HORIZON ACADEMY®

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Name.: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Date : 22/11/2015

Test No.: 15

Subject Code.: 222

Time : 3 Hrs. **M.M. : 720**

HORIZON TEST SERIES

for

Medical Entrance Exam. 2016

[Test No. I5]

INSTRUCTIONS FOR STUDENTS

1. Read each question carefully.
2. It is mandatory to use Blue/Black Ball Point Pen to darken the appropriate circle in the answer sheet.
3. Mark should be dark and should complete fill the circle.
4. Rough work must be done on the Question Paper, no additional sheet will be provided for this purpose.
5. Do not use white-fluid or any other rubbing material on answer sheet. No change in the answer once marked.
6. Student cannot use log tables and calculators or any other material in the examination hall.
7. Before attempting the question paper, student should ensure that the test paper contains all pages and no page is missing.
8. Each correct answer carries four marks. One mark will be deducted for each incorrect answer from the total score.
9. Before handing over the answer sheet to the invigilator, candidate should check the particulars have been filled and marked correctly.
10. Immediately after the prescribed examination time is over, the answer sheet to be returned to the invigilator.
11. Use of Calculator and other Electronic device is not permitted.

Test No. 15

Topics of The Test

Physics	Physical world, Units and measurements, Motion in a straight line, Motion in a plane, Laws of motion, Work, Energy and power, System of particles and rotational motion, Gravitation.
Chemistry	Some basic concepts of chemistry, States of matter, Atomic structure, Chemical bonding, Classification of elements, Redox reaction, Equilibrium.
Biology	**Zoology :** Animal reproduction, Reproduction in organism, Animal Physiology (Digestion, Respiration, Circulation, Excretion, Endocrine, Movement and Locomotion), Cockroach. **Botany :** Genetics (Molecular basis of inheritance and principles of inheritance) and Plant Physiology (Respiration, Photosynthesis, Plant water relation, Mineral nutrition, Plant growth).

Test No. 15

[PHYSICS]

1. The damping force on an oscillator is directly proportional to the velocity. The unit of the constant of proportionality is
   (A) kg-ms^{-1} (B) kg-ms^{-2}
   (C) kg-s^{-1} (D) kg-s

2. Which one of the following is not a unit of Young's modulus ?
   (A) Nm^{-1} (B) Nm^{-2}
   (C) Dyne cm^{-2} (D) MPa

3. Given that the displacement of an oscillating particle is given by $y = A\sin(Bx + ct + D)$. The dimensional formula for $(ABCD)$ is
   (A) $[M^0L^{-1}T^0]$ (B) $[M^0L^0T^{-1}]$
   (C) $[M^0L^{-1}T^{-1}]$ (D) $[M^0L^0T^0]$

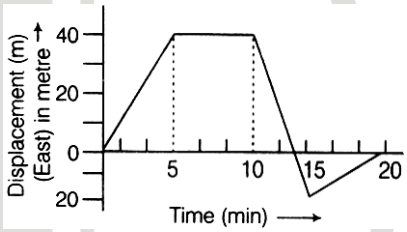
4. If $p = \frac{RT}{V-b}e^{-\alpha V/RT}$, then dimensional formula of α is
   (A) P (B) R
   (C) T (D) V

5. The error in the measurement of radius of sphere is 0.3%, what is percentage error in the measurement of its volume ?
   (A) 0.3% (B) 0.6%
   (C) 0.9% (D) $\frac{4}{3}\pi(0.3)^3$

6. The period of oscillation of a simple pendulum in the experiment is recorded as 2.63 s, 2.56 s, 2.42 s, 2.71 s and 2.80 s respectively. The average absolute error is
   (A) 0.1 s (B) 0.11 s
   (C) 0.01 s (D) 1.0 s

7. A wheel completes 2000 revolutions to cover the 9.5 km distance, then the diameter of the wheel is
   (A) 1.5 km (B) 1.5 m
   (C) 7.5 cm (D) 7.5 m

8. A boy begins to walk eastward along a street in front of his house and the graph of his displacement from home is shown in the following figure. His average speed for the whole time interval is equal to



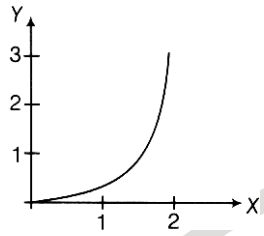
   (A) 8 m min^{-1} (B) 6 m min^{-1}
   (C) $\frac{8}{3}$ m min^{-1} (D) 2 m min^{-1}

9. A car covers the first half of the distance between the two places at 40 km/h and another half at 60 km/h. The average speed of the car is
   (A) 40 km/h (B) 48 km/h
   (C) 50 km/h (D) 60 km/h

10. A car moves from A to B with a speed of 30 km/h and from B to A with a speed of 20 km/h. What is the average speed of the car ?
   (A) 25 km/h (B) 24 km/h
   (C) 50 km/h (D) 10 km/h

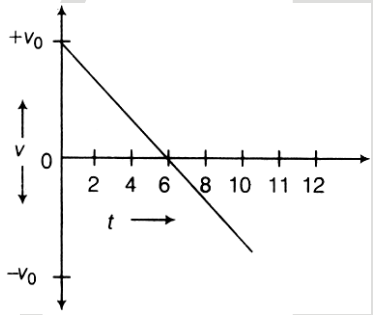
Space for Rough Work

11. If the figure below represents a parabola, identify the physical quantities representing *Y* and *X* for constant acceleration.



