HARVIN ACADEMY

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HFT/2/Droppers/21	720	3 hrs.
Test Code	Max. Marks	Time Allowed

Important Instructions:

1. This booklet carries 180 multiple choice questions; 45 in Physics, 45 in Chemistry and 90 in Biology.
2. The test is of 3 hours duration. 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.
3. Each question is followed by four alternatives as suggested answers. Mark the most appropriate alternative as your answer in the space provided in the OMR sheet.
4. Only one alternative is to be selected. Any cutting, overwriting, multiple responses will be treated as an incorrect response and will be awarded one negative mark.
5. Read the instructions on the OMR sheet carefully before filling up the responses.
6. Any indiscipline / use of unfair means in the Examination Hall will lead to disqualification of the candidate.
7. Use of white fluid for correction and use of electronic/manual calculator is prohibited.
8. The candidates are allowed to take away this test-booklet with them but must submit the OMR sheet before leaving the Examination Hall.
9. Use Blue/Black Ball Point Pen only for writing particulars on this page/marking responses.

Test Syllabus

Physics	:	Motion in a Straight Line, Vector, Projectile Motion, Laws of Motion
Chemistry	:	Some Basic Concepts of Chemistry, Structure of Atom, Classification of Elements and Periodicity in Properties, Chemical Bonding and Molecular Structure
Botany	:	Living World, Biological Classification, Kingdom Plantae
Zoology	:	Biomolecules, Digestive System, Respiratory System, Circulatory System

Name of the Candidate (in Capitals) : _____

Roll Number (In figures) : _____ Phone No._____

Centre of Examination (in Capitals) : _____

Date of Examination : _____

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

1. **An athlete completes one round of a circular track of radius *R* in 40 *sec*. What will be his displacement at the end of 2 min. 20 *sec***

1. Zero 2. $2R$
3. $2\pi R$ 4. $7\pi R$

2. **A 150 *m* long train is moving with a uniform velocity of 45 *km/h*. The time taken by the train to cross a bridge of length 850 meters is**

1. 56 *sec* 2. 68 *sec*
3. 80 *sec* 4. 92 *sec*

3. **The displacement x of a particle along a straight line at time *t* is given by $x = a_0 + a_1 t + a_2 t^2$. The acceleration of the particle is**

1. a_0 2. a_1
3. $2a_2$ 4. a_2

4. **The displacement of a body is given to be proportional to the cube of time elapsed. The magnitude of the acceleration of the body is**

1. Increasing with time
2. Decreasing with time
3. Constant but not zero
4. Zero

5. **A body starting from rest moves with constant acceleration. The ratio of distance covered by the body during the 5th *sec* to that covered in 5 *sec* is**

1. 9/25 2. 3/5
3. 25/9 4. 1/25

6. **An object is projected upwards with a velocity of 100 *m/s*. It will strike the ground after (approximately)**

1. 10 sec 2. 20 sec
3. 15 sec 4. 5 sec

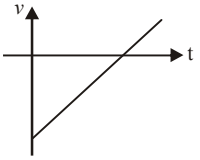
7. **If initial velocity of a particle is *u* and its acceleration at any instant 't' is given as αt^2 (where α is a constant). The velocity *v* of the particle at any instant 't' is given as**

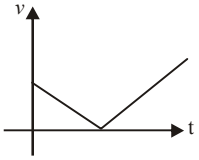
1. $v = u + \alpha t$ 2. $v = u + \frac{\alpha t^3}{3}$
3. $v = u + \alpha t^3$ 4. $v = u + \frac{\alpha t^3}{2}$

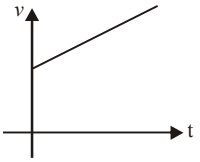
8. **A ball is released from top of a tower of height *h*. It takes time *t* to reach the ground. The position of ball at an instant *t*/2 from drop is (innore air resistance)**

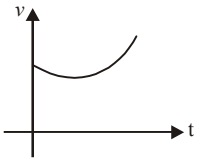
1. A height *h*/2 from ground
2. At height *h*/4 from ground
3. At height 3*h*/4 from ground
4. Depends on the mass & volume of the ball

9. **A particle moves along *x*-axis in such a way that its *x*-coordinate varies with time according to the equation $x = 18 - 4t + t^2$. The variation of speed *v* of the particle with time is best described by**

1. 

2. 

3. 

4. 

10. **A train of length 150 m is moving towards north with velocity 10 m/s. A bird is flying at velocity 5 m/s towards south along the track. The time taken by the bird to cross the train is**

1. 30 seconds 2. 10 seconds
3. 15 seconds 4. 50 seconds

11. **The vector projection of a vector $3\hat{i} + 4\hat{k}$ on *y*-axis is**

1. 5 2. 4
3. 3 4. Zero

12. **If a particle moves from point P(2,3,5) to point Q(3,4,5). Its displacement vector be**

1. $\hat{i} + \hat{j} + 10\hat{k}$ 2. $\hat{i} + \hat{j} + 5\hat{k}$
3. $\hat{i} + \hat{j}$ 4. $2\hat{i} + 4\hat{j} + 6\hat{k}$

13. **The vector that must be added to the vector $\hat{i} - 3\hat{j} + 2\hat{k}$ and $3\hat{i} + 6\hat{j} - 7\hat{k}$ so that the resultant vector is a unit vector along the *y*-axis is**

1. $4\hat{i} + 2\hat{j} + 5\hat{k}$ 2. $-4\hat{i} - 2\hat{j} + 5\hat{k}$
3. $3\hat{i} + 4\hat{j} + 5\hat{k}$ 4. Null vector

14. A hall has the dimensions $10m \times 12m \times 14m$. A fly starting at one corner ends up at a diametrically opposite corner. What is the magnitude of its displacement

