Talent Search Exam. 2021

Please read the instructions carefully. You are alloted 5 minutes specifically for this purpose.

INSTRUCTIONS

A. General :

1. This booklet is your Question Paper. DO NOT break seal of Booklet until the invigilator instructs to do so. Total Questions to be Attempted 120: **Chemistry : 30, Physics : 30, Biology : 50 & MAT : 10 Questions.**

2. The Answer Sheet is provided to you separately which is a machine readable Optical Response Sheet (ORS). You have to mark your answers in the ORS by darkening bubble, as per your answer choice, by using black & blue ball point pen.

3. Things NOT ALLOWED in EXAM HALL : Blank Paper, clipboard, log table, slide rule, calculator, camera, mobile and any electronic or electrical gadget. If you are carrying any of these then keep them at a place specified by invigilator at your own risk.

4. Do not use white-fluid or any other rubbing material on answer sheet. Before handing over the answer sheet to the invigilator, candidate should check that **Roll No, Test code and Book Code** have been filled and marked correctly. Immediately after the prescribed examination time is over, the **Answer sheet is to be returned to the invigilator.**

B. Filling the Answer Sheet :

5. On Side-1 of Answer Sheet write your Name and Roll Number in the respective boxes. Do not write anything on Side-2.

6. **Marking Scheme:**

   a. If darkened bubble is RIGHT answer : 4 Marks.

   b. If no bubble is darkened in any question: No Mark.

   c. If darkened bubble is WRONG answer: –1 Mark (Minus One Mark).

7. Think wisely before darkening bubble as there is negative marking for wrong answer.

PROCEDURE OF FILLING UP THE ANSWERS IN ANSWER SHEET

Avoid Improper Marking

Partially Filled   Lightly Filled   Tick-Cross Marked

Proper Marking

Fully darken

Name of the candidate (In Capital Letters)

Roll Number

I have read all the instruction and shall abide by them.

....

(Signature of the candidate)

I have verified all the information filled in by the candidate.

....

(Signature of the Invigilator)

You can never quit. Winners never quit, and quitters never win.

[CHEMISTRY]

1. 112.0 mL of NO_2 at STP was liquefied, the density of the liquid being 1.15 g mL^{-1}. Calculate the volume and the number of molecules in the liquid NO_2.

(a) 0.10 mL and 3.01×10^{22}

(b) 0.20 mL and 3.01×10^{21}

(c) 0.20 mL and 6.02×10^{23}

(d) 0.40 mL and 6.02×10^{21}

2. How much $NaNO_3$ must be weighed out to make 50 ml of an aqueous solution containing 70 mg of Na^+ per mL?

(a) 12.394 g   (b) 1.29 g

(c) 10.934 g   (d) 12.934 g

3. The temperature at which molarity of pure water is equal to its molality is:

(a) 273 K   (b) 298 K

(c) 277 K   (d) None

4. A compound is composed of 74% C, 8.7% H and 17.3% N by mass. If the molecular mass of the compound is 162, what is its molecular formula?

(a) C_5H_7N (b) $C_{10}H_{16}N_2$

(c) $C_8H_{14}N_3$ (d) $C_{10}H_{14}N_2$

5. Calculate the volume of O_2 needed for combustion of 1 kg of carbon at STP. C + O_2 $\xrightarrow{\Delta}$ CO_2.

(a) 1866.67 L O_2 (b) 3733.33 L O_2

(c) 933.33 L O_2 (d) 4666.67 L O_2

6. A balloon filled with methane (CH_4) is pricked with a sharp point and quickly plunged into a tank of hydrogen at the same pressure. After sometime, the balloon will have:

(a) Enlarged

(b) Shrinked

(c) Remain unchanged in size

(d) Ethylene (C_2H_4) inside it

7. A box of 1 L capacity is divided into two equal compartments by a thin partition which is filled with 2 g H_2 and 16 gm CH_4 respectively. The pressure in each compartment is recorded as P atm. The total pressure when partition is removed will be:

(a) P   (b) 2P

(c) P/2   (d) P/4

8. Which of the following has been arranged in increasing order of size of the hybrid orbitals?

(a) $sp < sp^2 < sp^3$ (b) $sp^3 < sp^2 < sp$

(c) $sp^2 < sp^3 < sp$ (d) $sp^2 < sp < sp^3$

9. In pent-3-en-1-yne the terminal carbon-atoms have following hybridization:

(a) sp and sp^2 (b) sp^2 and sp^3

(c) sp^2 and sp   (d) sp and sp^3

10. $BF_3 + F^- \rightarrow BF_4^-$

What is the hybridization state of B in BF_3 and BF_4^-?