(A) X = time, Y = velocity
(B) X = velocity, Y = time
(C) X = time, Y = displacement
(D) X = time, Y =acceleration

12. Consider the given velocity-time graph.



It represents the motion of
(A) a projectile projected vertically upward, from a point
(B) an electron in the hydrogen atom
(C) a car with constant acceleration along a straight road
(D) a bullet fired horizontally from the top of a tower

13. The angular speed of flywheel making 360 rev/min is
(A) 12π rad/s (B) 6π rad/s
(C) 3π rad/s (D) 2π rad/s

14. An electric fan has blades of length 30 cm as measured from the axis of rotation. If the fan is rotating at 1200 rpm, the acceleration of a point on the tip of the blade is about
(A) 1600 ms^{-2} (B) 4740 ms^{-2}
(C) 2370 ms^{-2} (D) 5055 ms^{-2}

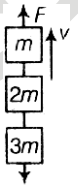
15. A body is projected with an angle θ. The maximum height reached is *h*. If the time of flight is 4 s and $g = 10 m/s^2$, then value of *h* is
(A) 40 m (B) 20 m
(C) 5 m (D) 10 m

16. Two bodies are thrown up at angles of 45° and 60° respectively, with the horizontal. If both bodies attain same vertical height, then ratio of velocities with which these are thrown is
(A) $\sqrt{2/3}$ (B) $2/\sqrt{3}$
(C) $\sqrt{3/2}$ (D) $\sqrt{3}/2$

17. A motorboat covers a given distance in 6 h moving downstream on a river. It covers the same distance in 10 h moving upstream. The time it takes to cover the same distance in still water is
(A) 9.5 h (B) 7.5 h
(C) 6.5 h (D) 8 h

18. The vectors from origin to the points *A* and *B* are $\mathbf{A} = 3\hat{\mathbf{i}} - 6\hat{\mathbf{j}} + 2\hat{\mathbf{k}}$ and $\mathbf{B} = 2\hat{\mathbf{i}} + \hat{\mathbf{j}} - 2\hat{\mathbf{k}}$, respectively. The area of the ΔOAB is
(A) $\frac{5}{2}\sqrt{17}$ (B) $\frac{2}{5}\sqrt{17}$
(C) $\frac{3}{5}\sqrt{17}$ (D) $\frac{5}{3}\sqrt{17}$

19. Three blocks with masses *m*, 2*m* and 3*m* are connected by strings as shown in the figure. After an upward force *F* is applied on block *m*, the masses move upward at constant speed v. What is the net force on the block of mass 2*m* ? (g is the acceleration due to gravity)



(A) Zero (B) 2*mg*
(C) 3*mg* (D) 6*mg*

Space for Rough Work

20. A block of mass M is pulled along a horizontal frictionless surface by a rope of mass m. If a force P is applied at the free end of the rope, then the force exerted by the rope on the block is

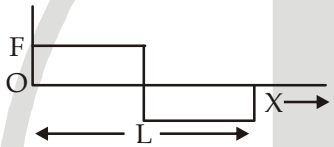
(A) $\frac{Pm}{M+m}$ (B) $\frac{Pm}{M-m}$

(C) P (D) $\frac{PM}{M+m}$

21. A bullet of mass 10 g is fired from a gun of mass 1 kg with recoil velocity of gun 5 m/s. The muzzle velocity will be

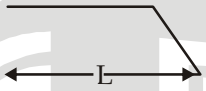
(A) 30 km/min (B) 60 km/min
(C) 30 m/s (D) 500 m/s

22. A person used force (F) shown in figure to move a load with constant velocity on given surface.

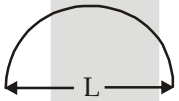


Identify the correct surface profile.

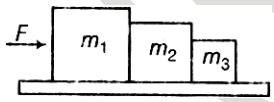
(A) 

(B) 

(C) 

(D) 

23. Three blocks of masses m_1, m_2 and m_3 kg are placed in contact with each other on a frictionless table. A force F is applied on the heaviest mass m_1, the acceleration of m_3 will be



(A) $\frac{F}{m_1}$ (B) $\frac{F}{m_1+m_2}$

(C) $\frac{F}{m_2+m_3}$ (D) $\frac{F}{m_1+m_2+m_3}$

24. With increase of temperature, the frictional force acting between two surfaces

(A) increases (B) remains the same
(C) decreases (D) becomes zero

25. A solid sphere rolls down two different inclined planes of same height, but of different inclinations. In both cases

(A) speed and time of descent will be same
(B) speed will be same, but time of descent will be different
(C) speed will be different, but time of descent will be same
(D) speed and time of descent both are different

26. A gardener pushes a lawn roller through a distance 20 m. If he applies a force of 20 kg-wt in a direction inclined at 60° to the ground, the work done by him is

(A) 1960 J (B) 196 J
(C) 1.96 J (D) 196 kJ

27. For a moving particle (mass m, velocity v) having a momentum p, which one of the following correctly describes the kinetic energy of the particle ?