1. $17\,m$ 2. $26\,m$
3. $36\,m$ 4. $20\,m$

15. 100 coplanar forces each equal to 10 N act on a body. Each force makes angle $\pi/50$ with the preceding force. What is the resultant of the forces

1. $1000\,N$ 2. $500\,N$
3. $250\,N$ 4. Zero

16. There are two force vectors, one of 5 *N* and other of 12 *N* at what angle the two vectors be added to get resultant vector of 17 *N*, 7 *N* and 13 *N* respectively

1. 0°, 180° and 90° 2. 0°, 90° and 180°
3. 0°, 90° and 90° 4. 180°, 0° and 90°

17. If $\vec{A} = 4\hat{i} - 3\hat{j}$ and $\vec{B} = 6\hat{i} + 8\hat{j}$ then magnitude and direction of $\vec{A} + \vec{B}$ will be

1. $5, \tan^{-1}(3/4)$ 2. $5\sqrt{5}, \tan^{-1}(1/2)$
3. $10, \tan^{-1}(5)$ 4. $25, \tan^{-1}(3/4)$

18. A particle is simultaneously acted by two forces equal to 4 *N* and 3 *N*. The net force on the particle is

1. $7\,N$ 2. $5\,N$
3. $1\,N$ 4. Between $1N$ and $7N$

19. Forces F_1 and F_2 act on a point mass in two mutually perpendicular directions. The resultant force on the point mass will be

1. $F_1 + F_2$ 2. $F_1 - F_2$
3. $\sqrt{F_1^2 + F_2^2}$ 4. $F_1^2 + F_2^2$

20. The magnitude of vector $\vec{A}, \vec{B}$ and $\vec{C}$ are respectively 12, 5 and 13 units and $\vec{A} + \vec{B} = \vec{C}$ then the angle between $\vec{A}$ and $\vec{B}$ is

1. 0 2. π
3. $\pi/2$ 4. $\pi/4$

21. A stone is just released from the window of a train moving along a horizontal straight track. The stone will hit the ground following

1. Straight path
2. Circular path
3. Parabolic path
4. Hyperbolic path

22. A bomb is dropped from an aeroplane moving horizontally at constant speed. When air resistance is taken into consideration, the bomb

1. Falls to earth exactly below the aeroplane
2. Fall to earth behind the aeroplane
3. Falls to earth ahead of the aeroplane
4. Flies with the aeroplane

23. Two particles are projected simultaneously in the same vertical plane, from the same point, both with different speeds and at different angles with horizontal. The path followed by one, as seen by the other is

1. a verical line
2. a parabola
3. a hyperbola
4. a straight line making a constant angle $(\neq 90^o)$

24. A body is thrown horizontally from the top of a tower of height 5 *m*. It touches the ground at a distance of 10 *m* from the foot of the tower. The initial velocity of the body is (g = 10 ms^{-2})

1. 2.5 ms^{-1} 2. 5 ms^{-1}
3. 10 ms^{-1} 4. 20 ms^{-1}

25. A particle (*A*) is dropped from a height and another particle (*B*) is thrown in horizontal direction with speed of 5 *m/sec* from the same height. The correct statement is

1. Both particles will reach at ground simultaneously
2. Both particles will reach at ground with same speed
3. Particle (*A*) will reach at ground first with respect to particle (*B*)
4. Particle (*B*) will reach at ground first with respect to particle (*A*)

26. A bomber plane moves horizontally with a speed of 500 *m/s* and a bomb released from it, strikes the ground in 10 sec. Angle at which it strikes the ground will be $(g = 10\ m/s^2)$

1. $\tan^{-1}\left(\frac{1}{5}\right)$ 2. $\tan\left(\frac{1}{5}\right)$
3. $\tan^{-1}(1)$ 4. $\tan^{-1}(5)$

27. A large number of bullets are fired in all directions with same speed v. What is the maximum area on the ground on which these bullets will spread

1. $\pi\frac{v^2}{g}$ 2. $\pi\frac{v^4}{g^2}$
3. $\pi^2\frac{v^4}{g^2}$ 4. $\pi^2\frac{v^2}{g^2}$

28. A body of mass *m* is thrown upwards at an angle θ with the horizontal with velocity *v*. While rising up the velocity of the mass after *t seconds* will be

1. $\sqrt{(v\cos\theta)^2 + (v\sin\theta)^2}$
2. $\sqrt{(v\cos\theta - v\sin\theta)^2 - gt}$
3. $\sqrt{v^2 + g^2t^2 - (2v\sin\theta)gt}$
4. $\sqrt{v^2 + g^2t^2 - (2v\cos\theta)gt}$

29. A ball is thrown from a point with a speed v_o at an angle of projection θ. From the same point and at the same instant a person starts running with a constant speed $v_o/2$ to catch the ball. Will the person be able to catch the ball? If yes, what should be the angle of projection

1. Yes, 60^o 2. Yes, 30^o
3. No 4. Yes, 45^o

30. A stone is thrown at an angle θ to the horizontal reaches a maximum height *H*. Then the time of flight of stone will be

1. $\sqrt{\frac{2H}{g}}$ 2. $2\sqrt{\frac{2H}{g}}$
3. $\frac{2\sqrt{2H\sin\theta}}{g}$ 4. $\frac{\sqrt{2H\sin\theta}}{g}$

31. Any object that is given any initial velocity and which follows a path due to gravitational force acting on it and by the frictional resistance of the atmosphere is called?

1. Projector 2. Positive current
3. Promotion 4. Projectile

32. The total flight requires a time that is?

1. thrice the time necessary to reach the maximum height
2. four times the time necessary to reach the maximum height.
3. twice the time necessary to reach the maximum height
4. equal to the time necessary to reach the maximum height.

