10/09/2025

Phase-2_Code-

Aakash
Medical | IIT-JEE | Foundations

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Fortnightly Test for NEET-2026_RM(P2)_FT-04B

MM : 720

Time : 180 M

Topics Covered:
Physics: Gravitation, Mechanical Properties of Solids, Mechanical Properties of Fluids
Chemistry: Thermodynamics
Botany: Morphology of Flowering Plants
Zoology: Excretory Products & their Elimination, Locomotion & Movement-I: (Upto properties of muscle contraction)

General Instructions :
Duration of Test is 3 hrs.
The Test consists of 180 questions. The maximum marks are 720.
There are four parts in the question paper consisting of Physics, Chemistry, Botany and Zoology having 45 questions in each part of equa weightage.
Each question carries +4 marks. For every wrong response, –1 mark shall be deducted from the total score. Unanswered/unattempte questions will be given no marks.
Use blue/black ballpoint pen only to darken the appropriate circle.
Mark should be dark and completely fill the circle.
Dark only one circle for each entry.
Dark the circle in the space provided only.
Rough work must not be done on the Answer sheet and do not use white fluid or any other rubbing material on the Answer sheet.

PHYSICS

1. A satellite is revolving at a height where it completes its 3 revolution in one day. If it is shifted to a height where it becomes a geostationary satellite, the ratio of respective distances of orbit from centre of earth is

(1) $\left(\frac{1}{3}\right)^{\frac{2}{3}}$

(2) $\left(\frac{1}{3}\right)^{\frac{1}{2}}$

(3) $\left(\frac{1}{8}\right)^{\frac{2}{3}}$

(4) $\left(\frac{2}{3}\right)^{\frac{1}{3}}$

2. Kinetic energy of the satellite of earth around sun is E. Its mechanical energy in the orbit is

(1) E

(2) $-E$

(3) $-2E$

(4) $2E$

3. Height at which magnitude of acceleration due to gravity will be equal to that at a depth $\frac{R}{2}$ is (where R is radius of earth)

(1) R

(2) $\sqrt{2}R$

(3) $(\sqrt{2}-1)\,R$

(4) $(\sqrt{2}+1)\,R$

4. If earth starts shrinking, then at what radius, it will become a black hole? (c is speed of light, M is mass of earth)

(1) $\frac{2GM}{c^2}$

(2) $\frac{3GM}{c^2}$

(3) $\frac{4GM}{c^2}$

(4) It will never become a black hole

5. Assume that force of gravitation varies as $F \propto \frac{1}{r}$. Then orbital speed of a satellite in a circular orbit of radius "r" is proportional to

(1) $\frac{1}{\sqrt{r}}$

(2) $\frac{1}{r}$

(3) $\sqrt{r}$

(4) r^0

6. Infinite number of bodies of masses m, $2m$, $4m$, ... are situated on x-axis at x = 1, 2, 4, ... respectively. The resulting gravitational field due to this system at origin will be

(1) $\frac{8}{3}Gm$

(2) $\frac{4}{3}Gm$

(3) $4Gm$

(4) $2Gm$

7. Three masses, m, $2m$ and $3m$ are placed at the corners of an equilateral triangle of side length "l". How much work should be done to increase the separation among them to "$2l$"?

(1) $\frac{3Gm^2}{l}$

(2) $\frac{3}{2}\frac{Gm^2}{l}$

(3) $\frac{6Gm^2}{l}$

(4) $\frac{11}{2}\frac{Gm^2}{l}$

8. Two point masses M and m are placed at a distance r. The gravitational potential at a point where gravitational field intensity is zero, will be

(1) $-\frac{G}{2r}\left[M+m-2\sqrt{Mm}\right]$

(2) $-\frac{G}{r}\left[M+m+2\sqrt{Mm}\right]$

(3) $-\frac{G}{r}\left[M+m-2\sqrt{Mm}\right]$

(4) $-\frac{G}{2r}\left[M+m+2\sqrt{Mm}\right]$

9. Two identical point masses of mass m, both are rele from rest such that initial separation between them is d. T speed of any mass, when the separation between them becomes $\frac{d}{2}$ is

(1) $\sqrt{\frac{2Gm}{d}}$

(2) $\sqrt{\frac{Gm}{d}}$

(3) $\sqrt{\frac{Gm}{2d}}$

(4) $\sqrt{\frac{3Gm}{d}}$

10. **A** : For the planets revolving around the sun, angular momentum of planet about sun remains constant.
R : Torque acting on planet about sun is zero.

(1) Both Assertion & Reason are true and the reason is the correct explanation of the assertion

(2) Both Assertion & Reason are true but the reason is not the correct explanation of the assertion

(3) Assertion is true statement but Reason is false

(4) Both Assertion and Reason are false statements

11. The force of gravitation is

(1) Conservative in nature

(2) Attractive in nature

(3) Repulsive in nature

(4) Both (1) & (2)

12. In some region the gravitational field is zero. The gravitational potential in this region

(1) Must be variable

(2) Must be constant

(3) Can not be zero

(4) Must be zero

13. Acceleration due to gravity is minimum at

(1) The surface of earth

(2) The depth 100 km from the earth's surface

(3) The centre of earth

(4) The height 100 km from the earth's surface

Two particles of combined mass M, placed in space with certain separation are released. Acceleration of one particle w.r.t. other when separation between them is R, has a magnitude

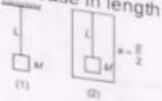
(1) Insufficient information

(2) $\frac{2GM}{R^2}$

(3) $\frac{GM}{2R^2}$

(4) $\frac{GM}{R^2}$

15. When a mass M is suspended from a rigid support with the help of wire of length L, it increases its length by l. If the same arrangement is suspended in an elevator accelerating upwards with an acceleration $\frac{g}{2}$, then increase in length will be



(1) l

(2) $\frac{3l}{2}$

(3) $2l$

(4) $\frac{2l}{3}$

16. The length of a metal wire is l_1 when the tension in it is T_1 and is l_2 when tension is T_2. The original length of wire is

(1) $\frac{l_1T_2-l_2T_1}{T_2-T_1}$

(2) $\frac{l_1T_2+l_2T_1}{T_2+T_1}$

(3) $\frac{l_1T_2+l_2T_1}{T_2-T_1}$

(4) $\frac{l_1T_2-l_2T_1}{T_2+T_1}$

17. A uniform wire of length l and mass m is suspended from the ceiling and a block of mass m is suspended at the other end of wire. If A is the area of cross section of the wire, then

(1) Tensile stress at any cross section of the wire is $= \frac{2mg}{A}$

(2) Tensile stress at any cross section of the wire is zero

(3) Tensile stress in wire at the point attached to the ceiling is $= \frac{2mg}{A}$

(4) Tensile stress at any cross section of the wire is $2\,mg$

18. A : The value of Bulk modulus of a perfectly rigid body is infinite.
R : Bulk modulus is defined as pressure per unit volume.

(1) Both Assertion & Reason are true and the reason is the correct explanation of the assertion.