(a) sp^2, sp^3 (b) sp^3, sp^3

(c) sp^2, sp^2 (d) sp^3, sp^3d

11. A compound contains 16% sulphur. The minimum molecular weight of the compound is

(a) 200   (b) 400

(c) 100   (d) 800

12. 14 gm of N_2 and 36 gm of ozone are at same temperature and pressure. Their volumes will be related as

(a) $2V_{N_2} = 3V_{O_3}$ (b) $3V_{N_2} = 2V_{O_3}$

(c) $3V_{N_2} = 4V_{O_3}$ (d) $4V_{N_2} = 3V_{O_3}$

13. For the non-zero values of force of attraction between gas molecules, gas equation will be

(a) $PV = nRT - \dfrac{n^2 a}{V}$ (b) $PV = nRT + nbP$

(c) $PV = Nrt$ (d) $P = \dfrac{nRT}{V - b}$

14. A balloon filled with ethyne is pricked with a sharp point and quickly dropped in a tank of H2 gas under identical conditions. After a while the balloon will have

(a) Shrunk

(b) Enlarged

(c) Completely collapsed

(d) Remained unchanged in size

15. The plane which is passing through the nucleus on which probability of finding the electrons is almost zero is called

(a) Subshell   (b) Angular node

(c) Orbital   (d) Orbit

16. How many 3d electrons can have spin quantum number $-\dfrac{1}{2}$?

(a) 5   (b) 7

(c) 8   (d) 10

17. Which of the following has maximum number of unpaired electrons?

[At. No. of Ti = 22, V = 23, Fe = 26]

(a) Ti^{+3} (b) V^{+3}

(c) Fe^{+3} (d) Fe^{+2}

18. Which of the following is arranged in decreasing order of size?

(a) $Mg^{+2} > Al^{+3} > Na^+ > O^{-2}$

(b) $O^{-2} > Al^{+3} > Mg^{+2} > Na^+$

(c) $O^{-2} > Na^+ > Mg^{+2} > Al^{+3}$

(d) $Al^{+3} > Mg^{+2} > Na^+ > O^{-2}$

19. When the electron of a hydrogen atom jumps from the n = 4 to the n = 1 state, the number of spectral lines emitted is

(a) 15   (b) 6

(c) 3   (d) 4

20. The four quantum numbers of the valence electron of potassium are

(a) $4, 1, 1, \dfrac{1}{2}$ (b) $4, 0, 0, \dfrac{1}{2}$

(c) $4, 1, 0, \dfrac{1}{2}$ (d) $4, 3, 0, \dfrac{1}{2}$

21. The size of species I, I^+ and I^- decreases in order

(a) $I^+ > I^- > I$ (b) $I^- > I > I^+$

(c) $I^- > I^+ > I$ (d) $I > I^+ > I^-$

22. The total number of protons 4.4 g of CO_2

(a) 6.02×10^{23} (b) 6.02×10^{22}

(c) 13.244×10^{23} (d) 26.48×10^{22}

23. The magnetic moment of $Mn^{a+} = \sqrt{35}$ B.M. What is the value of 'a' (atomic number of Mn = 25)?

(a) 5 (b) 2

(c) 3 (d) 4

24. Orbital angular moment of 2p electron

(a) $\sqrt{3}\dfrac{h}{2\pi}$ (b) $\sqrt{6}\dfrac{h}{2\pi}$

(c) $\sqrt{2}\dfrac{h}{2\pi}$ (d) Zero

25. The type of hybrid orbitals used by the chlorine atom in ClO_2^- is

(a) dsp^2 (b) sp^2

(c) sp^3 (d) sp

26. How many σ and π bonds are present in P_4O_{10}

(a) 16σ, 4π (b) 20σ, 4π

(c) 16σ, 8π (d) 18σ, 4π

27. X ml of H_2 gas effuses through a hole in a container in 5 seconds. The time taken for the effusion of the same volume of the gas specified below under identical condition is

(a) 10 seconds : He

(b) 35 seconds : CO_2

(c) 20 seconds : CO

(d) 20 seconds : O_2

28. The plot between pressure and volume is given, choose the correct order of temperature
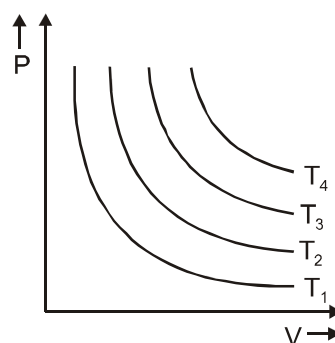
(a) $T_4 > T_3 > T_2 > T_1$

(b) $T_1 > T_2 > T_3 > T_4$

(c) $T_3 > T_2 > T_1 > T_4$

(d) $T_2 > T_3 > T_1 > T_4$

29. Which is not correctly matched?

(a) $XeF_4 \rightarrow$ Square planar

(b) $BCl_3 \rightarrow$ Triangular planar

(c) $SF_4 \rightarrow$ Square planar

(d) $H_3O^+ \rightarrow$ Pyramidal

30. The rms velocity of H_2 = 2400 m/sec at room temperature the rms velocity of O_3 at same temperature is

(a) 300 m/sec (b) 482 m/sec

(c) 4820 m/sec (d) 600 m/sec

4

[PHYSICS]

