous plants?

1) Anthocyanin 2) Phycocyanin
3) Phycoerythrin 4) Leghaemoglobin

127. Knot like bodies known as 'nodules' are found in the roots of groundnut plant it is produced by

1) Azospirillum 2) Azotobacter
3) Pseudomonas 4) Rhizobium

128. Phosphorus is a structural element in

1) Fat 2) Starch
3) Nucleotide 4) Carbohydrate

129. The most abundent element present in the plants is

1) Manganese 2) Iron
3) Carbon 4) Nitrogen

130. Function of zinc is

1) Synthesis of chlorophyll
2) Biosynthesis of IAA
3) Closing of stomata
4) Oxidation of carbohydrate

131. The death of stem and root tips occur due to the deficiency of

1) Phosphorus 2) Calcium
3) Nitrogen 4) Carbon

132. Which elements are relatively immobilized?

1) N and P 2) K and Mg
3) S and Ca 4) N and Mg

133. What is critical concentration?

1) Concentration of essential element which causes flowering in plants.
2) Concentration of essential element which is easily absorbed by plants.
3) Concentration of essential element below which the plant growth is retarded.
4) All the above

134. Which is the main amino acid that is used for transamination?

1) Tyrosine 2) Proline
3) Glutamic acid 4) Alanine

135. The enzyme nitrogenase is

1) Mo-Fe protein
2) Mo-Mn protein
3) Mn-Fe protein 4) Cu-Fe protein

PART-2 : Botany : Section-B (136-150)

Answer Any Ten Questions

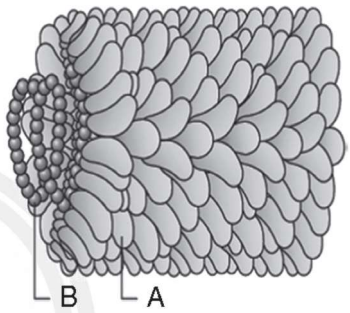
136. Which element is involved in the formation of mitotic spindle?

1) N 2) P 3) Ca 4) K

137. What is the number of the absolutely essential elements for growth and metabolism of all plants?

1) 14 2) 17 3) 21 4) 23

138. Identify the A and B shown in this figure.



1) A-DNA, B-Capsid 2) A-RNA, B-DNA
3) A-Capsid, B-RNA4) A-RNA, B-Capsid

139. In lichen, the algal component is called_and fungal component is called _____

1) mycobiont, phycobiont
2) phycobiont, mycobiont
3) phycobiont, mycorrhazia
4) mycorrhaiza, mycobiont

140. Virus infected plants generally have

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

141. Potato spindle tuber disease is caused by

1) Virus 2) Viroids 3) Lichens4) Fungi

142. Karyogamy and meiosis occurs in basidium produces_basidiospores.

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

143. Which of the following is extensively used in biochemical and genetic work?

1) Aspergillus 2) Claviceps
3) Neurospora 4) Penicillium

144. The following fungus belongs to class ascomycetes (count the total number).

Rhizopus, Penicillium, Yeast, Mucor, Agaricus, Puccinia, Albugo, Claviceps, Neurospora, Alternaria, Trichoderma, Aspergillus, Ustilago, Morels, Buffles, Colletotrichum, Toadstool

1) 5 2) 7 3) 9 4) 10

145. Euglenoids have flexible body because of

1) Cellulosic wall 2) Protein rich pellicle
3) Lipoic wall 4) Pectinic wall

146. Sleeping sickness is caused by

1) Plasmodium 2) Paramoecium
3) Trypanosoma 4) Entamoeba

147. Motile bacteria possess

1) Cilia 2) Flagella
3) Both (1) and (2) 4) None of these

148. Which one is correct about reproduction in bacteria?

1) Mainly by binary fission
2) Spores are formed under unfavorable condition
3) Sexual reproduction by transfer of DNA from one to another
4) All of these

149. Aristotle classified plants in herbs, shrubs and trees on the basis of

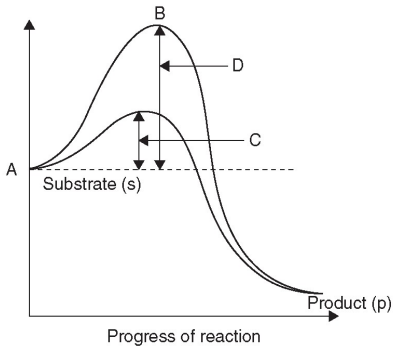
1) Anatomical feature
2) Morphological characters
3) Physiological characters
4) Biochemical characters

150. In which year Whittaker proposed the five kingdom classification?

1) 1960 2) 1959 3) 1969 4) 1979

Part-1 : Zoology : Section-A (151-185)

151. The figure given below shows the conversion of a substrate into product by an enzyme. In which one of the options (a to d) the components of reaction labelled as A, B, C and D are identified correctly?