(2) Both Assertion & Reason are true but the reason is not the correct explanation of the assertion.

(3) Assertion is true statement but Reason is false.

(4) Both Assertion and Reason are false statements.

19. The upper face of a cube of side 5 cm is displaced by an amount 0.2 mm by applying a force tangential to the face. The value of this force for modulus of rigidity 2×10^{11} Pa is (lower face is fixed)

(1) 2×10^6 N

(2) 0.2×10^6 N

(3) 4×10^5 N

(4) 0.4×10^5 N

20. A structural steel rod has radius of cross section 20 mm and length 4 m. When a force of 314 kN is applied, it stretches the rod along the length. Young's modulus of steel is 2×10^{11} N/m^2. The elastic energy density of rod is

(1) 1.56×10^5 J/m^3

(2) 1.57×10^5 J/m^3

(3) 3.12×10^5 J/m^3

(4) 3.12×10^4 J/m^3

21. The modulus of elasticity that is possessed by the gases is

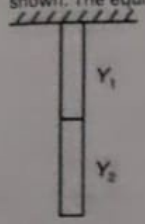
(1) Shear modulus

(2) Bulk modulus

(3) Neither (A) nor (B)

(4) Both (A) & (B)

22. If wire of equal length and cross-section are suspended as shown. The equivalent Young's modulus is



(1) $\frac{2Y_1Y_2}{Y_1+Y_2}$

(2) $\frac{Y_1+Y_2}{2}$

(3) $\frac{(Y_1+Y_2)Y_1}{Y_2}$

(4) $\frac{Y_1Y_2}{Y_1+Y_2}$

23. If radius of a sphere is decreased by 0.03% when taken to the bottom of deep sea. If compressibility of sea water is 10^{-10} m^2/N, then depth of sea is [Assume g is constant]

(1) 0.3 km

(2) 0.1 km

(3) 0.6 km

(4) 0.9 km

24. Which of the following affects the elasticity of a substance?

(1) Impurity in substance

(2) Hammering and annealing

(3) Change in temperature

(4) All of these

25. The Young's modulus of a wire is Y. If the energy stored per unit volume is E, then the strain will be

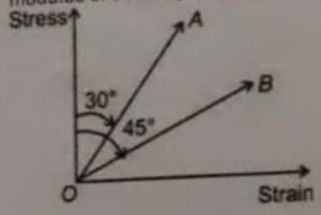
(1) $\sqrt{\frac{2E}{Y}}$

(2) $E\sqrt{2Y}$

(3) EY

(4) $\frac{E}{Y}$

26. Stress versus strain graph within elastic limit of the substances, A and B, is given below. The ratio of Young's modulus of elasticity of substance A to substance B is



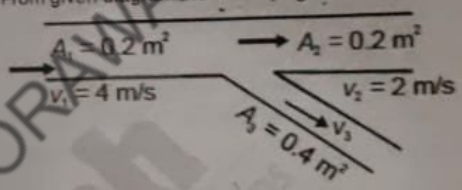
(1) $\sqrt{3} : \sqrt{2}$

(2) $\sqrt{2} : 1$

(3) $\sqrt{6} : 1$

(4) $\sqrt{3} : 1$

27. From given diagram the velocity v_3 is



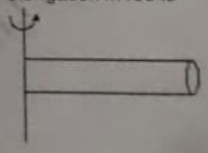
(1) 4 m/s

(2) 3 m/s

(3) 1 m/s

(4) 2 m/s

28. A uniform rod of length l and density ρ rotates with angular velocity ω about an axis which is passing through its one end as shown in figure. If Young's modulus of rod is Y, then elongation in rod is



(1) $\frac{\rho\omega^2 l^3}{3Y}$

(2) $\frac{\rho\omega^2 l^3}{3Y}$

(3) $\frac{\rho\omega^2 l^3}{2Y}$

(4) $\frac{\rho\omega^2 l^3}{2Y}$

Select correct statement regarding terminal velocity of a spherical ball in a viscous medium.

(1) Terminal velocity increases if density of ball material increases

(2) Terminal velocity increases if coefficient of viscosity of medium increases

(3) Terminal velocity decreases if density of medium decreases

(4) All of these

30. Water rises upto a height h in a capillary tube of certain diameter. This capillary tube is replaced by a similar tube of half diameter. Now water will rise to a height of

(1) $2h$

(2) $3h$

(3) $4h$

(4) $\frac{h}{2}$

31. A manometer connected to a closed water tap reads 2.1×10^6 N/m^2 and when water tap is opened the reading of manometer falls to 2×10^6 N/m^2. The speed of flow of water is [Consider streamline flow]

(1) 10 m/s

(2) 20 m/s

(3) $10\sqrt{2}$ m/s

(4) $20\sqrt{2}$ m/s

32. Two solid metal balls of same material having radii $2r$ and $3r$ are falling with their terminal speeds in a viscous liquid. The ratio of drag force acting on these two balls is

(1) 2 : 3

(2) 4 : 9

(3) 8 : 27

(4) 16 : 21

33. A solid cylindrical body floats along its length in water with half of its height submerged. In the same way if it floats with one fourth of height submerged in an oil then the density of oil (in g/cm^3) is

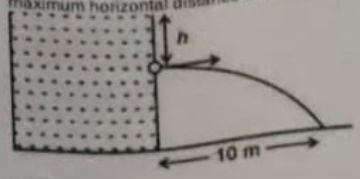
(1) $\frac{1}{4}$

(2) 4

(3) 2

(4) $\frac{1}{2}$

34. A liquid is coming out from the orifice of tank and falls upto a maximum horizontal distance 10 m. The height h is equal to



(1) 5 m

(2) 8 m

(3) 3 m

(4) 4 m

35. Bernoulli's equation is based on the principle of

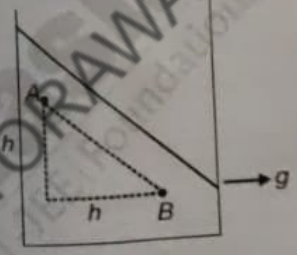
(1) Conservation of mass

(2) Conservation of energy

(3) Capillary rise

(4) Conservation of angular momentum

36. A container is accelerating towards right with acceleration g. If density of liquid is ρ, then pressure difference between point A and B is



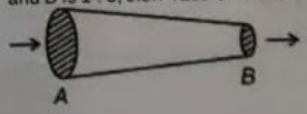
(1) Zero

(2) $h\rho g$

(3) $2h\rho g$

(4) $\frac{h\rho g}{2}$

37. Water is flowing through a horizontal pipe of non-uniform circular cross-section as shown. If ratio of speeds at end A and B is 1 : 3, then ratio of radius at A and B will be



(1) 3 : 1

(2) 9 : 1

(3) $\sqrt{3}$: 1

(4) 2 : $\sqrt{3}$

38. If 27 identical liquid drops are combined to form a larger drop of radius R, then loss of surface energy is (surface tension of liquid is S N.m^{-1})

(1) $\pi R^2 S$

(2) $2\pi R^2 S$

(3) $4\pi R^2 S$

(4) $8\pi R^2 S$

39. A spherical body falling through a viscous liquid of infinite extent finally attains a constant velocity, when

(1) Viscous drag – upthrust = weight

(2) Weight + viscous drag = upthrust

(3) Viscous drag + upthrust = weight

(4) Weight > upthrust + viscous drag

40. A water tank is placed on a platform of height 15 m and there is an orifice near the bottom in the wall of tank at 5 m below the level of water. The speed with which water will hit the ground is

(1) 14.14 m/s

(2) 17.32 m/s

(3) 10 m/s

(4) 20 m/s

41. A : On Adding detergent in water, its surface tension decreases.
R : Surface tension has same dimension as force per unit length.