31. Which of the following has dimensions different from the others?

(a) Spring constant   (b) Energy per unit area

(c) Pressure × length   (d) Energy gradient

32. A block of mass m attached to the lower end of an inextensible string is in vertical circular motion. At the instant when it is at the lowest point, its acceleration is

(a) Vertically upward

(b) Vertically downward

(c) Obliquely upward

(d) Obliquely downward

33. In the situation shown, a person P of mass 40 kg moves from A to B on the wooden plank AB of mass 60 kg. The displacement of person with respect to ground will be
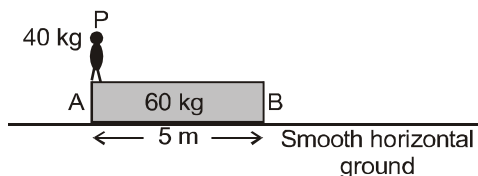

(a) 2 m   (b) 3 m

(c) 5 m   (d) 2.5 m

34. A ball of mass 10 kg is projected from the ground with kinetic energy 100 J making 60° with the horizontal. The work done on it by the force of gravity during its journey up to maximum height will be

(a) Zero   (b) –25 J

(c) –75 J   (d) –50 J

35. In the situation shown, the block of mass m = 10 kg is sliding down on an inclined plane AB with constant velocity. The force exerted on it by the inclined plane is (g = 10 ms^{-2})
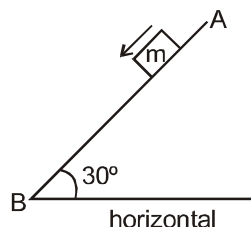
(a) 50 N   (b) 100 N

(c) Zero   (d) 150 N

36. A rough horizontal circular platform is rotating about its vertical axis. A small block of mass 2 kg kept on it at a distance of 20 cm from the axis is about to slide when the constant angular speed of rotation of the platform is 10 rads^{-1}. Select the incorrect statement from following

(a) The frictional force acting on the block provides the necessary centripetal force

(b) The acceleration of the block is zero

(c) The work done by the frictional force on the block is zero

(d) The force exerted on the block by the platform is not vertical

37. A person capable of swimming in still water with 5 kmh^{-1}, crosses a river 500 m wide in 7.5 minute along the shortest path. The speed of flow of water in the river is

(a) 3 kmh^{-1} (b) 4 kmh^{-1}

(c) 5 kmh^{-1} (d) 1.5 kmh^{-1}

5

38. A ball of mass m is projected from the ground with velocity $\vec{u}$ and it strikes the ground with velocity $\vec{v}$ where $\vec{u} \cdot \vec{v} = 0$. Its minimum kinetic energy during flight is

(a) $\dfrac{mu^2}{2}$

(b) $\dfrac{mu^2}{4}$

(c) $\dfrac{\sqrt{3}mu^2}{2}$

(d) $\dfrac{mu^2}{8}$

39. A bomb of mass 10 kg at rest on a horizontal smooth floor bursts into two parts of masses 4 kg and 6 kg and they move horizontally. If the speed, linear momentum and kinetic energy of 4 kg part are v_1, p_1 and E_1 respectively while those of 6 kg part are v_2, p_2 and E_2 respectively then

(a) $v_1 = v_2$, $p_1 = p_2$ and $E_1 = E_2$

(b) $v_1 > v_2$, $p_1 = p_2$ and $E_1 > E_2$

(c) $v_1 > v_2$, $p_1 = p_2$ and $E_1 < E_2$

(d) $v_1 < v_2$, $p_1 = p_2$ and $E_1 = E_2$

40. A small stone is projected in vertically upward direction from ground by a boy at time t = 0. It is at the same height at t = 3s and t = 5s. The maximum height reached by the stone is (g = 10 ms^{-2})

(a) 80 m

(b) 75 m

(c) 125 m

(d) 85 m

41. A body is taken slowly up the rough hill by a force F, Which is always directed along tangent to the path at each point. Mark the correct alternative
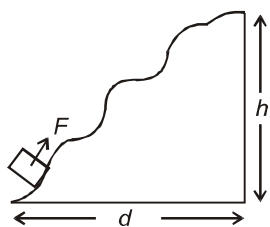
(a) Work done by friction depends on the shape of the surface

(b) Work done by friction does not depend on the shape of the surface

(c) Net work done by the force (F) is $mg\sqrt{x^2 + y^2}$

(d) Net work done by the force is mgy

42. The quantity $\int_{t_1}^{t_2} \vec{V}\, dt$ represents:

(a) Distance travelled during t_1 to t_2

(b) Displacement during t_1 to t_2

(c) Average acceleration during t_1 to t_2

(d) None of these

43. A particle of mass m is moving in a circular path of constant radius r such that its centripetal acceleration a_c is varying with time t as $a_c = k^2 r t^2$ where k is a constant. The power delivered to the particle by the forces acting on it is:

(a) $2\pi m k^2 r^2 t$

(b) $mk^2 r^2 t$

(c) $(mk^4 r^2 t^5)/3$

(d) Zero

44. A block of mass 'm' is suspended by a vertical spring of spring constant 'k'. Initially spring is in natural state and block is released from rest, which of the following is correct?