33. If a projectile is launched at 450 with velocity 100 m/s, it hit the target. It will have double the range if its velocity is:

1. 173.2 m/s 2. 200 m/s
3. 400 m/s 4. 141.4 m/s

34. The range of the projectile depends on the square of the initial velocity and?

1. cot of twice the projection angle θ
2. sine of twice the projection angle θ
3. cosine of twice the project angle θ
4. sine of thrice the projection angle θ

35. A bird weighs 2 *kg* and is inside a closed cage of 1 *kg*. If it starts flying, then what is the weight of the bird and cage assembly

1. 1.5 kg 2. 2.5 kg
3. 3 kg 4. 4 kg

36. A boy having a mass equal to 40 *kilograms* is standing in an elevator. The force felt by the feet of the boy will be greatest when the elevator (g = 9.8 metres/sec^2)

1. Stands still
2. Moves downward at a constant velocity of 4 *metres*/*sec*
3. Accelerates downward with an acceleration equal to 4 *metres*/*sec*^{2}
4. Accelerates upward with an acceleration equal to 4 *metres*/*sec*^{2}

37. **A mass of 10 *gm* is suspended by a string and the entire system is falling with a uniform acceleration of 400 cm/sec². The tension in the string will be (g = 980 cm/sec²)**

1. 5,800 *dyne* 2. 9,800 *dyne*
3. 11,800 *dyne* 4. 13,800 *dyne*

38. ***N* bullets each of mass *m kg* are fired with a velocity *v* ms^{-1} at the rate of *n* bullets per second upon a wall. The reaction offered by the wall to the bullets is given by**

1. nmv 2. $\frac{nmv}{n}$
3. $n\frac{Nm}{v}$ 4. $n\frac{Nv}{m}$

39. **The time in which a force of 2 *N* produces a change of momentum of 0.4 *kg* – ms^{-1} in the body is**

1. 0.2 *s* 2. 0.02 *s*
3. 0.5 *s* 4. 0.05 *s*

40. **The tension in the spring is**

1. Zero 2. 2.5 *N*
3. 5 *N* 4. 10 *N*

41. **A player caught a cricket ball of mass 150 *gm* moving at a rate of 20 *m/s*. If the catching process be completed in 0.1 *s*, then the force of the blow exerted by the ball on the hands of the player is**

1. 0.3 *N* 2. 30 *N*
3. 300 *N* 4. 3000 *N*

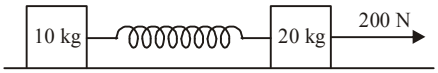
42. **When we jump out of a boat standing in water, it moves**

1. Forward
2. Backward
3. Side ways
4. It does not moves at all

43. **A person of mass *M* is in an elevator which moves up with an acceleration *a*. The normal reaction exerted by the floor of the elevator is on the person is**

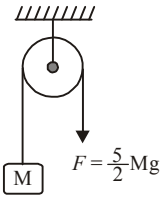
1. Mg 2. $Mg + Ma$
3. $Mg - Ma$ 4. Ma

44. **Two masses of 10 kg and 20 kg respectively are connected by a mass-less spring as shown in figure. A force of 200 N is applied on 20 kg block towards right. If at any instant, the acceleration of 10 kg block is found to be 8 m/s² towards right then acceleration of 20 kg block at that instant will be**



1. 6 m/s² 2. 10 m/s²
3. 12 m/s² 4. 20 m/s²

45. **In the arrangement shown the mass *M* will ascend with an acceleration of (pulley and rope are massless)**



1. zero 2. $\frac{5}{2}g$
3. $\frac{7}{2}g$ 4. $\frac{3}{2}g$

46. **The compound which does not contain ionic bond is :**

1. NaOH 2. HCl
3. K_2S 4. LiH

47. **Which of the following is an example of super octet molecule?**

1. ClF_3 2. PCl_5
3. IF_7 4. All the three

48. **An atom of the element A has 3 electrons in its outermost shell while another atom X has 6 electrons in its outermost shell. The formula of the compound between A and X could be :**

1. A_2X_3 2. AX_3
3. A_3X_2 4. A_2X

49. **Among the following isostructural compounds, which one has highest lattice energy ?**

1. LiCl 2. MgO
3. NaCl 4. LiF

50. NH_3 and BF_3 form adduct readily because they form
1. Ionic bond 2. Covalent bond
3. Co-ordinate bond 4. Hydrogen bond

51. The hybrid state of S in SO_3 is similar to that of
1. C in C_2H_2 2. C in C_2H_4
3. C in CH_4 4. C in CO

52. 1 gm butane (C_4H_{10}) is burnt with excess of O_2 to form CO_2. The approximate mass of CO_2 produced is
1. 1 gm 2. 2 gm
3. 3 gm 4. 4 gm

53. 2 gm Iron pyrite (FeS_2) is burnt with O_2 to form Fe_2O_3 and SO_2. The mass of SO_2 produced is (Fe = 56, S = 32, O = 16)
1. 2 gm 2. 2.13 gm
3. 4 gm 4. 4.26 gm

54. 800 ml of a mixture of O_2 and O_3 weight 1.2 gm at NTP. The volume of O_3 in the mixture is
1. 80 ml 2. 160 ml
3. 200 ml 4. 400 ml

55. 9.8 gm $KClO_3$ is decomposed then weight loss was 0.384 gm. The percentage of $KClO_3$ decomposed is
1. 10% 2. 20%
3. 40% 4. 100%

56. 10 gm carbon reacts with 100 gm Cl_2 to form CCl_4. The maximum weight of CCl_4 formed is
1. 128 gm 2. 94.22 gm
3. 108.45 gm 4. 54.22 gm