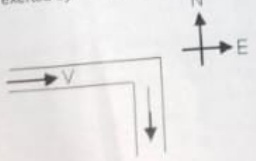
(1) Both Assertion & Reason are true and the reason is the correct explanation of the assertion.

(2) Both Assertion & Reason are true but the reason is not the correct explanation of the assertion.

(3) Assertion is true statement but Reason is false.

(4) Both Assertion and Reason are false statements.

42. A liquid is flowing steadily through a pipe of uniform cross-section as shown in the figure. The direction of the force exerted by the liquid on the pipe is



(1) North East

(2) South West

(3) South East

(4) North West

43. When four water droplets combine to form a large one, then

(1) Energy is absorbed

(2) Energy is released

(3) No change in energy

(4) Insufficient information

44. Breaking strength of an iron wire of radius r and length l is 2 $\times 10^6$ N/m^2. Breaking strength of another iron wire of radius r, and length l at same temperature will be

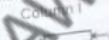
(1) 0.5×10^6 Nm^{-2}

(2) 1×10^6 N/m^2

(3) 2×10^6 N/m^2

(4) 8×10^6 N/m^2

45. Match the situations given in Column I with appropriate entries in Column II for a uniform rod.

Column I	Column II
(A) 	(P) Uniform tensile stresses developed in the rod
(B) 	(Q) Non-uniform compressive stresses developed in the rod
(C) 	(R) Uniform compressive stresses developed in the rod
(D) 	(S) Non-uniform tensile stresses developed in the rod

(1) (A) – (P), (B) – (Q), (C) – (R), (D) – (S)

(2) (A) – (Q), (B) – (P), (C) – (S), (D) – (R)

(3) (A) – (R), (B) – (P), (C) – (S), (D) – (Q)

(4) (A) – (P), (B) – (R), (C) – (Q), (D) – (S)

CHEMISTRY

46. Given below are two statements
Statement-I: A reversible process proceeds infinitely slowly by a series of equilibrium states.
Statement-II: Work done during a cyclic process is zero.
In the light of above statements, choose the correct option.

(1) Both statement I and statement II are correct

(2) Both statement I and statement II are incorrect

(3) Statement I is correct but statement II is incorrect

(4) Statement I is incorrect but statement II is correct

47. Heat required to raise the temperature of 2 mole of a gas from 100 K to 200 K at constant pressure is
[Given molar heat capacity at constant pressure C_P = 20 J/K mol]

(1) 3000 J

(2) 4000 J

(3) 3500 J

(4) 4500 J

48. Which among the following is not a state function?

(1) Enthalpy

(2) Work

(3) Internal energy

(4) Gibbs energy

49. Two moles of an ideal gas at 400 K is expanded isothermally and reversibly from 1 L to 10 L volume. ΔH for this process is
($R = 8.314\ JK^{-1}\ mol^{-1}$)

(1) 0 J

(2) 7659 J

(3) 15317 J

(4) 7523 J

50. Which of the following relations hold(s) correct for adiabatic free expansion?
(a) $\Delta U \neq 0$
(b) W = 0
(c) q = 0

(1) (a) and (b) only

(2) (a) only

(3) (b) only

(4) (b) and (c) only

51. The maximum heat of neutralisation with NaOH is given by

(1) HF

(2) HCl

(3) HCOOH

(4) CH_3COOH

52. What would be heat capacity at constant pressure for 2 moles of ideal gas, if heat capacity at constant volume is 20.7 J/K?

(1) 10.35 J/K

(2) 37.3 J/K

(3) 20.7 J/K

(4) 15.3 J/K

53. Which of the following is incorrectly matched?

(1) q = +ve : Heat is transferred from system to surroundings

(2) w = +ve : Work is done on the system

(3) ΔH_f = –ve : Reaction is exothermic

(4) Entropy : Extensive property

54. A system releases 80 joule of heat and the change in internal energy during the process is 100 J. Work done during the process is

(1) –180 joule

(2) 180 joule

(3) 20 joule

(4) –20 joule

55. Which of the following is correct for a cyclic process?
(a) ΔH = 0
(b) W = 0
(c) ΔS = 0
(d) ΔU = 0

(1) Only (a) and (d)

(2) Only (b)

(3) Only (a), (c) and (d)

(4) Only (c)

56. Which among the following is an intensive property?

(1) Mass

(2) Heat capacity

(3) Molar volume

(4) Internal energy

57. Given below are two statements one is Assertion (A) other is Reason (R).
Assertion (A) : For an ideal gas undergoing adiabatic process, $\Delta U = W$.
Reason (R) : In an adiabatic process, no heat is transferred between the system and surrounding.
In the light of above statements, choose the correct answer from the options given below.

(1) Both (A) and (R) are true but (R) is not the correct explanation of (A)

(2) (A) is true but (R) is false

(3) (A) is false but (R) is true

(4) Both (A) and (R) are true and (R) is the correct explanation of (A)

58. Given below are two statements
Statement I: Magnitude of work done during isothermal expansion of an ideal gas is lesser than work done during adiabatic expansion of an ideal gas.
Statement II: Initial temperature is higher than final temperature during adiabatic expansion of an ideal gas.
In the light of above statements, choose the correct answer from the options given below.

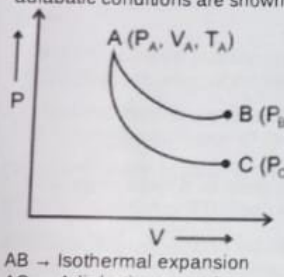
(1) Both statements I and II are incorrect

(2) Both statements I and II are correct

(3) Statement I is incorrect but statement II is correct

(4) Statement I is correct but statement II is incorrect

59. Reversible expansion of an ideal gas under isothermal and adiabatic conditions are shown in the figure.



AB → Isothermal expansion
AC → Adiabatic expansion
Which of the following options is not correct?

(1) $T_A > T_C$

(2) $T_A = T_B$

(3) $\Delta S_{adiabatic} > \Delta S_{isothermal}$

(4) $W_{isothermal} > W_{adiabatic}$

60. A gas is allowed to expand in a well insulated container against a constant external pressure of 3.0 atm from an initial volume of 4.2 L to the final volume of 8.7 L. The change in internal energy (ΔU) of the gas in joules will be

(1) –1.821 kJ

(2) –1.367 kJ

(3) –2.421 kJ

(4) –3.215 kJ

61. Given below are two statements:
Statement I: Both heat and work are state function.
Statement II: Pressure and heat capacity are intensive properties
In the light of the above statements, choose the *most appropriate* answer from the options given below.

