



Aakash

Medical | IIT-JEE | Foundations

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MM : 720

Fortnightly Test for NEET-2026_RM(P1)_FT-04A

Time : 180 Min.

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 equal weightage.

Each question carries +4 marks. For every wrong response, -1 mark shall be deducted from the total score. Unanswered/unattempted 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. At what height above the surface of earth, acceleration due to gravity becomes $\frac{1}{4}$ of its value at the surface of earth (where R is the radius of earth)?
 - (1) R
 - (2) $\frac{R}{4}$
 - (3) $\frac{R}{2}$
 - (4) $\frac{R}{3}$
2. The acceleration due to gravity g and mean density of the earth ρ are related by which of the following relations? (where G is the gravitational constant and R is the radius of the earth.)
 - (1) $\rho = \frac{3g}{4\pi GR^2}$
 - (2) $\rho = \frac{3g}{4\pi G R^3}$
 - (3) $\rho = \frac{4\pi g R^2}{3G}$
 - (4) $\rho = \frac{4\pi g R^3}{3G}$
3. If masses of two point objects are tripled and distance between them is doubled, then gravitational force of attraction between them will
 - (1) Increase by 225%
 - (2) Decrease by 56%
 - (3) Increase by 125%
 - (4) Decrease by 144%
4. The time period of earth is taken as T and its distance from sun as R . What will be the distance of a certain planet from sun whose time period is 64 times that of earth?
 - (1) 8 times the distance that of earth and sun
 - (2) 16 times the distance that of earth and sun
 - (3) 24 times the distance that of earth and sun
 - (4) 4 times the distance that of earth and sun

5. Work done in shifting a mass m slowly from the surface of earth to a height h above the surface is $\frac{mgR}{2}$. If R is the radius of earth and g is the acceleration due to gravity at surface then height h is equal to

- R
- $\frac{R}{2}$
- $\frac{R}{3}$
- $2R$

6. Two masses each equal to M are moving on a circular path of radius R about a common centre. The gravitational force of attraction between the masses has magnitude

- $F = \frac{GM^2}{R^2}$
- $F = \frac{GM^2}{4R^2}$
- $F = \frac{4GM^2}{R^2}$
- $F = \frac{GM^2}{2R^2}$

7. Escape velocity of a body of 1 kg mass on a planet is 50 m/s. Gravitational potential energy of the body at the surface of planet is

- 1250 J
- 1000 J
- 1750 J
- 1200 J

8. Potential at the centre of uniform solid sphere of mass M and radius R is given by

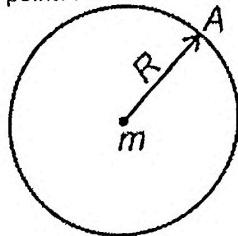
- $\frac{-GM}{2R}$
- $\frac{-3GM}{2R}$
- $\frac{-GM}{R}$
- $\frac{-3GM}{R}$

9. Match list I with list II and then choose the correct option

	List I		List II
a.	Magnitude of gravitational force of attraction F for a mass (m) outside earth separated by distance r	(i)	$-\frac{Gm_1m_2}{r}$
b.	Gravitational potential energy (U) associated with two particles of masses m_1 and m_2 separated by r	(ii)	Zero
c.	F_{net} on isolated system of two particles with masses m_1 and m_2 separated by distance r	(iii)	$\frac{Gm_1m_2}{r^2}$
d.	Work done in lifting a particle (of mass m) from $r = r_1$ to $r = r_2$ ($r_2 > r_1 > R_e$) along a vertical path (M_e = Mass of earth and R_e = Radius of earth)	(iv)	$-\frac{GmM_e(r_1 - r_2)}{r_1 r_2}$

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

10. Isolated uniform hollow sphere of mass M and radius R has a point mass m placed at its centre as shown. The work done in moving the point mass m slowly from centre to a point A is



- $-\frac{GMm}{R}$
- $\frac{2GMm}{R}$
- $-\frac{2GMm}{R}$
- Zero

11. Choose the correct statement.

While finding gravitational force between two bodies,
(1) their masses can always be assumed at their respective
centre of mass

Due to gravitational force between two particles, they
(2) move towards each other with same acceleration

If a particle is thrown from height h from earth surface (m is mass of earth and R is radius of earth) with speed