(a) Work done by 'mg' is negative from initial to equilibrium position

(b) Work done by spring is positive from initial to equilibrium position

(c) Net work done by all the forces is negative from initial to equilibrium position

(d) Net work done by all the forces is positive from initial to equilibrium position

45. In pure rotation of a body, its angular momentum is increased by 50% keeping moment of inertia constant, percentage change in K.E. is

(a) 100%   (b) 125%

(c) 25%   (d) 6.25%

46. A horizontal force F is applied on a system of two blocks as shown. What will be the maximum extension in the spring if the spring is initially relaxed? (k = spring constant)

Smooth
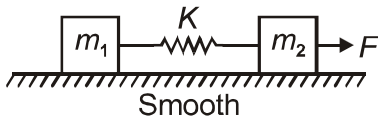
(a) $\dfrac{Fm_1}{(m_1 + m_2)K}$ (b) $\dfrac{2Fm_1}{(m_1 + m_2)K}$

(c) $\dfrac{2Fm_2}{(m_1 + m_2)K}$ (d) $\dfrac{Fm_2}{(m_1 + m_2)K}$

47. A block of mass 1 kg is held against a wall by applying a force as shown. The coefficient of friction between the surfaces of the block and the wall is 0.5. The friction force acting on the block is (Take g = 10 m/s²)
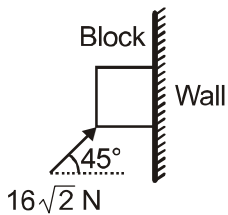
(a) Zero   (b) 10 N

(c) 6 N   (d) 8 N

48. A solid ball is rolling without slipping on a horizontal surface towards a smooth wall. When ball will again start rolling without slipping then

angular momentum of the ball about O will be [if collision is elastic]
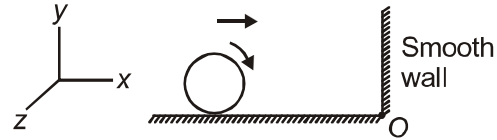
(a) In +z direction   (b) In –z direction

(c) Zero   (d) In –ve x-direction

49. A bead of mass $\dfrac{1}{2}$ kg starts from rest from A to move in a vertical plane along a smooth fixed quarter ring of radius 5 m, under the action of a constant horizontal force F = 5 N as shown. The speed of bead as it reaches the point B is [Take g = 10 ms⁻²]
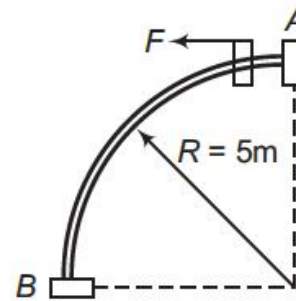

(a) 14.14 ms⁻¹   (b) 7.07 ms⁻¹

(c) 4 ms⁻¹   (d) 25 ms⁻¹

50. A smooth chain AB of mass m rests against a surface in the form of a quarter of a circle of radius R. If it is released from rest, the velocity of the chain after it comes over the horizontal part of the surface is
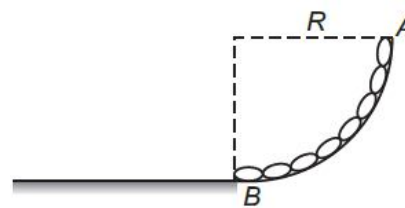
(a) $\sqrt{2gR}$ (b) $\sqrt{gR}$

(c) $\sqrt{2gR\left(1-\dfrac{2}{\pi}\right)}$ (d) $\sqrt{2gR(2-\pi)}$

51. A rod of mass M hinged at O is kept in equilibrium with a spring of stiffness k as shown in figure. The potential energy stored in the spring is
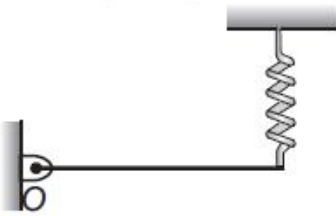
(a) $\dfrac{(mg)^2}{4k}$ (b) $\dfrac{(mg)^2}{2k}$