(1) Both Statement I and Statement II are correct

(2) Both Statement I and Statement II are incorrect

(3) Statement I is correct but Statement II is incorrect

(4) Statement I is incorrect but Statement II is correct

62. Consider the following statements:
Statement I : For free expansion of an ideal gas in vacuum under adiabatic condition, $q = 0$ and $\Delta U \neq 0$
Statement II : For free expansion of an ideal gas in vacuum; $w = 0$
In the light of above statements choose the correct option

(1) Both statement I and statement II are correct

(2) Statement I is correct but statement II is incorrect

(3) Statement I is incorrect but statement II is correct

(4) Both statement I and statement II are incorrect

63. $C(graphite) + O_2(g) \rightarrow CO_2(g)$, $\Delta_r H^\circ = -393.5$ kJ mol^{-1}
$H_2(g) + \frac{1}{2}O_2(g) \rightarrow H_2O(l)$, $\Delta_r H^\circ = -285.8$ kJ mol^{-1}
$CO_2(g) + 2H_2O(l) \rightarrow CH_4(g) + 2O_2(g)$, $\Delta_r H^\circ = +890.3$ kJ mol^{-1}
Based on the above thermochemical equation the value of $\Delta_r H^\circ$ at 298 K for the reaction
$C(graphite) + 2H_2(g) \rightarrow CH_4$ will be

(1) –74.8 kJ mol^{-1}

(2) –144.0 kJ mol^{-1}

(3) 74.8 kJ mol^{-1}

(4) 144.0 kJ mol^{-1}

64. $\Delta_C H^\circ$ for butane is –2658 kJ mol^{-1}. The amount of heat released by complete combustion of 5.8 g of butane is

(1) 265.8 kJ

(2) 458.2 kJ

(3) 1329 kJ

(4) 2652.2 kJ

65. In the neutralisation of strong acid and strong base, the enthalpy of formation of 1 mole of H_2O is –57.1 kJ. If 0.20 moles of strong monoprotic acid reacts with 0.10 moles of strong monohydroxy base, then what would be the enthalpy of neutralisation?

(1) +11.42 kJ

(2) –5.71 kJ

(3) –11.42 kJ

(4) –17.13 kJ

Lattice enthalpy of NaCl is $788\ kJ\ mol^{-1}$, hydration enthalpy of NaCl is $-780\ kJ\ mol^{-1}$. Calculate enthalpy of solution

(1) $-792\ kJ\ mol^{-1}$

(2) $-8\ kJ\ mol^{-1}$

(3) $+8\ kJ\ mol^{-1}$

(4) $1567\ kJ\ mol^{-1}$

67. If the change in enthalpy for the given reaction is –91.8 kJ mol^{-1}.

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

Given that bond enthalpy of N ≡ N and H–H are 946 kJ mol^{-1} and 435 kJ mol^{-1} respectively. What would be the bond enthalpy of N–H bond?

(1) 240 kJ mol^{-1}

(2) 390 kJ mol^{-1}

(3) 450 kJ mol^{-1}

(4) 310 kJ mol^{-1}

68. Consider the following processes
(a) Boiling of egg
(b) $H_2(g) \rightarrow 2H(g)$
(c) Stretching of rubber
The entropy increases in

(1) b only

(2) a and b only

(3) b and c only

(4) a and c only

69. Which of the following is/are endothermic reaction(s)?
(a) Combustion of methane
(b) Decomposition of water
(c) Hydrogenation of ethene to ethane
(d) Conversion of graphite to diamond

(1) (a) only

(2) (a), (b) and (d) only

(3) (b) and (d) only

(4) (a), (b), (c) and (d)

70. If standard molar enthalpy of formation of carbon dioxide gas, liquid water and ethane gas respectively are –90 kcal mol^{-1}, –70 kcal mol^{-1} and –20 kcal mol^{-1} then standard molar enthalpy of combustion of ethane will be

(1) –214.2 kcal mol^{-1}

(2) –303.7 kcal mol^{-1}

(3) –370 kcal mol^{-1}

(4) –410 kcal mol^{-1}

71. Given below are two statements.
Statement I: If system is in thermal equilibrium with surrounding, then the temperature of surrounding is same as that of system.
Statement II: $T\Delta S_{sys}$ is the energy which is not available to do useful work.
In the light of above statements choose the correct option given below.

(1) Statement I is incorrect but statement II is correct

(2) Statement I is correct but statement II is incorrect

(3) Both statement I and statement II are incorrect

(4) Both statement I and statement II are correct

72. Given below are two statements:
Statement I: Endothermic reactions with increasing entropy are spontaneous at very high temperature as it makes $(T\Delta S) > (\Delta H)$.
Statement II: Exothermic reactions with increasing entropy may be non-spontaneous at low temperature as it is in accordance with $(T\Delta S) < (\Delta H)$.
In the light of above statements, choose the most appropriate answer from the options given below.

(1) Both statement I and statement II are correct

(2) Statement I is correct but statement II is incorrect

(3) Statement I is incorrect but statement II is correct

(4) Both statement I and statement II are incorrect

73. For a reaction $A(g) \rightarrow B(g) + C(g)$, ΔH = 40 kJ/mole and ΔS = 60 $J\ K^{-1}\ mol^{-1}$, then temperature at which reaction will be spontaneous is

(1) 570 K

(2) 500 K

(3) 670 K

(4) 600 K

74. Given below are two statements:
Statement I: Heat added to a system at lower temperature causes greater randomness than when the same amount of heat is added to it at higher temperature.
Statement II: The total entropy change for system and surrounding of a spontaneous process is greater than zero.
In the light of above statements, choose the most appropriate answer from the options given below.

(1) Both statement I and statement II are incorrect

(2) Statement I is correct but statement II is incorrect

(3) Statement I is incorrect but statement II is correct

(4) Both statement I and statement II are correct

75. For any pure crystalline substance, as the temperature approaches to absolute zero, the entropy approaches

(1) A positive value

(2) Zero

(3) A negative value

(4) Infinite

76. For the reaction $2A(g) \rightarrow B(g) + C(g)$ if $\Delta U = 5$ kcal, $\Delta S = 50$ cal K^{-1} at 300 K then ΔG of the reaction will be

(1) – 10 kcal

(2) + 10 kcal

(3) 15.5 kcal

(4) – 15.5 kcal

77. What is the entropy change when 3 moles of an ideal gas is reversibly expanded from 0.5 L to 5 L at 27°C? (Given, R = 2 cal mol^{-1} K^{-1})

(1) 69 cal K^{-1}

(2) 1.38 cal K^{-1}

(3) 13.8 cal K^{-1}

(4) 6.9 cal K^{-1}

78. If entropy change for the transition of liquid water to steam is 100 JK^{-1} mol^{-1} at 27°C, then the enthalpy change for the process would be (in kJ mol^{-1})