57. The molarity of $NaNO_3$ solution is 1 M. The density of solution is 1.25 gm/ml. The molality of solution is
1. 1 m 2. 0.86 m
3. 1.25 m 4. 0.625 m

58. Which has maximum number of atoms at NTP?
1. 1 ml CH_4 2. 1 ml N_2
3. 1 ml H_2 4. 1 ml H_2O

59. Compound in which central atom assumes sp^3d hybridisation is
1. SO_3 2. PCl_5
3. SO_2 4. PCl_3

60. 0.5 gm of an oxalate sample is dissolved in water and diluted upto 100 ml. 10 ml of this solution is completely oxidised with 15 ml N/20 $KMnO_4$ in acidic medium. The percentage purity of sample is
1. 33% 2. 44%
3. 66% 4. 88%

61. In a chemical change from $PCl_3 \rightarrow PCl_5$ the hybrid state of P changes from :
1. sp^2 to sp^3 2. sp^3 to sp^2
3. sp^3 to sp^3d 4. sp^3 to dsp

62. The relationship between energy E, of the radiation with a wavelength 8000 Å and the energy of the radiation with a wavelength 16000 Å is
1. $E_1 = 6E_2$ 2. $E_1 = 2E_2$
3. $E_1 = 4E_2$ 4. $E_1 = 1/2E_2$

63. The ratio of the radii of the first three Bohr orbit in H atom is
1. $1:\frac{1}{2}:\frac{1}{3}$ 2. 1 : 2 : 3
3. 1 : 4 : 9 4. 1 : 8 : 27

64. In an atom two electrons move around the nucleus in circular orbits of radii R and 4R. The ratio of the time taken by them to complete one revolution is :
1. 1 : 4 2. 4 : 1
3. 1 : 8 4. 8 : 7

65. The orbital configuration of $_{24}Cr$ is $3d^5\ 4s^1$. The number of unpaired electrons in Cr^{3+} (g) is :
1. 3 2. 2
3. 1 4. 4

66. Which of the following is the correct set of quantum numbers for the outer shell electrons of $_{21}Sc$?
1. 3, 2, 0, + 1/2 2. 4, 0, 0, +1/2
3. 3, 0, 0, –1/2 4. 4, 0, –1, +1/2

67. The electronic configuration of a dipositive ion M^{2+} is 2, 8, 14 and its mass number is 56. The number of neutrons present in
1. 32 2. 42
3. 30 4. 34

68. The most volatile halogen acid is

1. HF 2. HCl
3. HBr 4. HI

69. Benzene ring contains

1. 12 σ and 3π 2. 6 σ and 3π
3. 9 σ and 3π 4. 8 s and 2p

70. According to Bohr's theory the angular momentum of an electron in the fourth orbit is

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

71. The transition of electrons in H atom that will emit maximum energy is :

1. $n_3 \rightarrow n_2$ 2. $n_4 \rightarrow n_3$
3. $n_5 \rightarrow n_4$ 4. $n_6 \rightarrow n_5$

72. For the electronic transition from n = 2→ n =1 which of the following will produce shortest wavelength ?

1. H atom 2. D atom
3. He^+ ion 4. Li^{2+} ion

73. In Bohr's model of the hydrogen atom the ratio between the period of revolution of an electron in the orbit n = 1 to the period of revolution of the electron in the orbit n = 2 is

1. 1 : 2 2. 2 : 1
3. 1 : 4 4. 1 : 8

74. A cricket ball of 0.5 kg is moving with a velocity of 100 ms^{-1}. The wavelength associated with its motion is :

1. 1/100 cm 2. 6.6×10^{-34} m
3. 1.32×10^{-35} m 4. 6.6×10^{-28} m

75. If uncertainties in the measurement of position and momentum are equal, the uncertainty in the measurement of velocity is:

1. $\frac{1}{2}\sqrt{\frac{mh}{\pi}}$ 2. $\frac{1}{2\pi}\sqrt{\frac{h}{m}}$
3. $\frac{1}{2m}\sqrt{\frac{h}{\pi}}$ 4. None of these

76. The First ionisation enthalpies of Na,Mg,Al and Si are in the order

1. Na < Mg > Al < Si
2. Na > Mg > Al > Si
3. Na < Mg < Al < Si
4. Na > Mg > Al < Si

77. Electronic configuration of chalcogens in their outermost orbit is

1. $s^2 p^3$ 2. $s^2 p^4$
3. $s^2 p^5$ 4. $s^2 p^6$

78. Which of the following is smallest in size?

1. Na^+ 2. F^-
3. O^{2-} 4. N^{3-}

79. When a neutral atom is converted into a cation,there is

1. Decrease in the atomic number
2. An increase in the atomic number
3. An increase in size
4. A decrease in size

80. For electron affinity of halogens, which of the following is correct?

1. Br > F 2. F > Cl
3. Br > Cl 4. F > I

81. Which one of the elements has highest ionisation energy?

1. [Ne] $3s^2 3p^1$ 2. [Ne] $3s^2 3p^2$
3. [Ne] $3s^2 3p^3$ 4. [Ar] $3d^{10} 4s^2 4p^2$

82. The electronegativity of the following elements increases in the order

1. C, N, Si, P 2. N, Si, C, P
3. Si, P, C, N 4. P, Si, N, C

83. Which of the following has the highest electron affinity?

1. F^- 2. O^-
3. O 4. Na

84. The correct order of the decreasing ionic radii among the following isoelectronic species is

1. $Ca^{2+} > K^+ > S^{2-} > Cl^-$
2. $Cl^- > S^{2-} > Ca^{2-} > K^+$
3. $S^{2-} > Cl^- > K^+ > Ca^{2+}$
4. $K^+ > Ca^{2+} > Cl^- > S^{2-}$

