

HFT/3/Droppers/22

Test Code

720

Max. Marks

3 hrs.

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/marketing responses.

Test Syllabus

Physics :	Motion in a Straight Line, Projectile Motion, Laws of Motion, Work Energy and Power, Rotational Motion
Chemistry :	Some Basic Concepts of Chemistry, Structure of Atom, Classification of Elements and Periodicity of Properties, Chemical Bonding and Molecular Structure, States of Matter, Thermodynamics, Equilibrium
Botany :	Living World, Biological Classification, Kingdom Plantae, Morphology in Flowering Plants
Zoology :	Biomolecules, Digestive System, Respiratory System, Circulatory System, Excretory 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. A body of mass 5 kg explodes at rest into three fragments with masses in the ratio 1 : 1 : 3. The fragments with equal masses fly in mutually perpendicular directions with speeds of 21 m/s. The velocity of the heaviest fragment will be
 1. 11.5 m/s
 2. 14.0 m/s
 3. 7.0 m/s
 4. 9.89 m/s
2. A heavy steel ball of mass greater than 1 kg moving with a speed of 2 m sec⁻¹ collides head on with a stationary ping-pong ball of mass less than 0.1 gm. The collision is elastic. After the collision the ping-pong ball moves approximately with speed
 1. 2 m sec⁻¹
 2. 4 m sec⁻¹
 3. 2×10^4 m sec⁻¹
 4. 2×10^3 m sec⁻¹
3. A body of mass 'M' collides against a wall with a velocity v and retraces its path with the same speed. The change in momentum is (take initial direction of velocity as positive)
 1. Zero
 2. $2Mv$
 3. Mv
 4. $-2Mv$
4. A gun fires a bullet of mass 50 gm with a velocity of 30 m sec⁻¹. Because of this the gun is pushed back with a velocity of 1 m sec⁻¹. The mass of the gun is
 1. 15 kg
 2. 30 kg
 3. 1.5 kg
 4. 20 kg
5. In an elastic collision of two particles the following is conserved
 1. Momentum of each particle
 2. Speed of each particle
 3. Kinetic energy of each particle
 4. Total kinetic energy of both the particles
6. A ^{238}U nucleus decays by emitting an alpha particle of speed v ms⁻¹. The recoil speed of the residual nucleus is (in ms⁻¹)
 1. $-4v/234$
 2. $v/4$
 3. $-4v/238$
 4. $4v/238$
7. A smooth sphere of mass M moving with velocity u directly collides elastically with another sphere of mass m at rest. After collision their final velocities are V and v respectively. The value of v is
 1. $\frac{2uM}{m}$
 2. $\frac{2um}{M}$
 3. $\frac{2u}{1 + \frac{m}{M}}$
 4. $\frac{2u}{1 + \frac{M}{m}}$
8. A body of mass m having an initial velocity v , makes head on collision with a stationary body of mass M . After the collision, the body of mass m comes to rest and only the body having mass M moves. This will happen only when
 1. $m \gg M$
 2. $m \ll M$
 3. $m = M$
 4. $m = \frac{1}{2}M$
9. A particle of mass m moving with a velocity \vec{v} makes a head on elastic collision with another particle of same mass initially at rest. The velocity of the first particle after the collision will be
 1. \vec{v}
 2. $-\vec{v}$
 3. $-2\vec{v}$
 4. Zero
10. A particle of mass m moving with horizontal speed 6 m/sec as shown in figure. If then for one dimensional elastic collision, the speed of lighter particle after collision will be

The diagram shows two particles, m and M, on a horizontal surface. Particle m is on the left, moving to the right with an initial velocity $u_1 = 6 \text{ m/s}$. Particle M is on the right, initially at rest. After the collision, particle m is shown moving to the right with a final velocity $u_2 = 4 \text{ m/s}$. A dashed line indicates the path of particle m before and after the collision.

 1. 2 m/sec in original direction
 2. 2 m/sec opposite to the original direction
 3. 4 m/sec opposite to the original direction
 4. 4 m/sec in original direction
11. A body of mass m is placed on the earth's surface. It is taken from the earth's surface to a height $h = 3R$. The change in gravitational potential energy of the body is
 1. $\frac{2}{3}mgR$
 2. $\frac{3}{4}mgR$
 3. $\frac{mgR}{2}$
 4. $\frac{mgR}{4}$

12. A bullet moving with a velocity of 100 m/s can just penetrate two planks of equal thickness. The number of such planks penetrated by the same bullet, when the velocity is doubled, will be:

1. 4 2. 6
3. 8 4. 10

13. A diwali rocket is ejecting 50 g of gas/es at a velocity of 400 m/s. The acceleration force on the rocket will be:

1. 22 dyne 2. 20 N
3. 20 dyne 4. 100 N

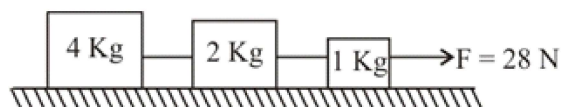
14. Two blocks of masses 2 kg and 1 kg are in contact with each other on a frictionless table. When a horizontal force of 3.0 N is applied to the block of mass 2 kg, the value of the force of contact between the two blocks is:

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

15. A man sitting in a train in motion is facing the engine. He tosses a coin up; the coin falls behind him. The train is:

1. Moving forward with acceleration
2. Moving forward with uniform speed
3. Moving backward with uniform speed
4. Moving backward with deceleration

16. In the arrangement shown in the figure given below, the strings are light and inextensible. The surface over which blocks are placed is smooth. What is the acceleration of each block?