(1) 27

(2) 30

(3) 300

(4) 270

79. Consider the following statements
(a) Standard molar enthalpies of formation of 'S' (rhombic) and $H_2(g)$ are zero
(b) Heat is a path function
(c) For spontaneous process ΔS_{total} is greater than zero.
The correct statement(s) is/are

(1) (a) and (c) only

(2) (a), (b) and (c)

(3) (c) only

(4) (a) and (b) only

80. One mole of an ideal monoatomic gas undergoes isobaric expansion from 27°C to 77°C. ΔH and ΔU respectively are (approximately)

(1) 1839 J, 1107.8 J

(2) 1107.8 J, 1839 J

(3) 1039.25 J, 622 J

(4) 622 J, 1039.25 J

81. If the amount of heat required to raise temperature of 2 mole monoatomic ideal gas by 1°C at constant pressure is 10 cal, then change in internal energy of gas is (R = 2 cal/K-mol)

(1) 6 cal

(2) 12 cal

(3) 9 cal

(4) 3 cal

82. If a gas is expanded adiabatically then which is true?

(1) $\Delta T = 0$

(2) $Q = 0$

(3) $\Delta U = 0$

(4) $\Delta H = 0$

83. A system gives out 20 J of heat and also does 40 J of work. What is the internal energy change?

(1) –20 J

(2) –10 J

(3) –60 J

(4) –40 J

84. If heat at constant volume for combustion of methane at 100°C is –20 kJ mol^{-1}, then heat at constant pressure will be

(1) –20 kJ mol^{-1}

(2) –41.66 kJ mol^{-1}

(3) +20 kJ mol^{-1}

(4) +13.79 kJ mol^{-1}

85. Consider the following process

$\frac{1}{2}A \rightarrow B$ +100 kJ

$3B \rightarrow 2C + D$ –120 kJ

$E + A \rightarrow 2D$ +325 kJ

For, $B + D \rightarrow E + 2C$; ΔH will be

(1) 305 kJ mol^{-1}

(2) 245 kJ mol^{-1}

(3) –305 kJ mol^{-1}

(4) –245 kJ mol^{-1}

86. If enthalpy of atomisation of $CH_4(g)$ is 1665 kJ mol^{-1} then mean C–H bond enthalpy will be

(1) 1665 kJ mol^{-1}

(2) 416.25 kJ mol^{-1}

(3) 832.5 kJ mol^{-1}

(4) 6660 kJ mol^{-1}

87. Molar heat capacity for isothermal process will be

(1) Zero

(2) 1

(3) Infinite

(4) 0.1

Given below are two statements: One is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): Temperature, is an intensive property.
Reason (R): For a particular system, as volume is halved the temperature will still remain the same
In the light of the above statements, choose the correct answer from the options given below.

(1) Both A and R are true and R is not the correct explanation of A.

(2) A is true but R is false

(3) A is false but R is true

(4) Both A and R are true and R is the correct explanation of A

89. The difference between heat of reaction at constant pressure and constant volume for the reaction $2C_6H_6(l) + 15O_2(g) \rightarrow 12CO_2(g) + 6H_2O(l)$ at 25°C in kJ is

(1) +7.43

(2) +4.83

(3) –7.43

(4) –4.83

90. In which conditions, a reaction will not occur at any temperature?

(1) $\Delta H < 0, \Delta S > 0$

(2) $\Delta H > 0, \Delta S < 0$

(3) $\Delta H < 0, \Delta S < 0$

(4) $\Delta H > 0, \Delta S > 0$

BOTANY

91. An angiospermic family which includes a plant that produces colchicine

(1) Bears non endospermous seeds

(2) Has tricarpellary superior ovary

(3) Has flowers which show zygomorphic symmetry

(4) Has unisexual flowers only

92. When calyx and corolla are not distinct then it is termed as perianth as in

(1) Tulip

(2) Mustard

(3) Bean

(4) *Petunia*

93. When female reproductive part occupies the highest position and other parts are situated below it, the flower is called

(1) Hypogynous with inferior ovary

(2) Hypogynous with superior ovary

(3) Epigynous with inferior ovary

(4) Epigynous with superior ovary

94. Select the **correct** match.

	Plant	Phyllotaxy	Gynoecium
A.	*Petunia*	Opposite	$\underline{G}_{(2)}$
B.	Soyabean	Alternate	$\overline{G}_1$
C.	Mustard	Whorled	$\underline{G}_{(2)}$
D.	*Aloe*	Alternate	$\underline{G}_{(3)}$

(1) A

(2) B

(3) C

(4) D

95. In a racemose inflorescence the main axis

(1) Bears a solitary flower

(2) Has unlimited growth

(3) Terminates in a flower

(4) Has limited growth & flowers grow in basipetal manner

96. When carpels are fused together it is called

(1) Pistillate condition

(2) Apocarpous condition

(3) Syncarpous condition

(4) Staminate condition

97. In which of the following aspects, tap root and adventitious root are **not** similar?
(1) They provide anchorage to the plant parts
(2) They can modify to store reserve food material
(3) They absorb water and minerals from the soil
(4) They arise from the radicle

98. The arrangement of flowers on the floral axis is termed as
(1) Venation
(2) Floral symmetry
(3) Inflorescence
(4) Phyllotaxy

99. Select the statements which are **incorrect**.
(i) A flower is a modified root.
(ii) Different floral appendages are produced at successive nodes.
(iii) When a shoot tip is transformed into a flower, it is always solitary.
(iv) Apical meristem changes to lateral meristem to form flower.
(1) (I), (II) and (IV)
(2) (II) and (III)
(3) (III) and (IV)
(4) (I) and (IV)

100. Which of the following stem modifications is found in *Euphorbia*?
(1) Axillary bud is modified into woody, straight and pointed structure.
(2) Axillary bud is modified into slender and spirally coiled structure.
(3) Stems are modified into fleshy cylindrical structures.
(4) A slender lateral branch arises from the base of the main axis and after growing aerially for some time arch downwards to touch the ground.