85. The correct order of second ionisation energies of B , C , N & O is

1. O > N > C > B 2. O > C >N >B
3. O > B > C > N 4. O > N > B > C

86. The total number of electrons in a subshell designated by azimuthal quantum number, *l* is given as

1. $2l + 1$ 2. l^2
3. $4l + 2$ 4. $2l + 2$

87. How many electrons in $_{19}K$ have n = 3;*l* = 0?

1. 1 2. 2
3. 4 4. 3

88. Which of the following sets of quantum numbers is impossible arrangement ?

1. n = 3, m = –2, s=+1/2
2. n = 4, m = +3, s = +1/2
3. n = 5, m = +2, s=–1/2
4. n = 3, m = –3, s = –1/2

89. How many orbitals are populated by one or two electrons in case of Cr (z = 24) **?**

1. 14 2. 15
3. 16 4. 12

90. Which is more concentrated?

1. $1N H_3 PO_2$
2. $1N H_3 PO_3$
3. $1N H_3 PO_4$
4. All have same concentration

91. Decomposers belong to kingdom

1. Monera and Protista
2. Protista and Fungi (Mycota)
3. Monera, Protista and Fungi
4. Protista, Fungi and Animalia

92. Six kingdom classification was suggested by Gray and Doolittle (1982) and Carl Woose (1990) divided these six kingdoms into three domains on the basis of sequence of

1. r-RNA genes
2. m-RNA genes
3. nitrogen bases in DNA
4. amino acids in protein

93. Which statement is/are wrong with respect to kingdom protista.

(i) All single celled eukaryotes are placed under protista

(ii) The boundaries of this kingdom are not well defined.

(iii) Chrysophytes, dinoflagellated, Euglenoids, slimemoulds and protozoans are included under protista.

(iv) All protista are eukaryotic, achlorophyllous, heterotrophic, nonvascular organism.

1. only (ii) 2. only (iii)
3. only (iv) 4. None of these

94. Which of the following statement is/are correct with respect to Bacteria

a. Bacteria are the sole members of the Kingdom Monera.

b. Bacteria occur almost everywhere

c. Bacteria are the most abundant micro organism

d. 80 S type of Ribosome are present in bacteria

1. a & d 2. b & d
3. a, b, c 4. b, c, d.

95. Which statement is/are wrong with respect to Archaebacteria.

a. Archaebacteria differ from other bacteria in having a different cell wall structure.

b. feature of cell wall is responsible for their survival in extreme conditions.

c. Methanogens are present in the guts of sereral ruminant animals such as cow & buffalo..

d. Peptidoglycan & muramic acid are present in cell wall

1. a and d 2. b and d
3. a, b and c 4. only d

96. Which statement is/are wrong with respect to Mycoplasma :

a. Mycoplasma are the smallest living cells known.

b. These can survive without oxygen

c. The Mycoplasma are organisms that completely lack a cell wall.

d. Mycoplasma can not pass through bacteria proof filters–

1. b & c 2. c & d
3. only d 4. Only b

97. Slime moulds are _____(i)_____protists. The body moves along decaing twigs and leaves engulfing organic material under suitable conditions, they form an aggregation called_____(ii)_____which may grow and spread over several feet.

In above question (i) & (ii) are respectively.

1. (i) Autotrophic, (ii) plasmodium
2. (i) Chemosynthetic autotrophic (ii) plasmodium
3. (i) Saprophytic, (ii) Phycobiont
4. (i) saprophytic, (ii) plasmodium

98. Majority of Euglenoids are Fresh water organisms found in stagnant water. Instead of cell wall, they have a protein rich layer called _____1._____ which maeks their body flexible. They have _____2._____flagella; 1. & 2. are respectively.

1. a. Pellicle b. One
2. a. Pellicle, b. Three
3. a. Gelatinous sheath, b. Two
4. a.Pellicle b. Two

99. Read statements A to D & find out how many statement are wrong

A. Golden Algae are classified under chrysophytes.

B. Gonyaulax & Diatoms are classified under Dinoflagellates

C. In Diatoms the cell wall form thin overlapping shell, which fit together as in soap box.

D. Most of the Dinoflagellates have two flagello.

How many statement are wrong.

1. one 2. two
3. three 4. four

100. Late blight of potato disease is caused by

1. *Peranospora*
2. *Phytophthora infestans*
3. *Synchytrium*
4. *Alternaria*

101. Read the following statement (A-D) and answer as asked next to them

A. Cell wall of Fungi consists of chitin or fungal cellulose.

B. Most fungi are heterotrophic

C. Fungi can also live as symbionts in association with algae as lichens and with roots of higher plants as mycorrhiza

D. Fusion of two nuclei called plasmogamy

How many of the above statement are correct?

1. Two 2. Three
3. Four 4. one

102. Members of phycomycetes are found in

i. Aquatic habitats

ii. On decaying wood

iii. Moist and damp places

iv. As obligate parasite on plants

Choose from the following options

1. None of the above 2. i and iv
3. ii and iii 4. All of the above

103. Red rot of Sugarcane and white rust of Radish are respectively caused by

1. Colletotrichum and Albugo candida
2. Colletotrichum and Fusarium
3. Pythium and phytophthora
4. Albugo candida and Puccinia graminis

104. PSTV have : -

1. Single stranded RNA not enclosed by protein coat
2. D.S. DNA enclosed by portein coat
3. Double stranded RNA enclosed by protein coat
4. S.S. DNA not enclosed by protein coat

105. Lichens are ecologically important because -

1. They are associated with mycorrhizal roots
2. They are association of algae and fungi
3. They are pioneers (earliest settlers on barren rocks) and pass xeric conditions successfully
4. They can grow in greatly polluted area

106. What is true about viruses?

1 They can be crystallised and stored for several year
2. Viruses do not occur as parasites in living cells
3. They can be cultured on artificial media
4. They are devoid of genetic material of their own

107. Which of the following statements regarding the universal rules of biological nomenclature is incorrect?

1. Biological names are either derived from Latin language or are latinised
2. The first word in a biological name represents the genus while the second component denotes the species.
3. Both the words in a biological name, when handwritten are separately underlined, or printed in italics to indicate their Latin origin
4. The specific epithet starts with a capital letter while the generic epithet starts with a small letter. It can be illustrated with the example of *mangifera Indica*.