1. 8 m/s^2 2. 4 m/s^2
3. 2 m/s^2 4. 14 m/s^2

17. When the bob of a simple pendulum swings, the work done by tension in the string is:

1. > 0 2. < 0
3. Zero 4. Maximum

18. When the force retards the motion of body, the work done is:

1. Zero
2. - ve
3. + ve
4. + ve or - ve depending upon the magnitude of force and displacement

19. Under the action of a force, a 2 kg body moves such that its position x as a function of time is given by: $x = t^3/3$, where x is in metre and t in seconds. The work done by the force in the first two seconds is:

1. 1.6 J 2. 16 J
3. 160 J 4. 1600 J

20. Two bodies with masses M_1 and M_2 have equal kinetic energies. If P_1 and P_2 are their respective momenta, then P_1/P_2 is equal to:

1. $M_1 : M_2$ 2. $M_1^2 : M_2^2$
3. $M_2 : M_1$ 4. $\sqrt{M_1} : \sqrt{M_2}$

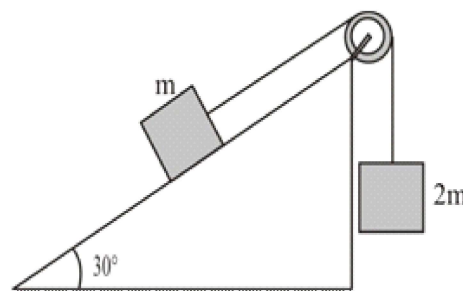
21. A body is moved along a straight line by a machine delivering a constant power. The distance, moved by the body in time t , is proportional to:

1. \sqrt{t} 2. $t^{3/4}$
3. $t^{3/2}$ 4. t^2

22. If μ_k is the coefficient of kinetic friction, μ_r the coefficient of rolling friction μ_s the coefficient of static friction then generally:

1. $\mu_s > \mu_k > \mu_r$ 2. $\mu_s < \mu_k < \mu_r$
3. $\mu_s < \mu_k > \mu_r$ 4. $\mu_s > \mu_r > \mu_k$

23. Two blocks of masses m and $2m$ are connected by a light string passing over a frictionless pulley. As shown in the figure, the m is placed on a smooth inclined plane of inclination 30° and $2m$ hangs vertically. If the system is released, the blocks move with an acceleration equal to:

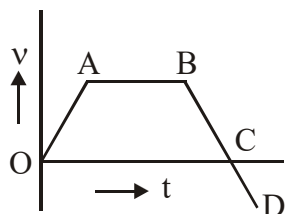


1. $g/4$ 2. $g/3$
3. $g/2$ 4. g

24. A bag of sand of mass 2 kg is suspended by a rope. A bullet of mass 10 gm is fired at it and gets embedded into it. The bag rises up a vertical height of 10 cm. The initial velocity of the bullet is (app.) (take = 10 ms^{-2}).

1. 70 m/s
2. 140 m/s
3. 210 m/s
4. 284 m/s

25. A plot of velocity versus time is shown in figure. A single force acts on the body. The correct statement is



1. In moving from C to D, work done by the force on the body is positive
2. In moving from B to C, work done by the force on the body is positive
3. In moving from A to B, the body does work on the system
4. In moving from O to A, work is done by the body and is negative

26. A cord is used to lower vertically a block of mass M , a distance d at a constant downward acceleration of $g/4$. The workdone by the cord on the block is

1. $Mg \frac{d}{4}$
2. $3Mg \frac{d}{4}$
3. $-3Mg \frac{d}{4}$
4. $Mg d$

27. A ball is allowed to fall down with initial speed n from a height of 10m. It loses 50% kinetic energy after striking the floor. It reaches to the same height after collision. What is the value of n ?

1. 28 m/s
2. 7 m/s
3. 14 m/s
4. It is never possible

28. The slope of K.E. versus displacement curve of a particle in motion is:

1. Equal to the acceleration of the particle
2. Inversely proportional to acceleration
3. Directly proportional to acceleration
4. None of these

29. A ball of mass m moving with a constant velocity strikes against a ball of same mass at rest. If e = coefficient of restitution, then what will be the ratio of velocity of two balls after collision ?