(A) $\frac{p^2}{2m}$ (B) $\frac{p}{2m}$

(C) $\frac{v^2}{2m}$ (D) $\frac{v}{2m}$

28. A particle is projected from the ground with a kinetic energy E at an angle of 60° with the horizontal. Its kinetic energy at the highest point of its motion will be

(A) $\frac{E}{\sqrt{2}}$ (B) $\frac{E}{2}$

(C) $\frac{E}{4}$ (D) $\frac{E}{8}$

29. A particle of mass m at rest is acted upon by a force P for a time t. Its kinetic energy after an interval t is

(A) $\frac{P^2t^2}{m}$ (B) $\frac{P^2t^2}{2m}$

(C) $\frac{P^2t^2}{3m}$ (D) $\frac{Pt}{2m}$

Space for Rough Work

30. An engineer claims to have made an engine delivering 10 kW power with fuel consumption of 1 gs^{-1}. The calorific value of fuel is 2 kcal g^{-1}. This claim is
(A) valid
(B) invalid
(C) dependent on engine design
(D) dependent on load

31. A body of mass (4m) is lying in *xy*-plane at rest. It suddenly explodes into three pieces. Two pieces each of mass (m) move perpendicular to each other with equal speeds (v). The total kinetic energy generated due to explosion is
(A) mv^2 (B) $3/2mv^2$
(C) $2mv^2$ (D) $4mv^2$

32. A body from height *h* is dropped. If the coefficient of restitution is *e*, then calculate the height achieved after one bounce.
(A) $h_1 = e^2h$ (B) $h_1 = e^4h$
(C) $h_1 = eh$ (D) $h_1 = \frac{h}{e}$

33. An object placed on the ground is in stable equilibrium. If the object is given a slight push, then initially the position of centre of gravity
(A) moves nearer to ground
(B) rises higher above the ground
(C) remains as such
(D) may remain at same level

34. A wheel has angular acceleration of 3.0 rad s^{-2} and an initial angular speed of 2.00 rad s^{-1}. In a time of 2 s, it has rotated through an angle (in radian) of
(A) 6 (B) 10
(C) 12 (D) 4

35. The moment of inertia of a thin rod of mass *M* and length *L*, about an axis perpendicular to the rod at a distance $\frac{L}{4}$ from one end is
(A) $\frac{ML^2}{6}$ (B) $\frac{ML^2}{12}$
(C) $\frac{7ML^2}{24}$ (D) $\frac{7ML^2}{48}$

36. The ratio of the radii of gyration of a circular disc about a tangential axis in the plane of the disc and of a circular ring of the same radius about a tangential axis in the plane of the ring is
(A) 2 : 3 (B) 2 : 1
(C) $\sqrt{5} : \sqrt{6}$ (D) $1 : \sqrt{2}$

37. A wheel having moment of inertia 2 kg-m^2 about its vertical axis, rotates at the rate of 60 rpm about this axis. The torque which can stop the wheel's rotation in one minute would be
(A) $\frac{2\pi}{15}$ N-m^{-1} (B) $\frac{\pi}{12}$ N-m^{-1}
(C) $\frac{\pi}{15}$ N-m^{-1} (D) $\frac{\pi}{18}$ N-m^{-1}

38. If the angular momentum of any rotating body increases by 200%, then the increase in its kinetic energy
(A) 400% (B) 800%
(C) 200% (D) 100%

39. If μ_s is coefficient of static friction, the maximum speed v_{max} with which a vehicle can negotiate an unbacked curved track having radius R and inclined at an angle θ with respect to horizontal plane is
(A) $v_{max} = \sqrt{Rg\tan\theta}$ (B) $v_{max} = \sqrt{\mu_s Rg}$
(C) $\sqrt{Rg}$ (D) $\sqrt{\tan\theta / Rg}$

40. A body projected vertically from the earth reaches a height equal to earth's radius before returning to the earth. The power exerted by the gravitational force is greatest
(A) at the instant just before the body hits the earth
(B) it remains constant all through
(C) at the instant just after the body is projected
(D) at the highest position of the body

Space for Rough Work

41. Weightlessness experienced while orbiting the earth in spaceships, in the result of
(A) inertia (B) acceleration
(C) zero gravity (D) centre of gravity

42. An asteroid of mass m is approaching earth, initially at a distance of $10R_e$ with speed v_i. It hits the earth with a speed v_f (R_e and M_e are radius and mass of earth), then

(A) $v_f^2 = v_i^2 + \frac{2Gm}{M_e R}\left(1-\frac{1}{10}\right)$

(B) $v_f^2 = v_i^2 + \frac{2GM_e}{R_e}\left(1+\frac{1}{10}\right)$

(C) $v_f^2 = v_i^2 + \frac{2GM_e}{R_e}\left(1-\frac{1}{10}\right)$

(D) $v_f^2 = v_i^2 + \frac{2Gm}{R_e}\left(1-\frac{1}{10}\right)$

43. An artificial satellite moves in a circular orbit around the earth. Total energy of the satellite is given by E. The potential energy of the satellite is
(A) $-2E$ (B) $2E$
(C) $\frac{2E}{3}$ (D) $-\frac{2E}{3}$

44. A satellite in a circular orbit of radius R has a period of 4 h. Another satellite with orbital radius $3R$ around the same planet will have a period (in hour)
(A) 16 (B) 4
(C) $4\sqrt{27}$ (D) $4\sqrt{8}$

45. A satellite moves in a circle around the earth. The radius of this circle is equal to one-half of the radius of the moon's orbit. The satellite completes one revolution in
(A) $\frac{1}{2}$ lunar month
(B) $\frac{2}{3}$ lunar month
(C) $2^{-3/2}$ lunar month
(D) $2^{3/2}$ lunar month

[CHEMISTRY]

46. One mole of CH_4 contains :
(A) 4g atoms of hydrogen
(B) 3.0g atoms of carbon
(C) 6.02×10^{23} atoms of hydrogen
(D) 1.81×10^{23} molecules of CH_4