101. Read the following statements and select the correct option.
Statement A: The root is covered at the apex by a thimble-like structure.
Statement B: In maize seed, the outer covering of endosperm separates the embryo by aleurone layer.
(1) Only statement A is correct
(2) Only statement B is correct
(3) Both the statements A and B are correct
(4) Both the statements A and B are incorrect

102. Which of the following is **not** the characteristic regarding outermost whorl of a flower?
(1) It may be colourful to attract pollinators
(2) It is modified into thorn to protect the plants from animals
(3) It protect the flower in bud stage
(4) It may perform photosynthesis

103. A parthenocarpic fruit has all of the following parts, ex
(1) Epicarp
(2) Endocarp
(3) Endosperm
(4) Mesocarp

104. 'Br' symbol in floral formula is used to denote
(1) Fusion between floral parts
(2) Adhesion in floral parts
(3) Bracteate flower
(4) Ebracteate flower

105. Direct elongation of radicle forms
(1) Primary root
(2) Secondary root
(3) Tertiary root
(4) Primary shoot

106. All of the following are most common functions of stem in flowering plants, **except**
(1) Conduction of water and minerals
(2) Providing support to leaves, flowers and fruits
(3) Absorption of minerals from surrounding
(4) Transportation of food from leaves to other parts of plants

107. Bicarpellary, syncarpous, superior ovary with swollen placenta are characteristic features of
(1) *Aloe*
(2) Ashwagandha
(3) *Trifolium*
(4) Soyabean

108. Consider the following four statements A, B, C and D and select the right option for two **correct** statements.
(A) *Citrus* bears polyadelphous stamens
(B) Pea flower has multicarpellary gynoecium
(C) *Datura* has parietal placentation
(D) *Salvia* flower has stamens of different length within a flower
The **correct** statements are
(1) (A) and (D)
(2) (A) and (B)
(3) (B) and (C)
(4) (B) and (D)

Select the **correct** option for the given floral diagram

(1) Gynoecium is bilocular with many ovules

(2) Given floral diagram is for *Allium cepa* flower

(3) Vexillary aestivation of perianth can be observed

The floral formula for given floral diagram is

(4) $E_{pi_{5-7}} \oplus \female K_{(5)} C_5 A_{(\infty)} \underline{G}_{(5)}$

110. How many of the following features are associated with china rose plant?

(a) Alternate phyllotaxy
(b) Monoadelphous stamens
(c) Valvate aestivation in corolla
(d) Axile placentation

(1) Two

(2) Three

(3) Four

(4) One

111. In a pinnately compound leaf

(1) Many small leaves are attached to the tip of a petiole

(2) Leaflets arise from a common point

(3) Each leaflet has its own stipule

(4) The mid rib forms a common axis called rachis

112. Select the **correct** statement.

(1) Banyan tree has stilt roots

(2) Tap roots are usually present in monocots

(3) Pneumatophores help to get oxygen for respiration

(4) Roots can modify only for storage of food

113. Select the **incorrect** match from the following.

(1) Sunflower – Alternate phyllotaxy
(2) *Alstonia* – Palmately compound leaf
(3) Guava – Opposite phyllotaxy
(4) Australian acacia – Expanded petiole

(1) (1)

(2) (2)

(3) (3)

(4) (4)

114. Correct position of floral parts over thalamus in mustard plant is

(1) Gynoecium is situated in the centre, and other parts of the flower are located at the rim of the thalamus, at the same level.

(2) Gynoecium occupies the highest position, while the other parts are situated below it.

(3) Margin of the thalamus grows upward, enclosing the ovary completely, and other parts arise below the ovary.

(4) Gynoecium is present in the centre and other parts cover it partially.

115. Papilionaceous corolla

(1) Has valvate aestivation

(2) Has keels as two lateral petals

(3) Has posterior petal as the largest one

(4) Has smallest fused petals called wings

116. Axillary buds of stem get modified into thorns in

(1) *Bougainvillea*

(2) *Aloe*

(3) *Opuntia*

(4) *Euphorbia*

117. An example of edible underground adventitious root is

(1) Ginger

(2) Carrot

(3) Sweet potato

(4) Turnip

118. In pitcher plant, pitcher is a modified

(1) Petiole

(2) Leaf base

(3) Lamina

(4) Leaf apex

119. Leaf modify into spine in

(1) Garden pea

(2) *Aloe*

(3) Cucumber

(4) *Parthenium*

120. Choose the **incorrectly** matched pair w.r.t. aestivation of corolla.

(1) *Calotropis* – Valvate

(2) Lady's finger – Imbricate

(3) China rose – Twisted

(4) Pea – Vexillary

121. Read the following statements and choose the **correct** option.
Assertion : Root cap protects the tender apex of the root.
Reason : Root hair increases the surface area for absorbtion of water and minerals from the soil.

(1) Both Assertion & Reason are true and the reason is the correct explanation of the assertion

(2) Both Assertion & Reason are true but the reason is not the correct explanation of the assertion

(3) Assertion is true statement but Reason is false

(4) Both Assertion and Reason are false statements

122. Read the following statements and select the **correct** option.
Assertion (A): In cymose inflorescence the main axis is limited in growth.
Reason (R): In cymose inflorescence the flowers are borne in a basipetal order.

(1) Only (A) is true

(2) Both (A) and (R) are true but (R) is not the correct explanation of (A)

(3) Both (A) and (R) are true and (R) is the correct explanation of (A)

(4) Both (A) and (R) are false

123. The roots that originate from the base of the stem are seen in

(1) Mustard plant

(2) Banyan tree

(3) Wheat plant

(4) Mango tree

124. A small pore above the scar found on seed coat is

(1) Micropyle

(2) Hilum

(3) Plumule

(4) Tegmen

125. Seed coat is membranous and generally fused wi
wall in

(1) Gram

(2) Maize

(3) Pea

(4) Mango

126. How many among the following features is/are **true** for *Solanum nigrum*?
(a) Both calyx and corolla shows valvate aestivation.
(b) Stamens are attached to the sepals of the flower.
(c) More than one carpel are present and they are free.
(d) Flower shows bilateral symmetry.
(e) Flowers are hypogynous.
Select the **correct** option

(1) Three

(2) Four

(3) Two

(4) One

127. Read the given statements (a-d)
a. Ovules develop into seeds after fertilization.
b. The hilum is a scar on the seed coat through which the developing seeds were attached to the fruit.
c. Nucellus remains persistent in some seeds and is called pericarp.
d. The plumule and radicle are enclosed in sheaths which are called as coleoptile and coleorhiza respectively.
In the light of above statements, select the **correct** option.

(1) All are correct except d

(2) Only b and c are correct

(3) Only a, b and d are correct

(4) Only c and d are correct

128. With respect to the floral formula of *Allium cepa*, which of the following representations for the particular parts is **correct**?

(1) $\overset{\frown}{P_{(3+3)}\ A_{3+3}}$

(2) $\underline{G}_3$

(3) $\overset{\frown}{C_5\quad A_5}$

(4) $K_{(5)}C_{1+2+(2)}$

...Select the **correct** option regarding the type and example of placentation shown in the given diagram.