(3) $u = \sqrt{\frac{3Gm}{2(R+h)}}$ in horizontal direction, then its trajectory
will be elliptical

Apparent weight of a body is maximum at equator and
(4) minimum at poles

12. Choose the incorrect statement about gravitational force.

- It forms action-reaction pair
- It is a central force
- It does not depend upon the nature of medium between
the masses
- It is a non-conservative force

13. Which of the following is/are Kepler's laws?

- Law of orbit
- Law of areas
- Law of continuity
- Both (1) and (2)

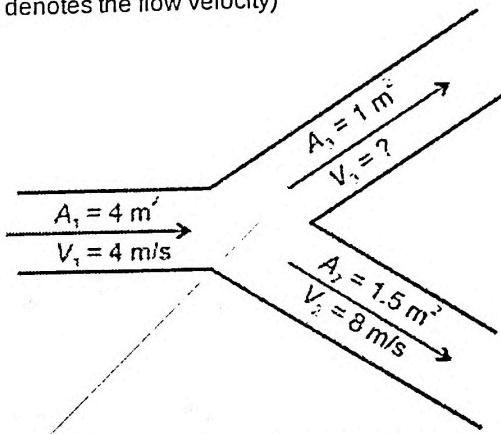
14. An artificial satellite is revolving around earth in an elliptical orbital. Its

- Kinetic energy is constant
- Potential energy is constant
- Total energy is constant
- All of these

15. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): Angular momentum conservation can be used to explain Kepler's second law of planetary motion.
Reason (R): Areal velocity of a planet revolving around the sun is equal to its angular momentum.
In the light of the above statements, choose the correct answer from the options given below:

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

16. An ideal incompressible liquid flows through a tube as shown. (where A denotes the area of cross section and v denotes the flow velocity)



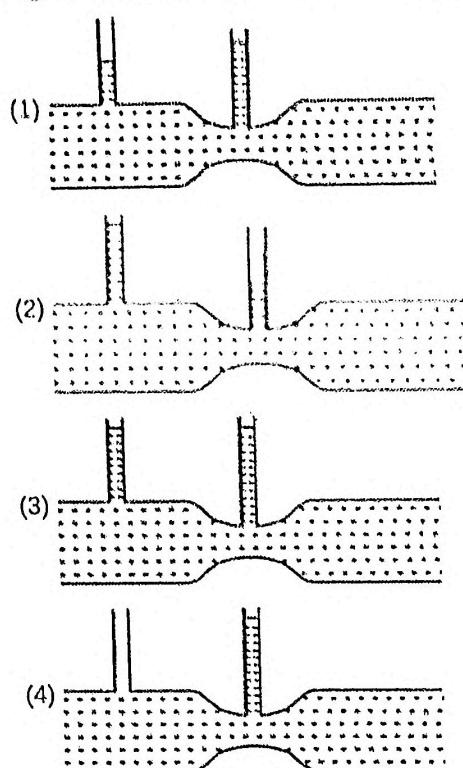
Based on above information, velocity v_3 will be equal to

- 4 m/s
- 8 m/s
- 12 m/s
- 16 m/s

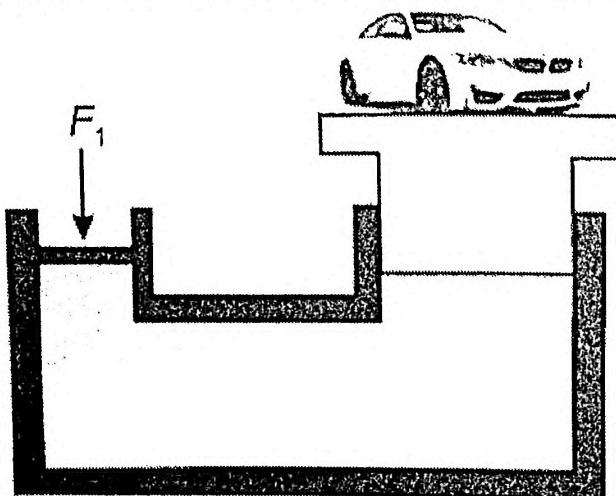
17. n identical small drops of water having radius r coalesce to form a bigger drop. If surface tension of water is T then excess pressure in bigger drop will be