(c) $\dfrac{(mg)^2}{8k}$ (d) $\dfrac{(mg)^2}{k}$

52. A uniform chain of length πr lies inside a smooth semicircular tube AB of radius r. Assuming a slight disturbance to start the chain in motion, the velocity with which it will emerge from the end B of the tube will be
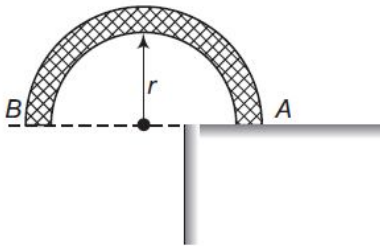

(a) $\sqrt{gr\left(1+\dfrac{2}{\pi}\right)}$ (b) $\sqrt{2gr\left(\dfrac{2}{\pi}+\dfrac{\pi}{2}\right)}$

(c) $\sqrt{gr(\pi+2)}$ (d) $\sqrt{\pi gr}$

53. Two bodies having masses m_1 and m_2 and velocities $\vec{u}_1$ and $\vec{u}_2$ collide and form a composite system of $m_1\vec{u}_1 + m_2\vec{u}_2 = 0(m_1 \ne m_2)$. The velocity of the composite system is:

(a) 0   (b) $\vec{u}_1 + \vec{u}_2$

(c) $\vec{u}_1 - \vec{u}_2$ (d) $(\vec{u}_1 + \vec{u}_2)/2$

54. Figure given below shows a rectangular plate of length L, the half of which is made of material of density d_1 and another half of density d_2. The distance of centre of mass from the origin O is:
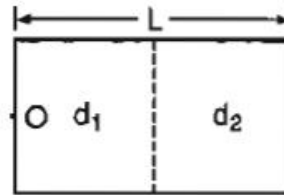
(a) $\dfrac{(d_1 + 2d_2)}{2(d_1 + d_2)}L$ (b) $\dfrac{(d_1 + 3d_2)L}{4(d_1 + d_2)}$

(c) $\dfrac{(d_1 + 3d_2)L}{2(d_1 + d_2)}$ (d) $\dfrac{(3d_1 + d_2)L}{4(d_1 + d_2)}$

55. A set of n identical cubical blocks lies at rest parallel to each other along a line on a smooth horizontal surface. The separation between the near surfaces of any two adjacent blocks in L. The block at one end is given a speed v towards the next one at time t = 0, all collisions are elastic then:

(a) The last block starts moving at t = $\dfrac{(n+1)L}{v}$

(b) The last block starts moving at t = $\dfrac{n(n-1)L}{2v}$

(c) The center of mass of the system will have the final speed v

(d) The center of mass of the system will have the final speed $\dfrac{v}{n}$

56. Two identical discs initially at rest are in contact on a table. A third disc of same mass but of double radius strikes them symmetrically and itself comes to rest after impact. The coefficient of restitution is:

(a) $\dfrac{9}{16}$

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

(c) $\dfrac{1}{2}$

(d) $\dfrac{1}{16}$

57. Four masses are fixed on a massless rod as shown in figure. The moment of inertia about the axis P is about:
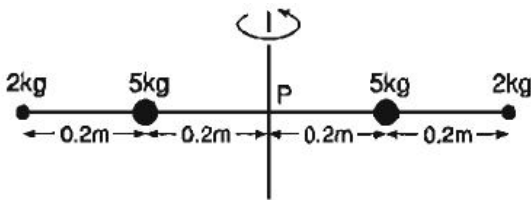
(a) 2 kg m^2 (b) 1.04 kg m^2

(c) 0.5 kg m^2 (d) 0.3 kg m^2

58. A mass m is moving at speed v perpendicular to a rod of length d and mass M = 6 m which pivots around a frictionless axle running through its centre. If strikes and sticks to the end of the rod. The moment of inertia of the rod about its centre is $Md^2/12$. Then the angular speed of the system just after the collision is:
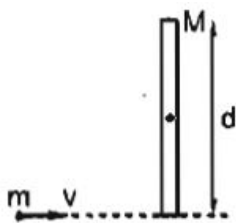
(a) $\dfrac{2v}{3d}$

(b) $\dfrac{2v}{d}$

(c) $\dfrac{v}{d}$

(d) $\dfrac{3v}{2d}$

59. A particle of mass m is moving in a horizontal circle of radius r under a centripetal force equal to $\left(-\dfrac{k}{r^2}\right)$, where k is a positive constant. Then if kinetic energy, potential energy and mechanical energy of the particle are KE, PE and ME respectively. Which one is correct?