1. $\frac{1-e}{1+e}$
2. $\frac{e-1}{e+1}$
3. $\frac{1+e}{1-e}$
4. $\frac{2+e}{e-1}$

30. If two balls, each of mass 0.06kg, moving in opposite directions with speed 4 m/s, collide and rebound with same speed, then impulse imparted to each ball due to other is

1. 0.48 kg m/s
2. 0.24 kg m/s
3. 0.81 kg m/s
4. Zero

31. A bomb explodes into two fragments of masses 3kg and 1 kg. The total kinetic energy of the fragments is $6 \times 10^4 \text{ J}$. What is the ratio of the velocities of the smaller and bigger fragments?

1. 3
2. -3
3. $\frac{1}{3}$
4. $-\frac{1}{3}$

32. Two billiard balls of the same size and mass are in contact on a billiard table. A third ball of the same size and mass strikes them symmetrically and remains at rest after the impact. The coefficient of restitution between the balls is

1. $\frac{2}{3}$
2. $\frac{2}{4.1}$
3. $\frac{1}{7}$
4. $\frac{1}{8}$

33. A uniform sphere is placed on a smooth horizontal surface and a horizontal force F is applied on it at a distance h above the surface. The acceleration of the centre

1. Is maximum when $h = 0$
2. Is maximum when $h = R$
3. Is maximum when $h = 2R$
4. Is independent of h .

34. A meter stick of mass 400 g is pivoted at one end and displaced through an angle 60° . The increase in its potential energy is

1. 1.7 J
2. 1.0 J
3. 100 J
4. 1000 J

35. A particle moving in the xy plane undergoes a displacement of $\vec{s} = (2\hat{i} + 3\hat{j})$ while a constant force $\vec{F} = (5\hat{i} + 2\hat{j})\text{N}$ acts on the particle. The work done by the force F is:
1. 17 joule
 2. 18 joule
 3. 16 joule
 4. 15 joule
36. A body of mass m accelerates uniformly from rest to v_1 in time t_1 . As a function of t, the instantaneous power delivered to the body is:
1. $\frac{mv_1 t}{t_1}$
 2. $\frac{mv_1^2 t}{t_1}$
 3. $\frac{mv_1 t^2}{t_1}$
 4. $\frac{mv_1^2 t}{t_1^2}$
37. If momentum of a body increases by 50% its kinetic energy will increase by
1. 50%
 2. 100%
 3. 125%
 4. 150%
38. A ball is dropped from a height of 1m. If coefficient of restitution between the surface and the ball is 0.6, the ball rebounds to a height of
1. 0.6 m
 2. 0.4 m
 3. 1 m
 4. 0.36 m
39. A particle of mass m is moving in a horizontal circle of radius R under the centripetal force $= -K / R^2$ where K is a constant. What is the total energy of the particle ?
1. $K/2 R$
 2. $-K/2 R$
 3. K/R
 4. $-K/R$
40. A car moving with a velocity of 50 km/hr can be stopped by brakes after atleast 6m. if the same car is moving at a speed of 100 km/hr, the minimum stopping distance is
1. 12 m
 2. 18 m
 3. 24 m
 4. 6 m
41. A car of mass 'm' is driven with acceleration 'a' along a straight level road against a constant external resistive force 'R'. When velocity of the car is 'V', the rate at which engine of car is doing work will be
1. RV
 2. ma V
 3. $(R + ma) V$
 4. $(ma - R)V$
42. A smooth sphere of mass m_1 moving with velocity u directly collides elastically with another sphere of mass m_2 at rest. After perfectly elastic collision, their final velocities are v_1 and v_2 respectively. The value of v_2 is
1. $\frac{2um_1}{m_2}$
 2. $\frac{2um_2}{m_1}$
 3. $\frac{2u}{1 + \frac{m_2}{m_1}}$
 4. $\frac{2u}{1 + \frac{m_1}{m_2}}$
43. A metal ball of mass 2 kg moving with a velocity of 10 ms^{-1} has a head-on collision with stationary ball of mass 3 kg. If, after the collision, both the balls move together, then loss in kinetic energy due to collision is
1. 60 J
 2. 80 J
 3. 120 J
 4. 160 J
44. Under the action of a force, 3 kg body moves such that $x = \frac{t^2}{2}$, where position x is in metre and t is in second. The work done by the force in first 3 second is
1. 13.5 J
 2. 27 J
 3. 81 J
 4. 109 J
45. Two particles A and B are at rest initially. When left free, they move towards each other in the influence of their mutual force. If at any instant, velocity of A is v and that of B is $-3v$, then velocity of their centre of mass will be
1. Zero
 2. v
 3. $-v$
 4. $-2v$
46. 100 mL of 0.3 N HCl solution were mixed with 200 mL of 0.6 N H_2SO_4 solution. The final acidic normality is:
1. 0.9 N
 2. 0.6 N
 3. 0.5 N
 4. 0.4 N
47. 0.84 g of a metal carbonate reacts with 40 mL of N/2 H_2SO_4 . The equivalent weight of metal carbonate is:
1. 84 g
 2. 64 g
 3. 42 g
 4. 38 g