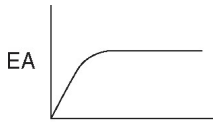


	A	B	C	D	E
1)	Potential energy	Transition state	Activation energy with enzyme	Activation energy enzyme	without
2)	Transition state	Potential energy	Activation energy without enzyme	Activation energy	with enzyme
3)	Potential energy	Transition state	Activation energy without enzyme	Activation energy	with enzyme
4)	Activation energy with enzyme	Transition state	Activation energy without enzyme	Potential energy	

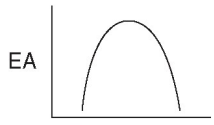
152. Haem is a prosthetic group of_enzyme

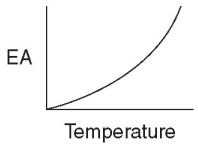
1) Peroxidase 2) Catalase
3) Both (1) and (2) 4) None of these

153. Which one of the graphs shows the effect of temperature on the enzymatic activity?

1) 

2) 

3) 

4) 

154. $CO_2 + H_2O \Leftrightarrow H_2CO_3$

Carbonic acid

Which one of the following statement is incorrect about the above reaction?

1) In the absence of enzyme, the rate of H_2CO_3 formation is about 200 molecules per hour.

2) When carbonic anhydrase catalyses the same reaction, there is no change in the rate of H_2CO_3 formation.

3) The reaction catalyzed by the enzyme shows dramatically higher decrease speed about 600,000 molecules being formed every second (rate becomes 10 million times more).

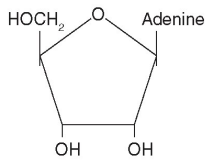
4) The enzymes carbonic anhydrase occurs in abundance of RBC's.

155. Which one of the following is a secondary metabolite?

1) Amino acid 2) Sugar

3) Flavonoides and antibiotics 4) Protein

156. Which one is correct about the following diagram?



1) It is a nucleotide.

2) It contains pyrimidine nitrogen base.

3) It is used to form DNA.

4) It is used to form RNA.

157. Sugar + Nitrogen bases + Phosphate forms

1) Nucleoside 2) Nucleotide

3) Peptide 4) Glycoside

158. The most abundant protein in whole biosphere is

1) RuBisCO 2) Collagen

3) Elastin 4) Albumin

159. How many amino-acids are used to form protein?

1) 18 2) 20 3) 21 4) 22

160. The bond formed between two adjacent monosaccharide is

1) Peptide bond 2) Ester bond

3) Glycosidic bond 4) Ionic bond

161. _of the total cell mass is formed by ions.

1) 1% 2) 2% 3) 3% 4) 4%

162. Which of the following is homopolysaccharide?

1) Cellulose 2) Inulin

3) Starch 4) All of these

163. In the primary structure of protein

1) Left end represents → 1st amino acid (C-terminal amino acid)

2) Right end represents → Last amino acid (N terminal amino acid)

3) Left end represents → 1st amino acid (N-terminal amino acid)

4) Right end represents → 1st amino acid (C-terminal amino acid)

164. Which of the following multiply through fragmentation?

1) Fungi 2) Filamentous algae

3) Planaria 4) All of these

165. Which of the following is self-conscious?

1) Human being 2) Tiger

3) Lion 4) Frog

166. Metabolic reactions take place

1) In vitro 2) In vivo

3) both (1) and (2)

4) only in unicellular organisms

167. Zoological name of house fly is

1) Mangifera indica

2) Solanum tuberosum

3) Solanum melongena

4) Musca domestica

168. IBG is situated at

1) Kew 2) Howrah

3) Lucknow 4) Jodhpur

169. The keys are based on contrasting characters generally in pairs called

1) Duplex 2) Couplet

3) Dimer 4) All of these

170. The blood returning to the heart from lungs via pulmonary veins is rich in –

1) Number of RBCs per ml of blood

2) Haemoglobin per ml of blood

3) Oxygen per ml of blood

4) Nutrients per ml of blood

171. In heart of mammals, inpulses are initiated by SA node. This type of heart is called as –

1) Cholinergic 2) Adrenergic

3) Neurogenic 4) Myogenic

172. Epinephrine is secreted by–

1) Adrenal medulla and increases heart rate

2) Adrenal medulla and decreases heart rate

3) Adrenal cortex and increases heart rate

4) Adrenal cortex and decreases heart rate

173. Heart beat is accelerated by –

1) Cranial nerves and acetylcholine

2) Sympathetic nerves and acetylcholine

3) Cranial nerves and adrenaline

4) Sympathetic nerves and epinephrine

174. Which one of the following is the correct route through which impulse travels in the heart?

1) SA node → Purkinje fibres →Bundle of His →AV node →Heart muscles

2) AV node → SA node → Purkinje fibres → Bundle of His → Heart muscles

3) AV node → Bundle of His → SA node → Purkinje fibres →Heart muscles

4) SA node →AV node → Bundle of His → Purkinje fibres → Heart muscles.