(a) $KE = \left(\dfrac{k}{2r}\right)$, $PE = -\left(\dfrac{k}{r}\right)$, $ME = -\left(\dfrac{k}{2r}\right)$

(b) $KE = \left(\dfrac{k}{2r}\right)$, $PE = -\left(\dfrac{k}{2r}\right)$, $ME = zero$

(c) $KE = zero$, $PE = zero$, $ME = zero$

(d) $KE = \left(\dfrac{k}{r}\right)$, $PE = -\left(\dfrac{k}{2r}\right)$, $ME = \left(\dfrac{k}{2r}\right)$

60. A bullet of mass 'm' is fired with certain velocity from a gun of mass 'M'. Gun, which is attached with one end of spring compresses it by distance 'd'. If 'k' is spring constant, velocity of the bullet is:

(a) $\dfrac{d}{m}\sqrt{kM}$ (b) $\dfrac{d}{M}\sqrt{km}$

(c) $dm\sqrt{\dfrac{1}{Mk}}$ (d) $mk\sqrt{\dfrac{1}{dM}}$

[BIOLOGY]

61. The living steady state has a self-regulatory mechanism which is

(a) Homeostasis

(b) Feedback mechanism

(c) Heterozygous

(d) None of the above

62. Which of the following is against the rules of ICBN?

(a) Hand written scientific names should be underlined

(b) Every species should have a generic name and a specific epithet

(c) Scientific names are in Latin and should be italicized

(d) Generic and specific names should be written, starting with small letters

63. Which taxonomical aid provides all information's about a particular taxon like order or family?

(a) Herbarium   (b) Catalogue

(c) Taxonomic key   (d) Monograph

64. Five kingdom classification is not based on

(a) Presence or absence of a well-defined nucleus

(b) Mode of reproduction

(c) Mode of nutrition

(d) Complexity of body organization

65. Match the following columns.

Column I	Column II
A. Halophiles	1. Aquatic environment
B. Thermoacidophiles	2. Gut of ruminant
C. Methanogens	3. In hot springs
D. Cyanobacteria	4. Salty areas

(a) A-1; B-4; C-3; D-2   (b) A-3; B-2; C-1; D-4

(c) A-2; B-1; C-4; D-3   (d) A-4; B-3; C-2; D-1

66. Oxygen is not produced during photosynthesis by

(a) Green sulphur bacteria

(b) Chara

(c) Cycas

(d) Nostoc

67. In prokaryotes, chromatophores are

(a) Specialized granules responsible for colouration of cells

(b) Structures responsible for organizing the shape of an organism

(c) Inclusion bodies lying free inside the cells for carrying out various metabolic activities

(d) Internal membrane systems that may become extensive and complex in photosynthetic bacteria

68. A bacterial cell divides once every minute and it takes 1 hour to fill a cup. How much time will it take to fill half the cup?

(a) 30 minutes   (b) 60 minutes

(c) 29 minutes   (d) 59 minutes

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

(a) Dinoflagellates   (b) Euglenoids

(c) Cyanobacteria   (d) Diatoms

70. Which of the following groups of organism have a protein rich layer called pellicle?

(a) Chrysophytes   (b) Euglenoids

(c) Dinoflagellates   (d) Slime moulds

71. Slime moulds form.........under favourable conditions.

(a) Protonema   (b) Plasmodium

(c) Mycelium   (d) Fruiting bodies

72. Match the following columns.

Column I	Column II
A. Chief producer	1. Diatoms in the oceans
B. Red tides	2. Dinoflagellates
C. Connecting link between plants and animals	3. Euglneoids
D. Fungus animals	4. Slime mould

(a) A-3; B-4; C-1; D-2   (b) A-1; B-2; C-3; D-4

(c) A-2; B-3; C-4; D-1   (d) A-4; B-1; C-2; D-3

73. Ciliates different from all other protozoans in

(a) Using flagella for locomotion

(b) Having two types of nuclei

(c) Using pseudopodia for capturing prey

(d) Having a contractile vacuole for removing excess water

74. Match Column I with Column II and select the correct option from the codes given below.

Column I (Kingdoms)	Column I (Classes)
A. Morels	1. Deuteromycetes
B. Smut	2. Ascomycetes
C. Bread mould	3. Basidiomycetes
D. Imperfecti fungi	4. Phycomycetes

(a) A-3; B-4; C-1; D-2   (b) A-2; B-3; C-4; D-1

(c) A-4; B-1; C-2; D-3   (d) A-3; B-4; C-2; D-1

75. Members of Phycomucetes are found.

I. In aquatic habitats.

II. On decaying wood.

III. In moist and damp places.

IV. As obligate parasite on plants.

Which of the following statement given above are correct?