48. The minimum quantity of H_2S needed to precipitate 63.5 g of Cu^{2+} will be nearly:
1. 63.5 g
 2. 31.75 g
 3. 34 g
 4. 20 g
49. 100 ml each of 0.5 N NaOH, N/5 HCl and N/10 H_2SO_4 are mixed together. The resulting solution will be
1. Acidic
 2. Alkaline
 3. Neutral
 4. Can't be determine
50. $2\text{SO}_2 + \text{O}_2 \rightarrow 2\text{SO}_3$, 6.4 gm SO_2 and 3.2 gm O_2 to form SO_3 . How much maximum mass of SO_3 is formed?
1. 32 gm
 2. 16 gm
 3. 8 gm
 4. 4 gm
51. 1.5 gm of a mixture of Na_2CO_3 and NaCl is completely reacted with 150 ml $\frac{\text{N}}{10}$ HCl then percentage of NaCl in the mixture is
1. 53
 2. 47
 3. 26.5
 4. 23.5
52. Rutherford scattering experiment is related to size of the
1. Nucleus
 2. Atom
 3. Electron
 4. Neutron
53. 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. $n = 3, m = -3, s = -1/2$
54. For d-electron, the orbital angular momentum is
1. $\sqrt{6} \frac{h}{2\pi}$
 2. $\sqrt{2} \frac{h}{2\pi}$
 3. $h/2\pi$
 4. $2h/\pi$
55. The transition in He^+ ion that would have the same wave number as the first Lyman line in hydrogen spectrum is :
1. $2 \rightarrow 1$
 2. $5 \rightarrow 3$
 3. $4 \rightarrow 2$
 4. $6 \rightarrow 4$
56. Which of the following is iso-electronic with neon?
1. O^-
 2. F^-
 3. Mg
 4. Na
57. If the value of $E_n = -78.4$ kcal/mol the order of the orbit in hydrogen atom is:
1. 4
 2. 3
 3. 2
 4. 1
58. A ball has a mass of 0.1 kg is velocity is 40 m/s. Find out de Broglie wave length
1. 1.66×10^{-34} m
 2. 2×10^{-34} m
 3. 3×10^{-34} m
 4. 4×10^{-34} m
59. Which electronic transition for Paschen series would result in maximum wavelength?
1. $n_2 \rightarrow n_1$
 2. $n_3 \rightarrow n_2$
 3. $n_4 \rightarrow n_3$
 4. $n_5 \rightarrow n_3$
60. Equivalent weight of $\text{Al}_2(\text{SO}_4)_3$ is given by (say molar mass M)
1. $\frac{M}{6}$
 2. $\frac{M}{3}$
 3. 0
 4. M
61. La (Lanthanum) atomic number 57 is a member of
1. s-block
 2. p-block
 3. d-block
 4. f-block
62. Third ionization enthalpy is maximum for
1. Magnesium
 2. Silicon
 3. Phosphorous
 4. Chlorine
63. Which has largest size?
1. N^{-3}
 2. O^{2-}
 3. F^-
 4. Na^+
64. The number of radial nodes and nodal plane in $3d_{z^2}$ orbital respectively is
1. 0, 0
 2. 1, 0
 3. 0, 1
 4. 1, 1
65. Which has highest ionisation potential?
1. B
 2. C
 3. N
 4. O