47. The equivalent weight of $K_2Cr_2O_7$ in acidic medium is expressed in terms of its molecular weight (M) as
(A) M/3 (B) M/4
(C) M/6 (D) M/7

48. 60 g of a compound on analysis produced 24 g carbon, 4 g hydrogen and 32 g oxygen. The empirical formula of the compound is
(A) CH_2O_2 (B) CH_2O
(C) CH_4O (D) $C_2H_4O_2$

49. The number of gram molecules of chlorine in 6.02×10^{25} hydrogen chloride molecules is
(A) 10 (B) 100
(C) 50 (D) 5

50. In the synthesis of ammonia

$$N_2(g)+3H_2 \rightleftharpoons 2NH_3(g)$$

If the quantity of N_2 reacted is 700 mL, the qunatity of H_2 and NH_3 would be
(A) 300 mL H_2 and 200 mL NH_3
(B) 300 mL H_2 and 300 mL NH_3
(C) 300 mL H_2 and 100 mL NH_3
(D) 100 mL H_2 and 200 mL NH_3

51. 20.0 kg of $N_2(g)$ and 3.0 kg of $H_2(g)$ are mixed to produce $NH_3(g)$. The amount of $NH_3(g)$ formed is
(A) 17 kg (B) 34 kg
(C) 20 kg (D) 3 kg

Space for Rough Work

52. The stoichiometry of the following reaction is
$K_2S_2O_8(aq) + 2KI(aq) \rightarrow 2K_2SO_4(aq) + I_2(aq)$
(A) 2 : 2 (B) 1 : 1
(C) 1 : 2 (D) 2 : 1

53. What is the weight of oxygen that is required for the complete combustion of 2.8 kg of ethylene ?
(A) 9.6 kg (B) 96.0 kg
(C) 6.4 kg (D) 2.8 kg

54. The energies E_1 and E_2 of two radiations are 25 eV and 50 eV respectively. The relation between their wavelengths i.e. λ_1 and λ_2 will be
(A) $\lambda_1 = \frac{1}{2}\lambda_2$ (B) $\lambda_1 = \lambda_2$
(C) $\lambda_1 = 2\lambda_2$ (D) $\lambda_1 = 4\lambda_2$

55. Which of the following pairs is isoelectronic ?
(A) Ne, Cl (B) Ca^{2+}, F^-
(C) Mg^{2+}, K^+ (D) N^{3-}, Na^+

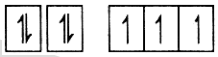
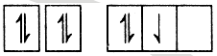
56. The ratio of charge and mass would be greater for
(A) proton (B) electron
(C) neutron (D) α-particle

57. As per de-Broglie formula, a macroscopic particle of mass 100 g and moving at a velocity of 100 cm s^{-1} will have a wavelength of
(A) 6.6×10^{-29} cm (B) 6.6×10^{-30} cm
(C) 6.6×10^{-31} cm (D) 6.6×10^{-32} cm

58. The mass (in kg) of a photon with wavelength 3.6Å is
(A) 6.135×10^{-19} (B) 5.6135×10^{-33}
(C) 6.100×10^{-19} (D) 6.135×10^{-33}

59. If uncertainty in position and momentum are equal then uncertainty in velocity is
(A) $\frac{1}{2m}\sqrt{\frac{h}{\pi}}$ (B) $\sqrt{\frac{h}{2\pi}}$
(C) $\frac{1}{m}\sqrt{\frac{h}{\pi}}$ (D) $\sqrt{\frac{h}{\pi}}$

60. The total number of atomic orbitals in fourth energy level of an atom is
(A) 4 (B) 8
(C) 16 (D) 32

61. The ground state electronic configuration of nitrogen is represented by
(A)  (B)
(C)  (D)

62. Which of the following is not a periodic property ?
(A) Atomic mass (B) Atomic volume
(C) Covalent radius (D) Electronegativity

63. The number of naturally occuring *p*-block elements that are diamagnetic is
(A) 18 (B) 6
(C) 5 (D) 7

64. What is the name of the element with atomic number 105 ?
(A) Kurchatovium (B) Dubnium
(C) Nobelium (D) Holmium

65. The correct order of decreasing first ionisation potential is
(A) Ca>K>Rb>Cs (B) Cs>Rb>K>Ca
(C) Ca>Cs>Rb>K (D) K>Rb>Cs>Ca

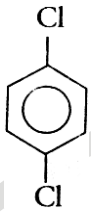
66. Which of the following pairs has almost same atomic radius ?
(A) Al, Ga (B) Be, Mg
(C) Mg, Al (D) B, Be

67. Ionisation potential for a noble gas is
(A) maximum in a period
(B) minimum in a period
(C) either minimum or maximum
(D) constant

68. In which one of the following cases, breaking of covalent bond takes place ?
(A) Boiling of H_2O (B) Melting of KCN
(C) Boiling of CF_4 (D) Melting of SiO_2