(1) Marginal	– Marigold
(2) Axile	– Lemon
(3) Free central	– *Dianthus*
(4) Basal	– Sunflower

(1) (1)

(2) (2)

(3) (3)

(4) (4)

130. In *Asparagus*, the flowers are

(1) Actinomorphic, hypogynous and bisexual

(2) Zygomorphic, epigynous and with valvate aestivation of petals

(3) Actinomorphic, hypogynous and with vexillary aestivation of petals

(4) Zygomorphic, epigynous and unisexual

131. Epigynous flowers are found in

(1) Rose

(2) Brinjal

(3) Ray florets of sunflower

(4) Peach

132. In leguminous plants, swollen leaf base is called

(1) Stipule

(2) Pulvinus

(3) Midrib

(4) Lamina

133. The edible part of Mango is

(1) Cotyledons

(2) Thalamus

(3) Mesocarp

(4) Endocarp

134. Flowers cannot be divided into two similar halves by any vertical plane passing through the centre in

(1) Canna

(2) *Cassia*

(3) *Datura*

(4) Chilli

135. A lateral branch with short internodes and each node bearing a whorl of leaves and a tuft of roots is seen in

(1) *Opuntia*

(2) Pineapple

(3) Banana

(4) *Pistia*

ZOOLOGY

136. High osmolarity gradient towards the inner medullary interstitium in kidney is mainly due to

(1) NaCl and Water

(2) Water and Urea

(3) NaCl and Urea

(4) Water and Glucose

137. Which of the following statements is **not** true w.r.t. different types of nephrons in human body?

(1) Cortical nephrons are more abundant as compared to juxtamedullary nephrons

(2) Vasa recta is reduced or absent in cortical nephrons

(3) Juxtamedullary nephrons have longer loop of Henle as compared to cortical nephrons

(4) The Malpighian corpuscle, PCT and DCT are present in the medullary region of the kidneys

138. All of the following hormones can increase the blood pressure in humans, **except**

(1) ADH

(2) Epinephrine

(3) ANF

(4) Aldosterone

139. Select the incorrect match w.r.t excretory structures in animals.

(1) Prawns – Antennal glands

(2) *Planaria* – Green glands

(3) *Camelus* – Kidney

(4) Rotifers – Flame cells

140. In humans, under normal physiological conditions, the fluid which is present throughout the distal convoluted tubule has the osmolarity

(1) Lower than the blood plasma

(2) Same as that of the blood plasma

(3) Higher than the blood plasma

(4) Same as that of the innermost medullary interstitium

141. Angiotensin-II is responsible for all of the following, **except**

(1) Vasoconstriction

(2) Increase in blood pressure

(3) Stimulating the release of mineralocorticoids

(4) Decreased reabsorption of Na^+ from renal tubules

142. All of the following organisms excrete their nitrogenous wastes in the form of pellet or paste with a minimum loss of water, **except**

(1) *Calotes*

(2) *Columba*

(3) *Corvus*

(4) *Canis*

143. The type of movement that helps in the maintenance of water current in the canal system of sponges is

(1) Amoeboid movement

(2) Flagellar movement

(3) Ciliary movement

(4) Muscular movement

144. Select the **incorrect** match among the following w.r.t the kidney of a healthy adult human.

(1) Length – 10 - 12 cm

(2) Width – 5 - 7 cm

(3) Thickness – 2 - 3 cm

(4) Position – Between the levels of last thoracic and first lumbar vertebrae

145. Which of the following is absent in dialysing fluid used in hemodialysis in artificial kidney?

(1) Water

(2) Sodium ion

(3) Potassium ion

(4) Urea

146. **Assertion (A):** Collecting duct plays a major role in the maintenance of pH and ionic balance of blood.
Reason (R): Collecting duct is capable of selective secretion of H^+ and K^+ ions and reabsorption of Na^+ and Cl^- ions.
In the light of above statements, choose the correct option.

(1) Both Assertion & Reason are true and the Reason is correct explanation of the Assertion.

(2) Both Assertion & Reason are true but the Reason is not correct explanation of the Assertion.

(3) Assertion is true statement but Reason is false.

(4) Both Assertion and Reason are false statements.

147. The average amount of CO_2 removed by lungs in an adult human under normal physiological conditions is approximately

(1) 200 ml/sec

(2) 200 ml/min

(3) 200 ml/hr

(4) 200 ml/day

148. Urine formed by nephrons is ultimately carried to the urinary bladder where it is stored till 'X' signals are given by 'Y'. Select the option that correctly identifies 'X' and 'Y' respectively.

(1) Involuntary, PNS

(2) Voluntary, PNS

(3) Involuntary, CNS

(4) Voluntary, CNS

149. Read the statements A and B and choose the most appropriate option.
Statement A: Animals never accumulate ammonia, urea, CO_2, Na^+, K^+, phosphate, sulphate, *etc.*, either by metabolic activities or by excess ingestion.
Statement B: In bony fishes, ammonia is generally excreted by diffusion through gill surfaces as ammonium ions.

(1) Both the statements A and B are true

(2) Only statement A is true

(3) Only statement B is true

(4) Both the statements A and B are false

...Consider the given organisms.
(i) Marine fishes, (ii) Birds, (iii) Aquatic insects, (iv) Reptiles
Which of the following represents correct order of increasing toxicity of chief nitrogenous wastes secreted by respective organisms?

(1) (i) < (ii) = (iii) < (iv)

(2) (ii) = (iv) < (i) < (iii)

(3) (i) < (ii) = (iv) < (iii)

(4) (i) < (iii) = (iv) < (ii)

151. In humans, during the release of urine

(1) Urethral sphincters relax

(2) Smooth muscles of urinary bladder relax

(3) Urethral sphincters contract

(4) Skeletal muscles of urinary bladder relax

152. In humans, sebaceous glands through sebum majorly eliminate

(1) Lactic acid

(2) Waxes

(3) Bilirubin

(4) Urea

153. **Assertion (A):** Active reabsorption of hydrogen ions occur in the proximal convoluted tubules.
Reason (R): PCT is lined by the brush bordered cuboidal epithelium.
In the light of above statements, select the **correct** option.

(1) Both (A) and (R) are true, (R) is the correct explanation of (A)

(2) (A) is true, (R) is false

(3) (A) and (R) are true, (R) is not the correct explanation of (A)

(4) (A) is false, (R) is true

154. Motor end plate contains
(i) A motor neuron
(ii) Sarcolemma of muscle fibres
(iii) A sensory neuron
Choose the correct option.

(1) (ii) only

(2) (i), (ii) and (iii)

(3) (ii) and (iii) only

(4) (i) and (ii) only

155. Which of the following steps of urine formation are not associated with glomerulus of the nephron?
(a) Ultrafiltration
(b) Reabsorption
(c) Tubular secretion
Select the **correct** option.

(1) (a) and (b)

(2) (a) and (c)

(3) (b) and (c)

(4) (a), (b) and (c)

156. Complete the analogy w.r.t. disorders of excretory system in humans.
Glycosuria : Glucose in urine : : Uremia : _____
Select the **correct** option.

(1) Increased urea in urine

(2) Presence of uric acid in blood

(3) Increased urea in blood

(4) Presence of uric acid in urine

157. Read the following steps w.r.t. haemodialysis :
(a) Blood is taken out of the patient and is cooled to 0°C.
(b) Blood is mixed with anti-heparin.
(c) Blood is then pumped to artificial kidney.
(d) Blood is filtered.
(e) Blood is warmed to body temperature and mixed with heparin.
(f) Blood is returned to vein of patient.
Which of the above mentioned steps are **incorrect** regarding their sequence during haemodialysis?