66. Which of the following order is correct as indicated?
1. $F > Cl > Br > I$ (Electron affinity)
 2. $I > I > I^+$ (Ionisation Energy)
 3. $I > I > I^+$ (Radii)
 4. $I^{+7} > I^+ > I^{+5}$ (Ionisation Energy)
67. In which of the following molecule the bond angle is maximum?
1. NH_3
 2. NF_3
 3. PH_3
 4. AsH_3
68. Molecular shapes of ClF_3 , I_3^- and XeO_3 respectively are
1. T-shape, Linear, Pyramidal
 2. Planar, Linear, Tetrahedral
 3. T-shape, Planar, Pyramidal
 4. Trigonal bipyramidal, Linear, Tetrahedral
69. Which has highest dipole moment?
1. CO_2
 2. BF_3
 3. NF_3
 4. NH_3
70. What will be the total volume of the mixture when 32 gm of oxygen and 3 gm of hydrogen are mixed and kept at 1 atm at $0^\circ C$?
1. 23.26 L
 2. 44.8 L
 3. 56 L
 4. 50 L
71. Which order is correct regarding 'a' and 'b' vander waal's constants?
1. $a_{NH_3} > a_{N_2}$, $b_{NH_3} > b_{N_2}$
 2. $a_{NH_3} < a_{N_2}$, $b_{NH_3} < b_{N_2}$
 3. $a_{NH_3} < a_{N_2}$, $b_{NH_3} > b_{N_2}$
 4. $a_{NH_3} > a_{N_2}$, $b_{NH_3} < b_{N_2}$
72. 200 ml of He at 0.66 atm pressure and 400 ml of O_2 at 0.52 atm pressure are mixed in a 400 ml vessel at $25^\circ C$. The partial pressure of He and O_2 respectively will be
1. 0.33, 0.52
 2. 0.52, 0.33
 3. 0.22, 0.45
 4. 0.33, 0.26
73. Correct set of four quantum numbers for the valence (outermost) electron of rubidium ($Z = 37$) is
1. 5, 0, 0, $+1/2$
 2. 5, 1, 0, $+1/2$
 3. 5, 1, 1, $+1/2$
 4. 6, 0, 0, $+1/2$
74. The potential energy of an electron in hydrogen atom is $-3.02 eV$, its kinetic energy will be
1. 1.51 eV
 2. 15.10 eV
 3. 13.6 eV
 4. 3.02 eV
75. For an exothermic reaction to be spontaneous ($\Delta S = \text{negative}$)
1. Temperature must be high
 2. Temperature must be zero
 3. Temperature may have any magnitude
 4. Temperature must be low
76. In which system entropy decreases?
1. Boiling of egg
 2. Dissolution of salt in water
 3. Stretching of rubber band
 4. Melting of ice
77. The specific heat of a gas is found to be 0.075 calories at constant volume and its formula weight is 40. The atomicity of the gas would be
1. 1
 2. 2
 3. 3
 4. 4
78. What weight of hydrogen at STP could be contained in a vessel that hold 4.8g of oxygen at STP?
1. 4.8g
 2. 3.0g
 3. 0.6g
 4. 0.3g
79. The correct order for T_p , T_B and T_C is
1. $T_i < T_C < T_B$
 2. $T_B < T_C < T_i$
 3. $T_C < T_B < T_i$
 4. $T_i < T_B < T_C$
80. A 50 ml solution of strong acid of $pH = 1$ is mixed with a 50 ml solution of strong acid of $pH = 2$. The pH of the mixture will be nearly: ($\log 5.5 = 0.74$)
1. 0.74
 2. 1.26
 3. 1.76
 4. 1.5
81. The pH of a solution obtained by mixing 50 ml of 0.4 N HCl and 50 ml of 0.2 M NaOH is :
1. 13
 2. 12
 3. 1.0
 4. 2.0
82. When NH_4Cl is added in NH_4OH solution then pH of solution
1. Increases
 2. Decreases
 3. Remains unchanged
 4. Firstly increases & more than decreases

83. In which of the following reaction the value of K_p will be equal to K_c ?

1. $N_2(g) + O_2(g) \rightleftharpoons 2NO(g)$
2. $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$
3. $2NH_3(g) \rightleftharpoons N_2(g) + 3H_2(g)$
4. $2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g)$

84. $\frac{K_p}{K_c}$ for the gaseous reaction:

- I. $2A + 3B \rightleftharpoons 2C$
- II. $2A \rightleftharpoons 4B$
- III. $A + B + 2C \rightleftharpoons 4D$

Would be respectively :

1. $(RT)^{-3}, (RT)^2, (RT)^0$
2. $(RT)^{-3}, (RT)^{-2}, (RT)^{-1}$
3. $(RT)^{-3}, (RT)^2, (RT)$
4. None of the above

85. N_2O_4 dissociates as $N_2O_4(g) \rightleftharpoons 2NO_2(g)$ at 273 K and 2 atm pressure. The equilibrium mixture has a vapour density of 41. What will be the percentage degree of dissociation ?

1. 14.2%
2. 16.2%
3. 12.2%
4. 87.8%

86. On adding inert gas to the equilibrium $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$ at constant pressure. The degree of dissociation will :

1. Unchanged
2. Decreased
3. Increased
4. May be decrease or increase

87. The oxidation number of sulphur in S_8 , S_2F_2 and H_2S respectively are :

1. 0, +1 and -2
2. +2, +1 and -2
3. 0, +1 and +2
4. -2, +1 and -2

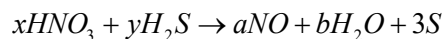
88. Which of the following is a redox reaction :

1. $NaCl + KNO_3 \rightarrow NaNO_3 + KCl$
2. $CaC_2O_4 + 2HCl \rightarrow CaCl_2 + H_2C_2O_4$
3. $Mg(OH)_2 + 2NH_4Cl \rightarrow MgCl_2 + 2NH_4^+ \bar{O}H$
4. $Zn + 2AgCN \rightarrow 2Ag + [Zn(CN)_2]^{2-}$

89. Which acts a s reducing agent only ?

1. SO_2
2. HNO_3
3. MnO_2
4. H_2S

90. For the balanced chemical reaction



What are the values of x, y, a and b respectively?