- $\frac{n^3 4T}{r}$
- $\frac{2T}{n^3 r}$
- $\frac{4T}{nr}$
- $\frac{2T}{n^3 r}$

18. Which of the following figures shown below is correct regarding the steady flow of an ideal liquid?



19. In a car lift, compressed air exerts a force F_1 on a small piston having a radius of 10 cm. This pressure is transmitted to a large piston of radius 20 cm as shown in figure. If the mass of the car to be lifted is 1500 kg, the value of F_1 will be

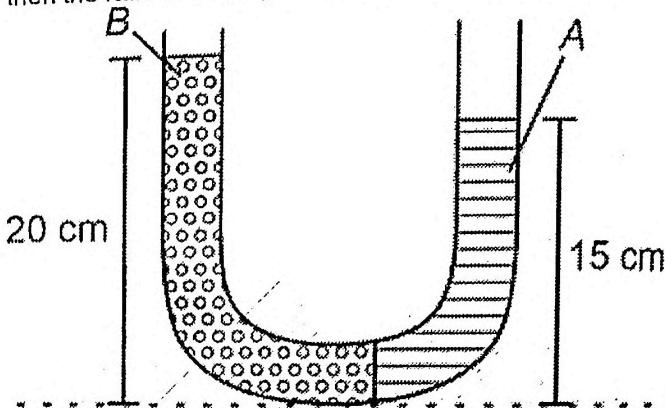


- (1) 1.5×10^4 N
- (2) 1.5×10^7 N
- (3) 3.75×10^3 N
- (4) 7.5×10^4 N

20. Consider the following statements:
Statement A: When a capillary tube is dipped into a liquid, if the liquid neither rises or falls in the capillary, if then the angle of contact must be zero.
Statement B: The working of a Venturimeter is based on the Bernoulli's theorem.
Based upon above information pick correct option.

- (1) Both statement (A) and (B) are correct
- (2) Both statement (A) and (B) are incorrect
- (3) Statement (A) is correct while statement (B) is incorrect
- (4) Statement (A) is incorrect while statement (B) is correct

21. In a U-tube as shown in figure, liquid A is on the right side of tube while liquid B is on the left side. The heights from the bottom for liquid A and B is 15 cm and 20 cm respectively, then the ratio of density of liquid B to that of liquid A is

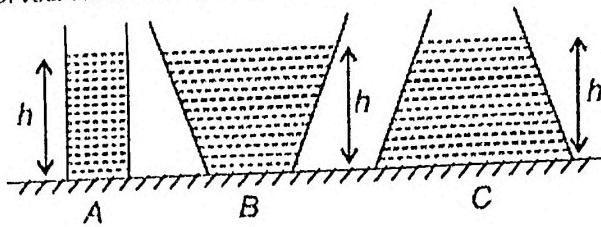


- (1) $\frac{3}{4}$
- (2) $\frac{4}{3}$
- (3) $\frac{5}{7}$
- (4) $\frac{7}{5}$

22. A liquid is filled upto a height of 80 cm in a cylindrical vessel. The speed of liquid coming out of a small hole at the bottom of vessel is ($g = 10 \text{ m/s}^2$)

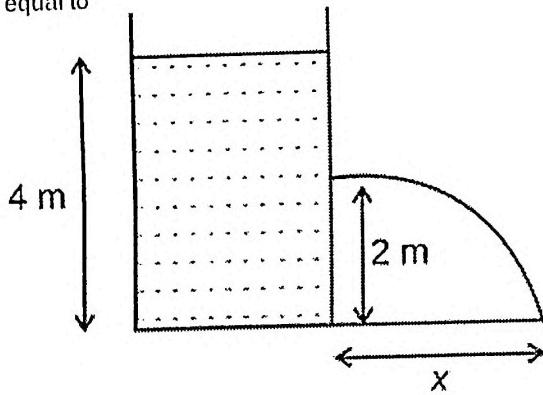
- (1) 2 m/s
- (2) 4 m/s
- (3) 6 m/s
- (4) 8 m/s

23. The increasing order of normal reaction applied by the base of vessels on the liquid are (Given base area $A_A < A_B < A_C$)