108. Study the following statements and select the correct ones

(i) Herbarium is a store house of collected plant specimens that are dried, pressed and preserved on sheets

(ii) Flora provides the index to the plant species found in a particular area

(iii) Monogrphs contains information on only one taxon

1. (i) and (iii) 2. (ii) and (iii)
3. (i) and (iii) 4. (i), (ii) and (iii)

109. Among rust, smut and mushroom, all the three

1. Are pathogens 2. Are saprobes
3. Bear ascocarps 4. Bear basidiocarps

110. Select the incorrect statement with respect to the taxon, 'genus'.

1. It is a group or assemblage of related species
2. A genus essentially possesses more than one number of species
3. Lion, Tiger, Leopard, Jaguar are closely related species which have been placed in the genus *Panthera* and are respectively named as *Panthera leo, P.tigris, P.pardus* and *P. onca.*
4. *Solanum, Penicillium, Withania* and *Canis* are the examples of genera.

111. Which of the following statements regarding the response of living organisms to external stimuli is correct?

1. The external environmental stimuli can be physical, chemical or biological
2. All organisms, from the prokaryotes to the most complex eukaryotes can sense and respond to environmental stimuli
3. Consciousness and response to external stimuli is the defining property of living organisms
4. All of these

112. Following features belongs to class

A. Mycelium branched and septate.
B. Asexual spores conidia produced exogenously.
C. Sexual spores produced endogenously.
D. Many members of this class are edible.

1. ascomycetes
2. phycomycetes
3. basidiomycetes
4. deuteromycetes

113. In virus infected plants following symptoms can be observed

1. Mosaic formation and stunted growth
2. Leaf rooling and curling
3. Yellowing and vein clearing
4. All

114. Choose correct option w.r.t. body organisation, metabolic diversity and structure of bacteria respectively

1. Loose tissue level, extensive, Complex
2. Complex, non-extensive, simple
3. Cellular, extensive, simple
4. Cellular, nun-extensive, complex

115. Once the perfect stages of members of deuteromycetes were discovered they were often moved to

1. Oomycetes and Zygomycetes
2. Basidiomycetes and Ascomycetes
3. Phycomycetes and Zygomycetes
4. Ascomycetes and Oomycetes

116. Read the following statements:

(I) Growth cannot be taken as a defining property of living organisms

(II) Growth occurs due to synthesis of protoplasmic and apoplasmic substances

(III) In unicelled organisms, reproduction is not synonymous with growth

(IV) In majority of higher animals and plants, growth and reproduction are mutually exclusive events

1. Only (I) and(II) are correct
2. (II), (III) and (IV) are correct
3. Only (III) is incorrect
4. (I), (III) and (IV) are correct

117. Fungi causes maximum damage to crop under which condition

1. Cool and humid conditions
2. Warm and humid places
3. Cool and dry places
4. Dry and organic rich soil

118. Match the scientist with their contribution:

(A)	D. J. Ivanowsky	(i)	Demonstrated extract of the infected plant of tobacco could cause infection in healthy plants
(B)	W. M. Stanley	(ii)	discovered new infectious agent that was smaller than viruses
(C)	T. O. Diener	(iii)	Showed viruses could be crystallized and crystals consist largely of proteins
(D)	M. W. Beijerinek	(iv)	recognized certain microbes or causal organism of the mosaic disease of tobacco.

1. A – I, B – iii, C – ii, D – iv
2. A – iv, B – iii, C – ii, D – i
3. A – iv, B – I, C – ii, D – iii
4. A – I, B – iv, C – iii, D – ii

119. Given below are the four statements regarding virus. Which of them is correct?

1. In general, viruses that infect plants have single stranded DNA and bacteriophages are usually double stranded RNA viruses
2. Capsomeres, are arranged in helical or polyhedral geometric forms
3. Can multiply in abiotic medium
4. Cause disease like AIDS, common cold, and potato spindle tuber disease

120. Dinoflagellates have

1. A single flagellum in the transverse groove between the cell plates
2. A single flagellum in the longitudinal groove between the cell plates
3. Two flagella one lies longitudinally and the other transversely in a furrow between the wall plates
4. No flagella

121. Lichens are composite organism made up of a fungus and a photosynthetic alga. Which of the following statements is wrong about lichen?

1. Lichens are sensitive to air pollution because they have no way to excrete toxic substances
2. Algal partner (phycobiont) and fungal partner (mycobiont) live mutually
3. Algae prepare food for fungi and fungi provide shelter and absorb water + minerals for algal partner
4. None of these

122. Unicellular green alga is

1. *Ulothrix* 2. *Spirogyra*
3. *Chlamydomonas* 4. All the above

123. Largest ovules, trees and gametes are found in

1. Monocots 2. Dicots
3. Both (1)and (2) 4. Gymnosperms

124. Chl *a*, Chl *d* and phycoerythrin occur in

1. Chlorophyceae 2. Bacillariophyceae
3. Cyanophyceae 4. Rhodophyceae

125. Kelps are

1. Fresh water algae
2. Marine algae
3. Terrestrial plants
4. Amphibious plants

126. The rhizoids in *Funaria* are

1. Green and branched thread like structures
2. Unbranched root like outgrowths
3. Branched and multicellular nongreen thread like structures
4. Unicellular and of two types