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

91. Pneumatophores help in

1. Photosynthesis
2. Food storage
3. Respiration
4. Reproduction

92. The stem of Maize and Sugercane has support roots coming out of the lower nodes of stem. They are called :

1. Stilt roots
2. Prop roots
3. Pneumatophores
4. Adventitious roots

93. In *Opuntia*, the spines are modification of:

1. Stems
2. Leaves
3. Roots
4. None of the above

94. Edible part of Ginger is:

1. Root
2. Stem
3. Leaf
4. Flower

95. Flat green photosynthetic stem is :

1. Phylloclade
2. Petiole
3. Stipule
4. Pedicel

96. Whorled phyllotaxy with simple reticulate leaves occurs in:

1. Alstonia
2. Gauva
3. Calotropis
4. Mustard

97. Petiole part of the leaf is also known as:

1. Epipodium
2. Mesopodium
3. Hypopodium
4. None of the above

98. Axis of the inflorescence is called

1. Peduncle
2. Thalamus
3. Petiole
4. Pedicel

99. Edible part of Cauliflower is:

1. Bud
2. Bract
3. Inflorescence
4. Leaves

100. Individual components of perianth are called:

1. Sepals
2. Petals
3. Tepals
4. Bracts

101. Arrangement of ovules on the placentae developed from central axis of ovary is:

1. Parietal placentation
2. Basal placentation
3. Marginal placentation
4. Axile placentation

102. Aestivation found in Pea flowers is:

1. Twisted
2. Valvate
3. Imbricate
4. Vexillary

103. Placentation in Tomato and Lemon is:

1. Parietal
2. Marginal
3. Free central
4. Axile

104. Thalamus grows to enclose ovary and other parts arise above the ovary in condition:

1. Hypogynous
2. Perigynous
3. Epigynous
4. None of these

105. Cotyledons and testa are respectively edible in:

1. Walnut and Tamarind
2. French Bean and Coconut
3. Cashew Nut and Litchi
4. Groundnut and Pomegranate

106. Pericarp develops from :

1. Ovary wall
2. Inner integument
3. Outer integument
4. Placenta

107. Drupe occurs in :

1. Pea
2. Mango
3. Tomato
4. Wheat

108. Placenta and pericarp are both edible in:

1. Banana
2. Tomato
3. Potato
4. Apple

109. Bicarpellary syncarpous ovary with axile placentation is found in :

1. Solanaceae
2. Asteraceae
3. Malvaceae
4. Caesalpiniaceae

110. Which family is characteristic representative of monocotyledonous plants ?

1. Liliaceae
2. Solanaceae
3. Fabaceae
4. Brassicaceae

111. Which of the following chemical characteristics is not common to all living beings?

1. Type of protein present in the body
2. Similar triplet codes for amino acids
3. Energy is stored by high phosphate bonds
4. Ribosomes are the sites of protein synthesis

112. Species is:

1. population of one type
2. a group of interbreeding populations
3. a group of individuals having same genotypes and phenotypes
4. population of individual having same genotypes and phenotypes

113. Reproduction of cyanobacteria is different from bacteria as they are reproduced by:

1. Conjugation
2. Transduction
3. Fragmentation
4. Binary fission

114. Which of the following causes abortion in ladies?

1. Viruses
2. Bacteria
3. Mycoplasma
4. None of these

115. Nuclear membrane is absent in:

1. Monera
2. Protista
3. Fungi
4. Plantae

116. Example of a bioluminescent protozoan:

1. Paramecium
2. Opalina
3. Entamoeba
4. Noctiluca

117. Nutrition, in general, in euglenoid form is:

1. parasitic
2. mixotrophic
3. saprophytic
4. chemotrophic

118. Zygosporangia are produced :

1. *Mucor* and *Rhizopus*
2. *Alternaria* and *Cystopus*
3. *Cystopus* and *Phytophthora*
4. All of the above

119. Deadly poisonous mushroom is:

1. *Polyporus*
2. *Agaricus*
3. *Amanita phalloides*
4. None of these

120. Famous Bengal Famine of 1942 was associated with infection of:

1. *Helminthosporium* on paddy
2. *Puccinia* on wheat
3. *Cercospora* on groundnut
4. *Fusarium* on arhar