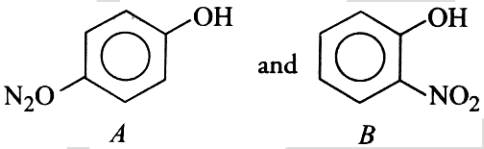
Space for Rough Work

69. The shape of $XeOF_2$ on the basis of VSEPR theory is
(A) *see-saw* (B) V-shaped
(C) trigonal planar (D) T-shaped

70. Non-zero dipole moment is shown by
(A) CCl_4 (B) CO_2
(C) H_2O (D) 

71. Which of the following is least volatile ?
(A) H_2O (B) H_2S
(C) H_2Se (D) H_2Te

72. Out of the two compounds shown below, the vapour pressure of *B* at a particular temperature is expected to be



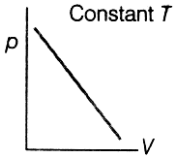
A *B*

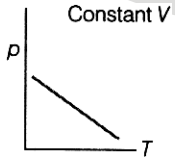
(A) higher than that of *A*
(B) lower than that of *A*
(C) same as that of *A*
(D) can be higher or lower depending upon the size of the vessel

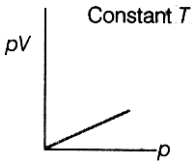
73. Which one of the following is paramagnetic ?
(A) NO^+ (B) CN^-
(C) NO^- (D) CO

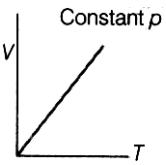
74. The temperature at which 28 g of N_2 will occupy a volume of 10.0 L at 2.46 atm is
(A) 299.6 K (B) 0°C
(C) 273 K (D) 10°C

75. Which of the following diagram correctly describes the behaviour of a fixed mass of an ideal gas ? (T is measured in K).

(A) 

(B) 

(C) 

(D) 

76. Two gases *A* and *B* having the same volume diffuse through a porous partition in 20 and 10 s respectively. The molecular mass of *A* is 49 u. Molecular mass of *B* will be
(A) 25.00 u (B) 50.00 u
(C) 12.25 u (D) 6.50 u

77. Identify the pair of gases that have equal rates of diffusion.
(A) NO, CO (B) N_2O, CO
(C) N_2O, CO_2 (D) CO_2, NO_2

78. The average kinetic energy of an ideal gas per molecule in SI units at 25°C will be
(A) 6.17×10^{-21} kJ K^{-1} (B) 6.17×10^{-21} JK^{-1}
(C) 6.17×10^{-20} JK^{-1} (D) 7.16×10^{-20} JK^{-1}

79. The RMS velocity of molecules of a gas of density 4 kg m^{-3} and pressure 1.2×10^5 Nm^{-2} is
(A) 900 ms^{-1} (B) 120 ms^{-1}
(C) 600 ms^{-1} (D) 300 ms^{-1}

80. Mark out the wrong expression.
(A) Boyle's temperature $T_b = \frac{a}{Rb}$
(B) Critical pressure $p_c = \frac{a}{27b^2}$
(C) Critical temperature $T_c = \frac{8a}{27Rb}$
(D) Critical volume $V_c = 3b$

81. On increasing pressure, melting point of ice
(A) decreases
(B) increases
(C) remains unchanged
(D) changes in regular manner

Space for Rough Work

82. An equilibrium constant of 10^{-4} for a reaction means, the equilibrium is
(A) largely towards backward direction
(B) largely towards forward direction
(C) equally poised
(D) never established

83. Reaction, $BaO_2(s) \rightleftharpoons BaO(s) + O_2(g); \Delta H = +ve$.
In equilibrium condition, pressure of O_2 depends on
(A) increased mass of BaO_2
(B) increased mass of BaO
(C) increased temperature of equilibrium
(D) increased mass of BaO_2 and BaO both

84. The number of hydroxyl ions in 10 cm^3 of 0.2 M HCl solution is
(A) 5×10^{-14} (B) 3×10^{8}
(C) 3×10^{12} (D) 5×10^{-12}

85. What is the pH of millimolar solution of ammonium hydroxide which is 20% dissociated ?
(A) 3.699 (B) 10.301
(C) 4.691 (D) 9.301

86. The dissociation constant for acetic acid and HCN at 25°C are 1.5×10^{-5} and 4.5×10^{-10} respectively.
The equilibrium constant for the equilibrium.
$CN^- + CH_3COOH \rightleftharpoons HCN + CH_3COO^-$ would be
(A) 3.0×10^{5} (B) 3.0×10^{-5}
(C) 3.0×10^{-4} (D) 3.0×10^{4}

87. Which of the following pairs constitutes a buffer ?
(A) HNO_2 and $NaNO_2$
(B) NaOH and NaCl
(C) HNO_3 and NH_4NO_3
(D) HCl and KCl

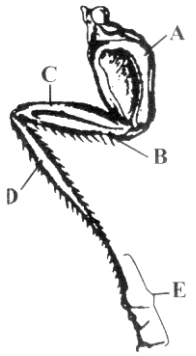
88. Strongest reducing agent is
(A) K (B) Mg
(C) Al (D) Ba

89. The oxidation number of Cr in $K_2Cr_2O_7$ is
(A) + 2 (B) + 4
(C) +6 (D) + 7

90. The coefficients of I^-, IO_3^- and H^+ in the redox reaction,
$$I^- + IO_3^- + H^+ \rightarrow I_2 + H_2O$$
in the balanced form respectively are
(A) 5,1,6 (B) 1,5,6
(C) 6,1,5 (D) 5,6,1

[ZOOLOGY]

91. In the given diagram of a leg of cockroach parts have been indicated by alphabets. Select the answer in which these alphabets have been correctly matched with the parts which they indicate.