127. Life cycle of *Funaria* is not completed without water. Choose the correct statement

1. As fertilization takes place in the presence of water only
2. As *Funaria* is hydrophyte
3. As plant is delicate and will dry without water
4. As branches will not develop

128. The main body of a bryophytic plant is always

1. Gametophyte 2. Lichen like
3. Sporophyte 4. Hormogonium

129. Xylem in Gymnosperms lacks

1. Tracheids 2. Xylem parenchyma
3. Xylem fibres 4. Vessels

130. Alga that is useful for prolonged space flight for liberation of oxygen, consumption of CO_2 , disposal of wastes and formation of food is

1. *Ulva* 2. *Caulerpa*
3. *Chlorella* 4. *Chlamydomonas*

131. Food reserve of *Laminaria* is

1. Starch 2. Fat
3. Mannitol 4. Glycogen

132. Heterosporous pteridophyte is

1. *Selaginella* 2. *Lycopodium*
3. *Nephrolepis* 4. *Equisetum*

133. Pteridophytes are distinguishable from bryophytes in possessing

1. Dependent sporophyte
2. Independent sporophyte
3. Dependent gametophyte
4. No vascular bundles

134. The storage product of rhodophyceae is

1. Glycogen 2. Chrysolaminarin
3. Starch 4. Floridean starch

135. In *Pinus*/gymnosperms, the haploid structures are

1. Megaspore, endosperm and embryo
2. Megaspore, pollen grain and endosperm
3. Megaspore, integument and root
4. Pollen grain, leaf and root

136. Which of the following bio-molecules is strictly not a polymer?

1. Carbohydrates 2. Proteins
3. Fats 4. Nucleic acids

137. Most of the polymerization reactions result from:

1. Redox reactions
2. Dehydration synthesis
3. Hydrolysis
4. Isomerization

138. The R group in a proteinaceous amino acid is hydroxymethyl. This amino acid:

1. is not an essential amino acid
2. is not genetically coded for
3. is involved in disulfide linkage
4. is acidic in nature

139. Which of the following components is found in least amounts in an average cell?

1. Carbohydrates 2. Fats
3. Nucleic acids 4. Proteins

140. Most abundant protein in the whole of the biosphere is:

1. Collagen 2. Cellulose
3. RUBISCO 4. Keratin

141. Inulin is a:

1. Disaccharide containing two galactose
2. Disaccharide containing fructose and galactose
3. Polymer of fructose
4. Polysaccharide used in microbial culture

142. Adenine and guanine are:

1. Substituted purines
2. Substituted pyrimidines
3. Deoxyribonucleosides
4. Ribonucleotides

143. The first amino acid in the primary structure of a protein is termed as:

1. C – terminus amino acid
2. N – terminus amino acid
3. An imino acid
4. Alpha amino acid

144. The compound from which cholesterol is formed is:
1. Mevalonic acid
2. Butyric acid
3. Alpha ketoglutaric acid
4. Acetic acid

145. The blood concentration of blood glucose in a normal healthy human ranges between:
1. 4.5 – 5.0 mM
2. 45 – 50 mM
3. 70 – 100 nM
4. 100 – 150 mM

146. Identify the correct statement:
1. The upper respiratory tract in humans includes larynx and dehumidifies the inhaled air
2. The trachea is invested by incomplete cartilaginous rings deficient ventrally
3. The respiratory unit includes the respiratory bronchiole
4. The alveoli are lined by brush bordered epithelium to increase their surface area

147. The maximum amount of air a person can expel from the lungs after a maximum inhalation is called as:
1. Functional residual capacity
2. Vital capacity
3. Expiratory capacity
4. Expiratory reserve volume

148. The functions of residual volume in humans include:
I. prevention of collapse of lungs
II. maintenance of blood pH
1. Only I 2. Only II
3. Both I and II 4. Neither I nor II

149. The partial pressure of oxygen in systemic circulation is:
1. equal to the partial pressure of oxygen in atmospheric air
2. less than the partial pressure of carbon dioxide in systemic circulation
3. less than the partial pressure of oxygen in alveoli
4. equal to the partial pressure of oxygen in the tissues

150. The respiratory membrane:
1. is composed of six layers
2. allows oxygen to diffuse across it faster than carbon dioxide
3. covers the external surface of both lungs
4. is less than 1 mm in cumulative thickness

151. A lack of surfactant is likely to cause:
1. Hyaline membrane disease
2. Pulmonary fibrosis
3. Emphysema
4. Pulmonary edema

152. In the course of normal metabolism the amount of oxygen delivered to a tissue by 100 ml of oxygenated blood will be about:
1. 5 ml 2. 10 ml
3. 15 ml 4. 20 ml

153. The oxy-hemoglobin curve is shifted to the right by all the following except:
1. Increased temperature
2. Increased pH
3. Increased carbon dioxide
4. 2,3 DPG

154. To bring about a change in the pulmonary volume, it is essential that:
1. the thoracic chamber is an air-tight chamber
2. the lungs are covered by a double layered membrane
3. lungs are filled with millions of alveoli
4. the air is pushed into the lungs by swallowing

155. Contraction of diaphragm:
1. leads to an increase in the diameter of thoracic chamber in antero-posterior axis and brings about exhalation
2. leads to an increase in the diameter of thoracic chamber in dorso-ventral axis and brings about exhalation
3. leads to a increase in the diameter of thoracic chamber in antero-posterior axis and brings about inhalation
4. leads to an increase in the diameter of thoracic chamber in antero-posterior axis and brings about inhalation

156. Identify the incorrect statement regarding human RBCs:

1. Initially, during the early foetal life, they are formed by liver and spleen and later exclusively by red bone marrow
2. Tissue hypoxia is likely to lead to release of erythropoietin by Kidneys that stimulate RBC production by bone marrow
3. The lack of mitochondria in the mature RBCs leads to a decreased efficiency of oxygen delivery by RBCs to tissues
4. Pernicious anaemia is actually caused by damage to gastric mucosa leading to inability of intestine to absorb vitamin B_{12}.