(a) I and II   (b) II, III and IV

(c) I, II and III   (d) I, II, III and IV

76. After karyogamy followed by meiosis, spores are produced exogenously in

(a) Neurospora   (b) Saccharimyces

(c) Agaricus   (d) Alternaria

77. Select the incorrect statement

(a) The term 'contagium vivum fluidum' was coined by MW Beijerinck

(b) Mosaic disease in tobacco and AIDS in human being are caused by viruses

(c) Ivanowski showed that viruses could be crystallized

(d) None of the above

78. Viroids were discovered by

(a) WM Stanley (b) DJ Ivanowski

(c) MW Beijerinck (d) TO Diener

79. The mycobiont in lichen

(a) Provides protection, anchorage and shelter for the alga

(b) Provides food for the alga

(c) Fixes the atmospheric nitrogen for the alga

(d) Releases oxygen for the alga

80. The radical symmetry is observed in

I. Platyhelminthes II. Coelenterates

III. Aschelminthes IV. Annelids

V. Echinoderms

(a) II, III and IV (b) I, II, III and V

(c) II only (d) II and V

81. Which of the following does not belong to phylum-Cnidaria?

(a) Sea pen (b) Sea lily

(c) Sea fan (d) Sea anemone

82. Which one of the following groups of animals reproduces only by sexual means?

(a) Cnidaria (b) Porifera

(c) Protozoa (d) Ctenophora

83. Which of the following animals has pseudocoelom?

(a) Pheretima (b) Ancylostoma

(c) Schistosoma (d) Taenia

84. 'Devil fish' belongs to phylum

(a) Chordata (b) Mollusca

(c) Annelida (d) Echinodermata

85. An aquatic living fossil, with ancient origin and many primitive characters which respires through book gills is

(a) Limulus (b) Cancer

(c) Lucifer (d) Daphnia

86. Which of the following is a hemichordate?

(a) Herdamania (b) Doliolum

(c) Balanoglossus (d) Branchiostoma

87. Match the following columns.

Column I	Column II
A. Squamous epithelium	1. Present in bronchioles
B. Cuboidal epithelium	2. Present in lungs
C. Columnar epithelium	3. Present in stomach
D. Ciliated epithelium	4. Present in kidneys

(a) A-3; B-2; C-1; D-4 (b) A-4; B-3; C-2; D-1

(c) A-2; B-4; C-3; D-1 (d) A-1; B-2; C-3; D-4

88. Given below is the diagrammatic sketch of a certain type of connective tissue.

Identify the parts labeled as A, B, C and D and select the right option about them.
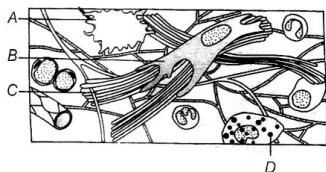
(a) A-Macropage, B-Fibroblast, C-Collagen fibres, D-Mast cell

(b) A-Mast cell, B-Macrophage, C-Fibroblast, D-Collagen fibres

(c) A-Macrophage, B-Collagen fibres, C-Fibroblast, D-Mast cell

(d) A-Mast cell, B-Collagen fibres, C-Fibroblast, D-Macrophage

89. 'Mummies' of Egypt still have their arteries preserved due to the presence of

(a) Yellow elastic connective tissue fibres

(b) White elastic connective tissue fibres

(c) Cartilage

(d) Velves

90. Which of the following cytoplasmic granules contain histamine?

(a) Basophils   (b) Acidophils

(c) Eosinophils   (d) Neutrophils

91. The term 'ash' in terms of living tissue sample analysis refers to

(a) Compounds evolved in the form of gases

(b) The residual material left after burning the tissue containing inorganic elements (e.g. calcium, magnesium, etc.)

(c) Organic compounds oxidized to gaseous form (CO_2 and water vapour) after burning of tissue

(d) Compounds which may be soluble in intracellular fluid

92. Which of the following secondary metabolites belong to the group of drugs?

I. Morphine   II. Curcumin

III. Codeine   IV. Vinblastin

V. Abrin

(a) I and II   (b) I and V

(c) II and III   (d) II and IV

93. Concanavalin-A is

(a) An essential oil   (b) A lectin

(c) A pigment   (d) An alkaloid

94. The compound which is made up of amylopectin and amylose units is

(a) Cellulose   (b) Insulin

(c) Galactose   (d) Starch

95. Which of the following scientists discovered the triple helical structure of collagen?

(a) GN Ramachandran

(b) Antonie van Leeuwenhoek

(c) Mathias Schkeiden

(d) Theodor Schwann

96. Which of the following is least likely to be involved in stabilizing the three-dimensional folding of most proteins?

(a) Hydrogen bonds

(b) Electrostatic interaction

(c) Hydrophobic interaction

(d) Ester bonds

97. Which one of the following hydrolyse internal phosphodiester bonds in a polynucleotide chain?

(a) Lipase   (b) Protease

(c) Endonuclease   (d) Trypsin

98. Identify the false statement.

I. Living processes are in a constant effort to promote falling into equilibrium

II. Energy can enter and leave a cell.

III. Matter can enter and leave a cell.

IV. Metabolic pathways are interlinked.

(a) Only I   (b) Only IV

(c) I and IV   (d) Only II

99. The living steady state has a self-regulatory mechanism which is:

(a) Homeostasis

(b) Feedback mechanism

(c) Homozygous

(d) Heterozygous

100. Which one of the following animals is correctly matched with its particular named taxonomic category?

(a) Triticum – Poales, order

(b) Cuttle fish – Mollusca, a class

(c) Humans – Primata, the family

(d) Housefly – Musca, an order

101. How many organisms in the list given below are autotrophs?

Lactobacillus, Nostoc, Chara, Nitrosomonas, Nitrobacter, Streptomyces, Saccharomyces, Trypanosoma, Porphyra, Mycoplasma