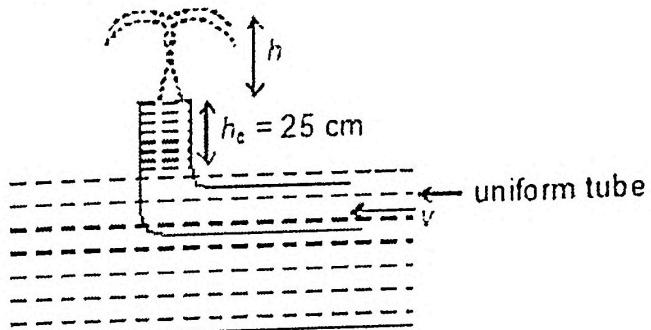
- (1) $N_A < N_B < N_C$
- (2) $N_B < N_A < N_C$
- (3) $N_A < N_C < N_B$
- (4) $N_A = N_B = N_C$

24. A drum is placed on the floor and it is filled with a liquid of almost no viscosity up to a height 4 m. A small opening is made at height 2 m from the base. The liquid jet strikes the floor at a distance x from the wall of the drum, then x is equal to



- (1) 4 m
- (2) 6 m
- (3) 8 m
- (4) $\sqrt{40}$ m

25. A bent tube is lowered into a water stream as shown in figure. The velocity of the stream relative to the tube is equal to $v = 5 \text{ m s}^{-1}$. The closed upper end of the tube has a small orifice. To what height h will the water jet spurt? ($g = 10 \text{ m s}^{-2}$)



- (1) 1.5 m
- (2) 0.25 m
- (3) 2.25 m
- (4) 1 m

26. A copper sphere has cavity inside it. The mass of the sphere is 20 kg. When completely submerged in the water (density 1000 kg/m^3), the apparent weight of the sphere is 20% less than true weight. The volume of the cavity inside the sphere is [Take, density of copper = 9000 kg/m^3 and $g = 10 \text{ m/s}^2$]

- (1) 1.77 m^3
- (2) $1.77 \times 10^{-3} \text{ m}^3$
- (3) $2.81 \times 10^{-3} \text{ m}^3$
- (4) 2.81 m^3

27. A hydraulic lift works on the principle of

- (1) Floatation
- (2) Bernoulli's principle
- (3) Pascal's law
- (4) Continuity

28. A : Bernoulli's theorem is based on energy conservation.
R : Bernoulli's theorem holds good for all liquids.

- (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.

29. Match column-I (concepts) with column-II (relevant expression), where symbols have their usual meaning.

Column-I	Column-II
a. Capillary rise in a tube	(p) $P + \frac{1}{2}\rho v^2 + \rho gh = \text{constant}$
b. Hydrostatic pressure	(q) $h = \frac{2s \cos \theta}{\rho g}$
c. Bernoulli's theorem	(r) $F_v = 6\pi \eta r v$
d. Stoke's law	(s) $\Delta P = h \rho g$

- (1) a(p), b(q), c(r), d(s)
- (2) a(q), b(s), c(p), d(r)
- (3) a(s), b(p), c(q), d(r)
- (4) a(r), b(s), c(p), d(q)

30. If a liquid drop spreads on a glass plate then the angle of contact between liquid and glass can be

- (1) 35°
- (2) 135°
- (3) 105°
- (4) 120°

31. The liquid surfaces have a tendency to contract. This phenomenon may be attributed to

- (1) Surface tension
- (2) Viscosity
- (3) Buoyancy
- (4) Capillarity

32. A small ball of mass m and density ρ is dropped in a viscous liquid of density ρ_0 . After sometime, the ball falls with constant velocity. The net force acting on the ball after it attains constant velocity, will be

- (1) $mg \left(\frac{\rho_0}{\rho} - 1 \right)$
- (2) $mg(\rho - \rho_0)$
- (3) $mg \left(1 - \frac{\rho}{\rho_0} \right)$
- (4) Zero

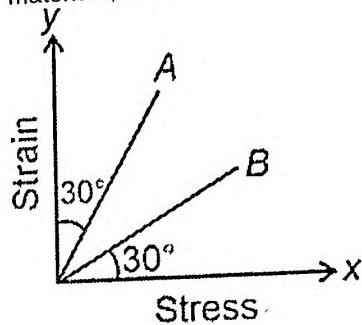
33. Relative density of a body is 0.75. The density of the body is