	A	B	C	D	E
(A)	Coxa	Tibia	Tarsus	Femur	Trochanter
(B)	Coxa	Femur	Trochanter	Tarsus	Tibia
(C)	Coxa	Tarsus	Femur	Tibia	Trochanter
(D)	Coxa	Trochanter	Femur	Tibia	Tarsus

92. In the mouth parts of a cockroach, the labium forms (i) while (ii) acts as a tongue.
(A) (i) - upper lip; (ii) - maxilla
(B) (i) - upper lip; (ii) - hypopharynx
(C) (i) - lower lip; (ii) - maxilla
(D) (i) - lower lip; (ii) - hypopharynx

Space for Rough Work

93. The development of Periplaneta americana is
(A) holometabolous (B) paurometabolous
(C) ametabolous (D) hemimetabolous

94. Glisson's capsule is the characteristic feature of
(A) mammals (B) birds
(C) reptiles (D) arthropods

95. Which of the following statements is incorrect ?
(A) Mucosal epithelium has goblet cells which secrete mucus for lubrication.
(B) Mucosa forms gastric glands in the stomach and crypts in between the bases of villi in intestine.
(C) Cells lining the villi has brush border or microvilli.
(D) All the four basic layers in the wall of gut never show modifications in different parts of the alimentary canal.

96. In man, the gall bladder is situated in _____ lobe of liver.
(A) left (B) right
(C) caudate (D) quadrate

97. Which one of the following pairs of food components in humans reaches the stomach totally undigested ?
(A) Starch and fat
(B) Fat and cellulose
(C) Starch and cellulose
(D) Protein and starch

98. If we take food rich in lime juice, then
(A) action of ptyalin on starch is enhanced
(B) action of ptyalin on starch is reduced
(C) action of ptyalin on starch is unaffected
(D) action of ptyalin on starch stops.

99. The back flow of faecal matter from the large intestine into the small intestine is prevented by the presence of
(A) epiglottis
(B) sphincter of Oddi
(C) ileo-caecal value
(D) gastro-oesophageal sphincter.

100. Which of the following options is incorrect about the larynx (sound box) ?
(A) It is a bony box.
(B) Glottis is the opening into the larynx.
(C) During swallowing of food glottis is covered by epiglottis to prevent food entry into the larynx.
(D) All of these.

101. Which of the following structures close the glottis during swallowing to prevent the entry of food into wind pipe.
(A) Tongue (B) Epiglottis
(C) Diaphragm (D) Larynx

102. After forceful inspiration, the amount of air that can be breathed out by maximum forced expiration is equal to
(A) Inspiratory Reserve Volume (IRV) + Expiratory Reserve Volume (ERV) + Tidal Volume (TV) + Residual Volume (RV)
(B) IRV + RV + ERV
(C) IRV + TV + ERV
(D) TV + RV + ERV

103. The urge to inhale in humans results from
(A) rising Pco_2 (B) rising Po_2
(C) falling Pco_2 (D) falling Po_2

104. The factor which does not affect the rate of alveolar diffusion is
(A) solubility of gases
(B) thickness of the membranes
(C) pressure gradient
(D) reactivity of the gases

105. What is the approximate normal composition of alveolar air ?
(A) 14% oxygen, 6% carbon dioxide, 80% nitrogen
(B) 21% oxygen, 2% carbon dioxide, 77% nitrogen
(C) 16% oxygen, 3% carbon dioxide, 81% nitrogen
(D) 10% oxygen, 8% carbon dioxide, 82% nitrogen

Space for Rough Work

106. A certain road accident patient with unknown blood group needs immediate blood transfusion. His one doctor friend at once offers his blood. What was the blood group of the donor ?
(A) Blood group B (B) Blood group AB
(C) Blood group O (D) Blood group A

107. Blood of AB group cannot be given to B group patient because
(A) patient has antibodies b
(B) patient lacks antibodies b
(C) patient lacks antibodies a
(D) patient has antibodies a

108. What is the oxidation state of iron in haemoglobin ?
(A) Fe^{-} (B) Fe^{2+}
(C) Fe^{3+} (D) Fe^{4+}

109. Which of the following about RBCs in humans is true?
(A) They do not carry CO_2 at all.
(B) They carry about 20-25% of CO_2
(C) They transport 99.5% of O_2.
(D) They transport about 80% O_2 only and rest 20% of it is transported in dissolved state in blood plasma.

110. Rate of heart beat is determined by
(A) Purkinje fibres (B) papillary muscles
(C) AV-node (D) SA-node

111. Right atrium receives blood from
(A) pulmonary aorta
(B) pulmonary veins
(C) inferior venacava
(D) superior and inferior venacava

112. Which of the following groups contains uricotelic animals only ?
(A) Reptiles, birds, land snails, insects
(B) Reptiles, birds, land snails, aquatic insects
(C) Amphibians, birds, land snails, insects
(D) Amphibians, reptiles, birds, insects

113. Renin is released by
(A) loop of Henle
(B) Collecting duct
(C) juxtaglomerular apparatus
(D) renal pelvis

114. The basic functional unit of human kidney is
(A) nephridia (B) Henle's loop
(C) nephron (D) pyramid

115. A large quantity of fluid is filtered everyday by nephrons in the kidneys but only about 1% of it is excreted as urine. The remaining 99% of the filtrate
(A) is stored in the urinary bladder
(B) is reabsorbed into the blood
(C) gets collected in the renal pelvis
(D) is lost as sweat

116. Diuresis is the condition in which
(A) the excretory volume of urine increases
(B) the excretory volume of urine decreases
(C) the kidneys fail to excrete urine
(D) the water balance of the body is disturbed