157. A blood transfusion reaction will:

1. occur when plasma antibodies contact red blood cells carrying the antigen with which they react
2. only occur if both red blood cells and plasma are transfused
3. always occur if someone is given type O blood
4. not cause any damage to the red blood cells

158. Which of the following, when introduced in to the blood, will cause coagulation of the blood at the site of its introduction?

1. Heparin 2. Fibrinogen
3. Thrombokinase 4. Calcium

159. Erythroblastosis fetalis (hemolytic disease of the newborn) occurs when

1. a premature Rh positive baby is given a transfusion of Rh negative blood
2. anti-Rh antibodies from the maternal circulation cross the placenta and agglutinate the fetal red blood cells
3. the fetus cannot make normal red blood cells
4. the fetus' white blood cells are destroyed by antibodies from the maternal circulation

160. The right ventricle of the human heart:

1. is thin walled than the left ventricle and pumps less blood than the left ventricle each time it contracts
2. is thin walled than the left ventricle and pumps equal blood as pumped by the left ventricle each time it contracts
3. is thick walled than the left ventricle and pumps less blood than the left ventricle each time it contracts
4. is thick walled than the left ventricle and pumps equal blood as pumped by the left ventricle each time it contracts

161. During the cardiac cycle, the first heart sound is heard due to simultaneous:

1. closure of the atrio-ventricular valves at the beginning of ventricular systole
2. opening of the atrio-ventricular valves at the beginning of ventricular systole
3. opening of the atrio-ventricular valves at the beginning of ventricular diastole
4. closure of the atrio-ventricular valves at the beginning of ventricular diastole

162. What percentage of ventricular filling is passive and due to the opening of the atrio-ventricular valves?

1. 30 2. 50
3. 70 4. 100

163. Identify the incorrectly matched pair:

1. Stroke volume: Cardiac output X Heart rate
2. Bradycardia: heart rate less than 60 beats per minute
3. Systolic blood pressure: maximum pressure during one heart beat
4. Venous return = Cardiac output

164. The steps of the cardiac cycle in sequence are:

1. isovolumic contraction, isovolumic relaxation, ejection, passive ventricular filling, active ventricular filling.
2. isovolumic relaxation, isovolumic contraction, ejection, passive ventricular filling, active ventricular filling.
3. isovolumic contraction, ejection, isovolumic relaxation, passive ventricular filling, active ventricular filling.
4. isovolumic contraction, ejection, isovolumic relaxation, active ventricular filling, passive ventricular filling.

165. The sino-atrial node functions as the normal pacemaker in the human heart because:

1. The human heart is myogenic and derived from embryonic mesoderm
2. It is located at the top of the heart in the wall of the right atrium
3. It is the most innervated part of the human heart
4. It generates impulse at the maximum rate among the nodal tissue

166. Which gastrointestinal layer is characterized by having tough, fibrous connective tissue?
1. mucosa 2. submucosa
3. muscle 4. serosa

167. Which intestinal layer accounts for the action of the peristaltic waves?
1. serosa 2. muscularis
3. submucosa 4. mucous

168. The _____ nervous system division usually stimulates and promotes digestion.
1. somatic
2. sympathetic
3. central
4. parasympathetic

169. The frenulum is the membrane attached to the inferior surface of the _____.
1. tongue 2. stomach
3. lips 4. liver

170. Select what is not true about intestinal villi among the following:
1. They posses microvilli
2. They increase the surface area
3. They are supplied with capillaries and the lacteal vessels
4. They only participate in digestion of fats

171. Mark the right statement amont the following.
1. Trypsinogen is an inactive enzyme
2. Trypsinogen is secreted by intestinal mucosa
3. Enterokinase is secreted by pancreas
4. Bile cointains trypsin

172. Assertion : Chemical process of digestion is initiated in oral cavity.
Reason : Protein digestion starts in mouth.
1. If both assertion and reason is true and reason is the correct explanation of assertion.
2. If both assertion and reason is true but reason is not the correct explanation of assertion
3. If assertion is true but reason is false
4. If both assertion and reason is false.

173. Calcium deficiency occurs in the absence of vitamin
1. D 2. C
3. E 4. B

174. What will happen if the secretion of parietal cells of gastric glands is blocked with an inhibitor?
1. In the absence of HCl secretion, inactive pepsinogen is not converted into active enzyme pepsin
2. Entrokinase will not be released from the duodenal mucosa and so trypsinogen is not converted to trypsin
3. Gastric juice will be deficient in chymotrypsin
4. Gastric juice will be deficient in p epsinogen

175. A hiatal hernia is a weakness in the _____ muscle, which allows a portion of the digestive tract to enter the thoracic cavity.
1. diaphragm 2. stomach
3. intestinal 4. thoracic wall

176. The _____ part of the stomach is the area the is connected to the esophagus.
1. cardiac 2. pyloric
3. fundus 4. body

177. The _____ prevents food from entering the small intestine.
1. cardiac sphincter
2. pyloric valve
3. ileo-colic valve
4. sphincter of Oddi

178. Gastric enzymes are secreted by the _____ cells.
1. chief 2. goblet
3. parietal 4. oxyntic

179. Proteins are digested or broken down by the _____ in the stomach.
1. pepsinogen 2. pepsin
3. hydrochloric acid 4. lipase

180. Nutrients absorbed by the blood capillaries of intestinal villi first go into
1. Liver through hepatic portal vein
2. Hepatic arter
3. Aorta
4. Posterior vena cava