175. The cardiac pacemaker in a patient fails to function normally. The doctors find that an artificial pace maker is to be grafted in him. It is likely, that it will be grafted, at the site of –

1) Sinoatrial node

2) Atrioventricular node

3) Atrioventricular bundle

4) Purkinje fibres

176. The wall of heart is made up of

1) Epicardium 2) Myocardium

3) Endocardium 4) All of the above

177. Bundle of His is a network of –

1) Nerve fibres found throughout the heart

2) Muscle fibres distributed throughout the heart walls

3) Muscle fibres found only in the interventricular septum

4) Nerve fibres distributed in the ventricles

178. Match blood vessels of human heart listed under column-I with functions given under Column-II; Choose the answer which gives correct combination of the alphabets of two columns –

Column I (Blood Vessel)		Column II (Function)	
A	Superior vena cava	p	Carries deoxygenated blood to lungs
B	Inferior vena cava	q	Carries oxygenated blood to lungs
C	Pulmonary artery	r	Bring deoxygenated blood from lower parts of the body to the right atrium
D	Pulmonary vein	s	Brings oxygenated blood to the left atrium
		t	Brings deoxygenated blood from upper parts of the body into the right atrium

1) A = t, B = p, C = r, D = q
2) A = t, B = r, C = p, D = s
3) A = s, B = t, C = r, D = p
4) A = t, B = s, C = r, D = p

179. Blood returns from lungs to the –

1) Right atrium 2) Right ventircle
3) Left ventricle 4) Left atrium

180. An artifical pacemaker is implanted subcutaneously and connected to the heart in patients –

1) Having 90% blockage of the three main coronary arteries
2) Having high blood pressure
3) With irregularity in the heart beat rhythm
4) Suffering from arteriosclerosis

181. Mitral valve in mammals guards the opening between –

1) Stomach and intestine
2) Pulmonary vein and left atrium
3) Right atrium and right ventricle
4) Left atrium and left ventricle

182. During allergic disorder there is increase in the number –

1) Lymphocytes 2) Basophils
3) Eosinophils 4) Neutrophils

183. The vagus nerve, on stimulation, will cause heart rate to –

1) Decrease 2) Increase
3) Remian unchanged 4) None of these

184. Cardiac output is determined by –

1) Heart rate 2) stroke volume
3) blood flow 4) Both (1) and (2)

185. Which type of white blood cells are concerned with the release of histamine and heparin?

1) Neutrophils 2) Basophils
3) Eosinophils 4) Monocytes

Part-2 : Zoology : Section-B (186-200)

Answer Any Ten Questions

186. The bundle of His sends electric impulse to the

1) AV node 2) SA node
3) Purkinje fibres 4) Atria

187. Average life span of an RBC is

1) 50 days 2) 70 days
3) 120 days 4) 220 days

188. Which of the following pairs is not correctly matched?

1) Amoebocytes – Transport food to non-feeding cells
2) Collar cells – Movement of water and filtering food
3) Osculum – Control of water entry
4) Spicules – Skeletal supporting element

189. Sponges need a continuous current of water flowing through their bodies for–

1) Respiration
2) Respiration and excretion
3) Respiration, excretion and reproduction
4) Respiration, excretion, nutrition and reproduction

190. Ctenophores have similarities with members of–

1) Porifera 2) Annelida
3) Coelenterata 4) Arthropoda

191. Absence of circulatory system in *Hydra* is compensated by

1) Pseudocoelomic fluid
2) Gastrovascular cavity
3) Presence of tentacles
4) None of these

192. Pseudocoelom is not found in –

1) *Ascaris* 2) *Ancylostoma*
3) *Fasciola* 4) Enterolobius

193. *Wuchereria bancrofti* is transmitted by the bite of–

1) *Culex* 2) *Anopheles*
3) Tsetse fly 4) Sand fly

194. Locomotion occurs in earthworm through–

1) setae
2) parapodia
3) setae and circular muscles
4) setae, circular and longitudinal muscles

195. Organs of locomotion in Echinoderms are–

1) Pseudopodia 2) Parapodia
3) Foot 4) Tube feet

196. Radial symmetry is found in –

1) Anopheles 2) Snail
3) Cockroach 4) *Asterias*

197. An unsegmented animal with coelom, radial symmetry, distinct oral and aboral surfaces is a member of–

1) Porifera 2) Mollusca
3) Echinodermata 4) Arthropoda

198. Representative of Hemichordata is

1) *Scoliodon* 2) *Myxine*
3) *Balanoglossus* 4) *Petromyzon*

199. Which of the following is not found in vertebrates?

1) Bilateral symmetry
2) Gill openings
3) Body scales
4) Cnidoblasts

200. Which one of the following animals has a notochord throughout its life?

1) Fish 2) Bird 3) Snake 4) *Amphioxus*

PACE FOR ROUGH WORK