117. Glycosuria is the condition, where a man
(A) eats more sugar
(B) excretes sugar in urine
(C) sugar is excreted in faeces
(D) has low sugar level in blood

118. What is sarcomere ?
(A) Part between two H-lines
(B) Part between two A-lines
(C) Part between two l-bands
(D) Part between two Z-lines

119. During muscle contraction, actin and myosin form
(A) actomyosin (B) actoplasm
(C) plastosine (D) myoplasm

120. If a stimulus, several times greater than the threshold stimulus, is provided to a muscle fibre, it will
(A) contract with a larger force
(B) contract with a smaller force
(C) contract with the same force
(D) undergo tetany

Space for Rough Work

121. Which of the following ions help in muscle contraction?
(A) K^+ and Mg^{++} (B) Na^+ and K^+
(C) Ca^{++} and Na^{++} (D) Ca^{++} and Mg^{++}

122. Which one of the following is proteinaceous in chemical nature ?
(A) Thyroxine (B) FSH
(C) Progesterone (D) Oxytocin

123. Chemically, hormones are
(A) biogenic amines (B) proteins
(C) steroids (D) all of these

124. Thyroxine and triiodothyronine, produced by the thyroid gland, are synthesized from iodine and
(A) phenylalanine (B) tyrosine
(C) tryptophan (D) cholesterol

125. Which part of body secretes the hormone secretin ?
(A) Stomach (B) Oesophagus
(C) Ileum (D) Duodenum

126. MSH is secreted by
(A) anterior lobe of pituitary
(B) middle lobe of pituitary
(C) posterior lobe of pituitary
(D) endostyle

127. The islets of Langerhans are found in
(A) liver (B) pancreas
(C) stomach (D) alimentary canal

128. Goitre is a pathological condition associated with
(A) glucagon (B) progesterone
(C) thyroxine (D) testosterone

129. Which of the following is synthesized in both the brain and endocrine glands ?
(A) ACTH (B) Cortisol
(C) Oxytocin (D) Somatostatin

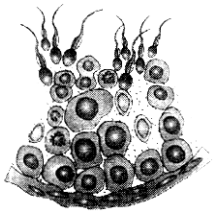
130. Which of the following is a mineralocorticoid ?
(A) Testosterone (B) Progesterone
(C) Adrenaline (D) Aldosterone

131. Select the correctly matched pair.
(A) Pineal gland - Does not influence menstrual cycle
(B) Corpus luteum - Secretes oxytocin
(C) Interstitial cells - Erythropoietic
(D) Cholecystokinin - Stimulates pancreatic enzyme secretions

132. In which one pair, both the plants can be vegetatively propagated by leaf pieces ?
(A) Bryophyllum and Kalanchoe
(B) Chrysanthemum and Agave
(C) Agave and Dioscorea
(D) Bryophyllum and Asparagus

133. Oestrous cycle is reported in
(A) cows and sheep
(B) humans and monkeys
(C) chimpanzees and gorillas
(D) none of these

134. What does the given figure represent ?



(A) Sectional view of ovary
(B) Sectional view of seminiferous tubule
(C) L.S. of testis
(D) Mature Graafian follicle

135. hCG, hPL and relaxin are produced in women
(A) at the time of puberty
(B) only during pregnancy
(C) at the time of menopause
(D) during menstruation

Space for Rough Work

[BOTANY]

136. D.P.D. :

(A) O.P. × T.P. (B) O.P. + T.P.
(C) O.P. – W.P. (D) T.P. – W.P.

137. Cohesion tension theory of ascent of sap was given by:

(A) Curtis
(B) Dixon and Jolly
(C) Kramer and Kozlowski
(D) None of the above

138. What should happen if a thin slice of sugar beet is placed in a concentrated solution of NaCl ?

(A) It should become turgid
(B) It should neither absorb water nor loose it
(C) It should absorb water from the NaCl solution
(D) It should loose water from the cells

139. When beet root slices are washed and then placed in cold water, anthocyanin does not come out, because plasma membrane is ?

(A) Dead structure
(B) Permeable to anthocyanin
(C) Impermeable to anthocyanin
(D) Differentially permeable to anthocyanin

140. That the cell wall is permeable membrane can be best deduced from the passage of water and mineral salts from:

(A) Root hairs into cortical cells
(B) Cortical cells into the pericycle
(C) Soil into root hairs
(D) Pericycle cells into tracheal elements

141. The uniformly sweet taste of coffee or tea is due to :

(A) spreading (B) Permeability
(C) distribution (D) diffusion

142. Which of the following is not an antitranspirant ?

(A) ABA (B) Aspirin
(C) PMA (D) None of these

143. The stomata open when guard cells are :

(A) Green (B) Flaccid
(C) Large (D) Turgid

144. If the temperature remains constant, the rate of transpiration increases more in :

(A) Plants 1 km below sea level
(B) Plants at sea level
(C) Plants 1 km above sea level
(D) Plants 1.5 km above sea level

145. Under what conditions, transpiration would be most rapid ?

(A) Excess of water in the soil
(B) Low temperature and high humidity
(C) Bright light and high CO_2
(D) High temperature and low relative humidity

146. Phenylmercuric acetate :

(A) Reduces transpiration
(B) Reduces photosynthesis
(C) Reduces respiration rate
(D) Kills the plant

147. Hydroponics is a method of :

(A) Study of the development of soil
(B) Study of soil protection
(C) Growth of plants in liquid culture medium
(D) Growing plants in laboratory