121. Fungi differ from other group of organisms in having:

1. Unicellular, decomposer
2. Multicellular, decomposer
3. Unicellular, consumers
4. Multicellular, consumers

122. Which of the following is an infectious agent that contains protein but no nucleic acid?

1. Kuru
2. Prion
3. Virino
4. Viroid

123. Interferons were discovered by:

1. Zinder and Lederberg
2. Temin and Baltimore
3. Safferman and Morris
4. Isaacs and Lindenmann

124. Which of the following is not a viral disease?

1. Polio
2. Leprosy
3. Rabies
4. Chickenpox

125. Transfer of genetic information through virus is termed :

1. conjugation
2. conduction
3. transduction
4. transformation

126. Which one of the following are intracellular obligate parasites ?

1. Viruses
2. Bacteria
3. Slime moulds
4. Blue-green algae

127. Potato spindle tuber disease is caused by a:

1. virus
2. prion
3. viroid
4. fungus

128. In *Spirogyra*, meiosis occurs during:

1. Conjugation
2. Gamete formation
3. Perennation
4. Germination of zygospore

129. Murein is not found in the cell wall of:

1. *Nostoc*
2. Eubacteria
3. Cyanobacteria
4. Diatoms

130. Which produces peat ?

1. *Polytrichum*
2. *Funaria*
3. *Sphagnum*
4. *Dawsonia*

131. Heterosporous pteridophyte is:

1. *Psilotum*
2. *Adiantum*
3. *Equisetum*
4. *Salvinia*

132. Which of the following gametophyte is not independent free-living?

1. *Funaria*
2. *Marchantia*
3. *Pteris*
4. *Pinus*

133. Apocarpous conditions occur in:

1. *Ranunculus*
2. *Magnolia*
3. *Nelumbo*
4. All of these

134. Corolla is never:

1. Deciduous
2. Persistent
3. Caducous
4. White in colour

135. Which of the following is not a stem modification?

1. Pitcher of *Nepenthes*
2. Thorns of *Citrus*
3. Tendrils of cucumber
4. Flattened structures of *Opuntia*

136. Presence of ketonuria and glycosuria is indicative of:

1. Renal failure
2. Diabetes mellitus
3. Nephrotic syndrome
4. Renal stones

137. Juxtamedullary nephrons:

1. are more common than cortical nephrons
2. do not have a well developed vasa recta associated with them
3. play a very important role in concentration of urine
4. produce angiotensinogen

138. Identify the incorrect statement regarding anatomy of human kidney:

1. Adrenal gland is located at the inferior pole of each kidney
2. Columns of Bertini are extensions of cortex into medulla
3. Right kidney is slightly lower in location than the left kidney
4. The renal pelvis continues into ureter

139. All the following animals are uricotelic except:

1. Reptiles
2. Land snails
3. Birds
4. Marine fishes

140. Identify the incorrectly matched pair [assume normal physiological conditions]:

1. GFR – 125 ml/min
2. Amount of urea produced – 25 to 30 mg/day
3. Average urine output – 1 to 1.5 liter/day
4. Average amount of blood filtered by kidney – 1100 to 1200 ml/min

141. During concentration of urine, NaCl is returned to medullary interstitium by:

1. Ascending limb of Loop of Henle
2. Descending limb of Loop of Henle
3. Ascending limb of Vasa Recta
4. Descending limb of Vasa Recta

142. The dialyzing fluid has same composition as that of plasma except:

1. Nitrogenous wastes
2. Bicarbonate
3. Sodium
4. Chloride

143. The proximal convoluted tubule of the nephron is lined by:

1. simple ciliated cuboidal epithelium
2. simple ciliated columnar epithelium
3. compound cuboidal brush bordered epithelium
4. simple cuboidal brush bordered epithelium

144. In majority of the nephrons the loop of Henle:

1. is absent
2. extends only a little into the medulla
3. extends deep into the medulla
4. is associated with a highly developed vasa recta

145. Extension of renal cortex between the medullary pyramids is called as:

1. Juxta-glomerular apparatus
2. Macula densa
3. Columns of Bertini
4. Ducts of Bellini

146. Removal rate of carbon dioxide by lungs is approximately:

1. 125 ml/minute
2. 200 ml/minute
3. 280 ml/minute
4. 325 ml/minute

147. A capillary network around the renal tubule is formed by:

1. Afferent arteriole
2. Efferent arteriole
3. Vasa recta
4. Arcuate artery

148. Urine in ureter is drained directly from:

1. Collecting duct
2. Papilla
3. Renal pelvis
4. Major calyces

149. The main physiological stimulus for vasopressin release is

1. Blood volume
2. Plasma osmolality
3. Blood pressure
4. Stroke volume

150. A reduction in expanded extracellular fluid (ECF) volume by increasing renal sodium excretion is a function of:

1. ADH
2. Aldosterone
3. Angiotensin II
4. ANF

151. What will happen to glomerular filtration rate (GFR) if efferent arteriole smooth muscle is contracted?

1. GFR will increase
2. GFR will decrease
3. GFR will remain constant
4. GFR will increase initially and then decrease

152. Damage to alveolar walls leading to decrease in respiratory surface is characteristic of:

1. Asthma
2. Pneumoconiosis
3. Emphysema
4. Pneumonitis

153. The functions of the respiratory rhythm center can be moderated by a center located in:

1. Medulla oblongata
2. Pons varoli
3. Hypothalamus
4. Cerebrum

154. Approximately what amount of oxygen is carried in a dissolved state through the plasma by 100 ml of oxygenated blood?