(1) (a) & (e)

(2) (c) & (d)

(3) (b) & (e)

(4) (e) & (f)

158. Select the correct match w.r.t hormones and their functions in humans.

(1)	ADH	–	Facilitates the conversion of angiotensin I in blood to angiotensinogen
(2)	Aldosterone	–	Facilitates reabsorption of Na^+ and water from distal part of the renal tubule
(3)	Renin	–	Causes vasodilation
(4)	ANF	–	Increases sodium reabsorption

(1) (1)

(2) (2)

(3) (3)

(4) (4)

159. 'A' and 'B' represents the structures found in renal medulla and renal cortex of the kidney respectively. Identify A and B and choose the correct option.

	A	B
(1)	Bowman's capsule	Vasa recta
(2)	Loop of Henle	DCT
(3)	PCT	Collecting duct
(4)	DCT	Malpighian corpuscle

(1) (1)

(2) (2)

(3) (3)

(4) (4)

160. Sympathetic stimulation of renal artery of kidney leads to their I and II in GFR. Choose the option that fills I and II **correctly**.

	I	II
(1)	Dilation	Increase
(2)	Constriction	Decrease
(3)	Constriction	Increase
(4)	Dilation	Decrease

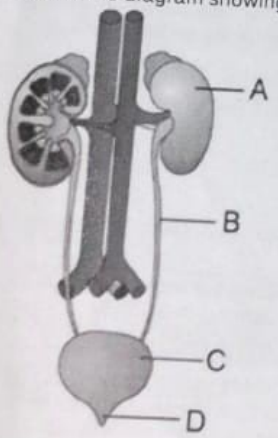
(1) (1)

(2) (2)

(3) (3)

(4) (4)

161. Given is the diagram showing human excretory system.



Choose the **correct** option w.r.t. labelled parts and their function in normal adult human.

(1) A-Production of urine

(2) B-Weigh about 120-170 gm

(3) C-Filtration of urine

(4) D-10-12 cm in length

162. ATP binding sites and actin binding sites are locat... which part of myosin filament?

(1) Tail of meromyosin

(2) Light meromyosin

(3) Globular head of meromyosin

(4) Short arm of meromyosin

163. Select the **incorrect** match

(1) *Hydra* – Tentacles

(2) *Paramecium* – Cilia

(3) *Amoeba* – Cilia

(4) *Euglena* – Flagella

164. In a myofibril, the functional unit of contraction lies between two successive

(1) 'M' lines

(2) 'I' bands

(3) 'A' bands

(4) 'Z' lines

165. Match Column I with Column II w.r.t. types of movements associated with different elements/structures of humans.

	Column I		Column II
(a)	Amoeboid	(i)	Trachea
(b)	Ciliary	(ii)	Macrophages
(c)	Flagellar	(iii)	Limbs
(d)	Muscular	(iv)	Spermatozoa

Choose the correct option.

(1) a(ii), b(i), c(iii), d(iv)

(2) a(ii), b(i), c(iv), d(iii)

(3) a(ii), b(iv), c(iii), d(i)

(4) a(ii), b(iii), c(iv), d(i)

166. Read the following statements carefully and select the **correct** option.

Statement (A): About 55-65 per cent of the body weight of a normal human adult is contributed by muscles.

Statement (B): Muscles are specialised tissue of mesodermal origin.

(1) Both statements (A) and (B) are correct

(2) Only statement (A) is correct

(3) Only statement (B) is correct

(4) Both statements (A) and (B) are incorrect

167. Muscle bundles of organised skeletal muscle are held together by a common collagenous connective tissue layer called

(1) Myofibrils

(2) Fascicles

(3) Fascia

(4) Myofilaments

168. All of the following are related with muscles, **except**
(1) Myelination
(2) Contractility
(3) Extensibility
(4) Excitability

169. Visceral muscle fibres are characterised as
(1) Non-striated, multinucleated, involuntary, branched fibres
(2) Striated, uninucleated, voluntary, unbranched fibres
(3) Non-striated, uninucleated, involuntary, unbranched fibres
(4) Striated, multinucleated, voluntary, branched fibres

170. Choose the **correct** option to complete the analogy w.r.t. muscle contraction.
Mitochondria : ATP :: Sarcoplasmic reticulum : ——
(1) Ca^{2+}
(2) Mg^{2+}
(3) Fats
(4) Proteins

171. The plasma membrane of a muscle fibre is called
(1) Sarcoplasma
(2) Sarcolemma
(3) Sarcoplasmic Reticulum
(4) Syncytial

172. Which of the following does **not** occur during muscle contraction?
(1) Release of calcium into sarcoplasm
(2) Unmasking of myosin binding sites on actin
(3) Binding of ATP on actin head
(4) Shortening of sarcomere

173. Myoglobin content is high in some of the skeletal muscle fibres which
(1) Contain high amount of sarcoplasmic reticulum
(2) Possess more than one nuclei and more number of mitochondria
(3) Depends primarily on anaerobic process for energy
(4) Can't contract for prolong time period

174. Match column I with column II and select the correct option from codes given below.

(A)	Regulatory protein	(i)	Actin
(B)	Structural protein	(ii)	Tropomyosin
(C)	Contractile protein	(iii)	Dystrophin

(1) (A)-(i); (B)-(ii); (C)-(iii)
(2) (A)-(ii); (B)-(iii); (C)-(i)
(3) (A)-(ii); (B)-(i); (C)-(iii)
(4) (A)-(iii); (B)-(ii); (C)-(i)

175. Monomeric protein of F-actin and thick filament are respectively
(1) G-actin and meromyosin
(2) Tropomyosin and troponin
(3) Meromyosin and G-actin
(4) G-actin and troponin

176. In humans, based on the location, majorly three types of muscles are identified. One of them has muscle fibres that are non-striated and involuntary. These muscle fibres assist in
(1) Locomotion for search of food
(2) Transportation of gametes through the genital tract
(3) Change in body posture while sleeping
(4) Conduction of impulses in cardiac musculature via intercalated discs

177. In a sarcomere, ___X___ bisects 'I' band whereas thick filaments in the 'A' band are held together in the middle by a thin fibrous membrane called ___Y___.
Identify X and Y.

	X	Y
(a)	'M' line	'Z' line
(b)	'Z' line	'M' line
(c)	'H' zone	'Z' line
(d)	'M' line	'H' zone

Select the **correct** option.
(1) (a)
(2) (b)
(3) (c)
(4) (d)

178. Which of the following is the correct similarity between skeletal muscle fibres and cardiac muscle fibres?

	Parameter	Skeletal muscle fibres	Cardiac muscle fibres
(1)	Shape	Cylindrical	Cylindrical
(2)	Branching	Branched	Branched
(3)	Location of nuclei	Peripheral	Peripheral
(4)	Number of nuclei	Multi-nucleated	Multinucleated

(1) 1

(2) 2

(3) 3

(4) 4

179. In a sarcomere, I-band has

(1) Only myosin filaments

(2) Only actin filaments

(3) Both actin and myosin filaments

(4) Neither actin nor myosin filaments

180. During heavy exercise, muscles undergo fatigue and contain

(1) More ATP, less glycogen

(2) More ADP, more lactic acid

(3) More creatine phosphate, less lactic acid

(4) More creatine phosphate, more ATP