148. Number of ATP molecules and $NADPH_2$ molecules produced in cyclic photophosphorylation :

(A) 1 and 1 (B) 1 and 2
(C) 2 and 1 (D) 2 and 0

149. Which is not chemosynthetic bacteria ?

(A) Nitrosomonas (B) Nitrobacter
(C) Beggiatoa (D) Azotobacter

150. The type of CO_2 fixation seen in many succulent plant species is :

(A) C_4 pathway (B) C_2 pathway
(C) CAM pathway (D) C_3 pathway

Space for Rough Work

151. The role of chlorophyll in photosynthesis is :
(A) Absorption of CO_2
(B) Absorption of light
(C) Absorption of light and photochemical decomposition of water
(D) Absorption of water

152. C_4 plants are found among :
(A) Gramineae only
(B) Monocots only
(C) Dicots only
(D) Monocots as well as dicots

153. Source of CO_2 for photosynthesis during day in CAM plants is :
(A) 3-PGA (B) Malic acid
(C) Oxaloacetic acid (D) Pyruvate

154. The conversion of phosphoglyceric acid to phosphoglyceraldehyde during photosynthesis can be described as :
(A) Oxidation (B) Hydrolysis
(C) Electrolysis (D) Reduction

155. R.Q. is :
(A) $\frac{O_2}{CO_2}$ (B) $\frac{CO_2}{O_2}$
(C) $CO_2 + O_2$ (D) $CO_2 - O_2$

156. If the volume of CO_2 liberated during respiration is more than the volume of O_2 used, the respiratory substance will be :
(A) Fats (B) Organic acids
(C) Proteins (D) Carbohydrates

157. The substrate for photorespiration is :
(A) PGA (B) Glycolate
(C) Glyoxylate (D) Pyruvic acid

158. End-products of fermentation are :
(A) O_2 and ethyl alcohol
(B) O_2 and acetaldehyde
(C) CO_2 and ethyl alcohol
(D) CO_2 and acetaldehyde

159. What would happen, if $NADH_2$ is oxidised to form water in a single step ?
(A) 3 ATP produced
(B) Most of the energy is wasted in heat form
(C) 5 ATP produced
(D) Cell would burn

160. Glycolysis is a part of
(A) Anaerobic respiration only
(B) Aerobic respiration only
(C) Both (A) and (B)
(D) Krebs' cycle

161. During one kreb's cycle, number of CO_2 molecules released is:
(A) 1 (B) 2
(C) 3 (D) 4

162. Which of the following is a growth inhibitor?
(A) Auxins (B) Ethylene
(C) Gibberellic acid (D) Cytokinins

163. 'Fluorene ring' is feature of:
(A) GA (B) Ethylene
(C) Morphactines (D) None of these

164. The example of a saprophyte is :
(A) Nepenthes (B) Utricularia
(C) Dionaea (D) Monotropa

165. If the tip of a seedling is cut-off, growth as well as bending ceases because it hampers:
(A) Perception of light stimulus
(B) Transpiration
(C) Respiration
(D) Photosynthesis

166. Thigmotropism is the response of the plant to:
(A) Water (B) Gravity
(C) Contact (D) Light

167. Nyctinasty and thigmonasty movements are seen in
(A) Mimosa (B) Drosera
(C) Cuscuta (D) Utricularia

168. Which of the following is responsible for apical dominance?
(A) GA_3 (B) IAA
(C) ABA (D) Florigen

Space for Rough Work

169. Cytoplasmic inheritance is responsible for:
(A) Inheritance of kappa particles
(B) Iojap inheritance in corn
(C) Petite character in yeast
(D) All of the above

170. Cytoplasmic male sterility in maize is inherited:
(A) Paternally (B) Maternally
(C) Both (A) and (B) (D) None of these

171. Mutations are mostly:
(A) Dominant (B) Incompletely dominant
(C) codominant (D) Recessive

172. Mutation is essential for evolution because :
(A) It produces new variations
(B) It stops the struggle for existence
(C) It causes recombination
(D) It brings a balance in the environment

173. Datura is a classical example of a :
(A) Trisomic (B) Triploid
(C) Monosomic (D) Monoploid

174. In case of incomplete dominance if F_2 generation :
(A) Genotypic ratio is 3 : 1
(B) Phenotypic ratio is 3 : 1
(C) Genotypic ratio = phenotypic ratio
(D) Nothing can be concluded

❑ ❑ ❑

175. Strong evidence in favour of DNA as genetic material comes from :
(A) Constancy of DNA
(B) Staining with feulgen
(C) Transformation experiment in bacteria
(D) None of the above

176. Strands of DNA are bound by :
(A) Hydrogen bonds
(B) Phosphate diester bonds
(C) Covalent bonds
(D) Ionic bonds

177. C-value means :
(A) Haploid DNA content in an individual
(B) Colchicine treatment value
(C) Gene binding frequency on chromosome
(D) None of the above

178. Semiconservative mode of replication of DNA was first proved experimentally by :
(A) Taylor et al.
(B) Watson and Crick
(C) Messelson and Stahl
(D) Alexander Rich

179. Coiling in DNA is :
(A) Right handed (B) Zig-zag
(C) Left handed (D) None of these

180. DNA fingerprinting technique was first developed by:
(A) Jeffreys, Wilson and Thien
(B) Boysen and Jensen
(C) Schleiden and Schwann
(D) Edward and Streptoe

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