1. 0.6 ml
2. 1.4 ml
3. 4 ml
4. 5 ml

155. A person suffers punctures in his chest cavity in an accident, without any damage to the lungs. It's effect could be:

1. A decreased respiratory rate
2. Absence of breathing on the affected side
3. Hyper inflation of the lung on affected side
4. An increase in the partial pressure of oxygen in deoxygenated blood

156. The value of which of the following is normally the highest in normal physiological conditions?

1. Residual volume
2. Expiratory reserve volume
3. Functional residual capacity
4. Inspiratory reserve volume

157. Platelets are cell fragments that:

- I. are produced from megakaryocytes in the spleen in fetal life
 - II. can release variety of factors involved in blood coagulation
1. Only I is correct
 2. Only II is correct
 3. Both I and II are correct
 4. Both I and II are incorrect

158. An Rh -ve person, when exposed to Rh +ve blood:

1. will form antibodies against the Rh antigen
2. will be unaffected
3. will form antibodies against the Rh antigen only on second exposure
4. will receive anti Rh antibodies from the donor

159. Which among the following is correct during each cardiac cycle?

1. The volume of blood by right and left ventricles is same
2. The volume of blood by right and left ventricles is different
3. The volume of blood received by right and left atria is different
4. The volume of blood received by pulmonary arteries and aorta is different

160. Cardiac activity could be moderated by the autonomic nervous system. Tick the correct answer:

1. The parasympathetic system stimulates heart rate and stroke volume
2. The sympathetic system stimulates heart rate and stroke volume
3. The parasympathetic system stimulates heart rate but decreases stroke volume
4. The sympathetic system stimulates heart rate but decreases stroke volume

161. An event usually not seen on the surface ECG is:

1. Atrial depolarization
2. Atrial repolarization
3. Ventricular depolarization
4. Ventricular repolarization

162. Which of the following can be called as a 'cascade' process?

1. Micturition reflex
2. Formation of cross bridges in skeletal muscle contraction
3. Coagulation of blood
4. Regulation of respiration

163. The nodal musculature of the heart has the capability to generate impulse:

1. on stimulation by the sympathetic division of the autonomic nervous system
2. on stimulation by the parasympathetic division of the autonomic nervous system
3. on stimulation by the somatic neural division of the peripheral nervous system
4. without any external stimulus

164. During ventricular contraction in a cardiac cycle:

1. the AV valves close earlier than the opening of semi lunar vales
2. the AV valves close earlier than the closure of semi lunar vales
3. the AV valves close later than the opening of semi lunar vales
4. the AV valves closure and opening of semi lunar valves occurs simultaneously

165.If the left ventricle fails to pump blood adequately to the body's cells, it usually leads to:

1. heart block
2. cardiac tamponade
3. congestive heart failure
4. cardiac arrest

166.What regulates the opening of oesophagus into the stomach?

1. A membranous valve
2. A muscular sphincter
3. A mesodermal septum
4. A cartilaginous flap

167.The longest part of the small intestine is:

1. Ilium
2. Duodenum
3. Jejunum
4. Ileum

168.Rugae are:

1. irregular folds in the stomach formed by mucosa
2. irregular folds in the stomach formed by submucosa
3. irregular folds in the stomach formed by muscularis
4. regular folds in the stomach formed by mucosa

169.The part of the small intestine where maximum absorption takes place is lined by:

1. Squamous epithelium
2. Cuboidal brush bordered epithelium
3. Columnar brush bordered epithelium
4. Transitional epithelium

170.Which of the following would not be classified as an accessory digestive gland?

1. Liver
2. Crypts of Lieberkuhn
3. Pancreas
4. Salivary glands

171.The structural and functional units of liver containing hepatic cells are:

1. Hepatic lobes
2. Hepatobiliary tree
3. Hepatic lobules
4. Hepatic sinusoids

172.The duct of gall bladder (cystic duct) along with the hepatic duct from the liver forms the:

1. Common hepatopancreatic duct
2. Duct of Rivinus
3. Wharton's duct
4. Common bile duct

173.The pancreatic acini:

1. Produce insulin and glucagon
2. Produce somatostatin
3. Secrete hydrolases
4. Store glucose and fats

174. The proenzyme pepsinogen gets converted into the active enzyme pepsin on exposure to:

1. HCl
2. Enterokinase
3. Enterogastrone
4. Bile

175.Which of the following is a sub-mucosal gland?

1. Sublingual salivary gland
2. Pyloric glands
3. Brunner's glands
4. Submandibular salivary gland

176.The property of water that enables it to stabilize temperature in bodies of organisms and thus makes it indispensable for life is:

1. High specific heat
2. High latent heat of fusion
3. High latent heat of vaporization
4. High cohesion and adhesion

177.The number of high energy bonds in a molecule of ATP is:

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

178.The correct ascending order of percent composition of various components of a typical cell would be:

1. Protein – Carbohydrate – Lipids – Nucleic acids
2. Protein – Nucleic acids – Carbohydrate – Lipids
3. Carbohydrates – Protein – Nucleic acids – Lipids
4. Carbohydrates – Protein – Lipids – Nucleic acids

179.Type of bonds that stabilize a tertiary structure of a protein include all the following except:

1. van der Waal's interactions
2. Hydrophobic interactions
3. Disulfide linkage
4. Covalent bonds

180.A ribosome inhibiting secondary metabolite protein found in the castor plant is:

1. Ricin
2. Abrin
3. Concanavalin A
4. Vinblastin