(a) Four   (b) Five

(c) Six   (d) Three

102. Euglenoid species that have chlorophylls are

(a) Facultative autotrophs

(b) Facultative heterotrophs

(c) Obligate heterotrophs

(d) Obligate autotrophs

103. Identify the correct statements.

(a) Slime moulds are haploid

(b) Protozoans lack cell wall

(c) Dinoflagellates are immotile

(d) Pellicle is absent in Euglena

104. Which of the following secretes toxins during storage conditions of crop plants?

(a) Aspergillus

(b) Penicillium

(c) Fusarium

(d) Colletotrichum

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105. Which of the following pairs are the common parasites of class-Basidiomycetes?

(a) Ustilago and Puccinia

(b) Agaricus and Ustilago

(c) Alternaria and Colletotrichum

(d) Colletotrichum and Puccinia

106. The movement or locomotion in Aschelminthes is due to

(a) Siliceous skeleton

(b) Calcareous skeleton

(c) Hydroskeleton

(d) Exoskeleton

107. Assertion : Periplaneta Americana is a nocturnal, omnivorous and household pest.

Reason : It is because it acts as scavenger.

(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion

(b) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion

(c) Assertion is true, but Reason is false

(d) Both Assertion and Reason are false

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

(a) Thrombocytes   (b) Tendon

(c) Hyaline cartilage   (d) Ciliated epithelium

109. Tendons, which attach one bone to another bone are made up of

(a) Dense regular connective tissue

(b) Dense irregular connective tissue

(c) Areolar tissue

(d) Adipose tissue

110. Nissl's granules are absent in

(a) Axon

(b) Cyton

(c) Dendrons
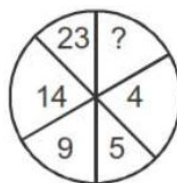
(d) Both (A) and (C)

[MENTAL ABILITY]
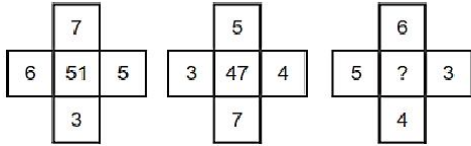
111. Find the missing term

200, 64, 100, 32, 50, 16, ?

(a) 25   (b) 35

(c) 8   (d) 45

112. Complete the figure replacing question mark (?) with suitable number logically.

(a) 27   (b) 37

(c) 25   (d) 9

113. Complete the figure replacing question mark (?) with suitable number logically.

(a) 43   (b) 49

(c) 39   (d) 45

114. Find the correct digital number/code for given English word

If WINDOW = 987659 and TREE = 3422 then WINTER = ?

(a) 987342   (b) 987432

(c) 987423   (d) 987324

115. If x stands for addition; ÷ stands for 'subtraction; + stands for 'multiplication' and – stands for 'division', then $40 \times 4 \div 8 - 4 + 2$ has the value equal to

(a) 25   (b) 5

(c) 30   (d) 40

116. Which of the four options given below shows the correct sequence of the given words?

(1) Service (Job)   (2) Examination

(3) Learning   (4) Admission

(5) Result

(a) 1, 4, 2, 3, 5   (b) 4, 3, 2, 5, 1

(c) 5, 4, 3, 2, 1   (d) 2, 3, 5, 1, 4

117. On 14th January 2014 is Saturday, the which day on 15th August 2014?

(a) Tuesday   (b) Thursday

(c) Friday   (d) Saturday

118. A statement and four predictions are given in the following question. Find a fair prediction. Some

Leader's like Nagesh are corrupt.

(a) Nagesh is not corrupt

(b) Leaders are corrupt

(c) Sometime Nagesh is not corrupt

(d) Some leaders are corrupt

119. Suresh and Mahesh were in opposite direction of each other in the evening on the Gujarat University ground. The shadow of Mahesh appears on his right side. Then in which direction Suresh's mouth will be?

(a) East   (b) South

(c) West   (d) North

120. Richa walks 4 km in the direction of sun of sunset time. Then she turns a right and walks 1km. She turns left and walks 1km then she turns left and walk 1km. Now how many km would she away from her origin?

(a) 3   (b) 4

(c) 5   (d) 6