- (1) 1000 kg/m^3
- (2) 750 kg/m^3
- (3) 500 kg/m^3
- (4) 250 kg/m^3

34. A uniform rod of length L has mass M . If the area of cross-section is A and Young's modulus of rod is Y , then elongation in rod (suspended vertically) due to its own weight will be

- (1) $\frac{MgL}{AY}$
- (2) $\frac{MgL}{3AY}$
- (3) $\frac{MgL}{2AY}$
- (4) $\frac{2MgL}{AY}$

35. The strain-stress graph for wires A and B are as shown in the figure. If Y_A and Y_B are the Young's moduli of the materials, then



- (1) $2Y_A = Y_B$
- (2) $Y_A = Y_B$
- (3) $Y_A = 3Y_B$
- (4) $3Y_A = Y_B$

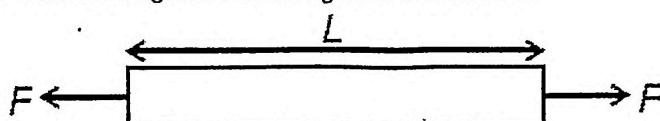
36. Which of the following quantities does not have the unit of force per unit area?

- (1) Young's modulus
- (2) Bulk modulus
- (3) Breaking stress
- (4) Longitudinal strain

37. The breaking stress of a wire depends upon

- (1) Length of the wire
- (2) Radius of the wire
- (3) Material of the wire
- (4) Shape of cross-section

38. A uniform cylindrical rod of length L , cross-sectional area A and Young's modulus Y is acted upon by two forces as shown in the figure. The elongation of the rod is



- (1) $\frac{2FL}{YA}$
- (2) $\frac{FL}{YA}$
- (3) $\frac{FL}{2YA}$
- (4) Zero

39. Bulk modulus of elasticity is defined for

- (1) Only solids
- (2) Only liquids
- (3) Only gases
- (4) All solids, liquids and gases

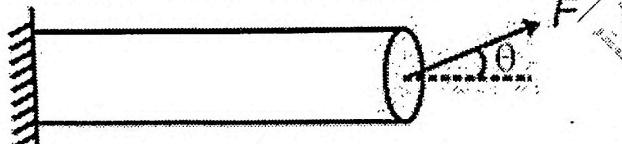
40. For a material, if the plastic region of its stress-strain curve is large then the material will be

- (1) Brittle
- (2) Ductile
- (3) Elastomers
- (4) Both (1) and (3)

41. The ratio of tensile stress to longitudinal strain is termed as

- (1) Bulk modulus
- (2) Young's modulus
- (3) Compressibility
- (4) Shear modulus

42. A force of magnitude F is applied at an angle θ from horizontal on the free end of a cylindrical bar as shown.



The shear stress developed at the given cross-section of area A will be

- (1) $\frac{F}{A}$
- (2) $\frac{F \cos \theta}{A}$
- (3) $\frac{F}{A \cos \theta}$
- (4) $\frac{F \sin \theta}{A}$

43. Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R.

Assertion (A): The unit of stress is same as that of pressure.

Reason (R): Stress is a vector quantity.

In the light of above statements, select the correct option.

- (1) Both (A) and (R) are true and (R) is the correct explanation of (A) ~~SAY IT IS~~
- (2) Both (A) and (R) are true but (R) is not the correct explanation of (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false

44. A liquid of bulk modulus B is compressed by applying an external pressure such that its density increases by 0.04%. The pressure applied on the liquid is

- (1) $\frac{B}{1000}$
- (2) $\frac{B}{2500}$
- (3) $\frac{B}{3000}$
- (4) $\frac{B}{100}$

45. Force constant of a spring (k) is analogous to (symbols have their usual meaning)

- (1) $\frac{YA}{L}$
- (2) $\frac{YL}{A}$
- (3) $\frac{AL}{Y}$
- (4) ALY

46. Consider the given statements:

Statement I : If enthalpy of atomisation of methane 1665 kJ mol^{-1} then mean bond enthalpy of C – H bond is $416.25 \text{ kJ mol}^{-1}$.

Statement II : In methane, all the four C – H bonds are equal in bond length and the energies required to break the individual C – H bonds in each successive step will also be the same.

In the light of above statements choose the correct option.

- Both the statements I and II are correct
- Both the statements I and II are incorrect
- Statement I is incorrect but statement II is correct
- Statement I is correct but statement II is incorrect

47. An ideal gas is allowed to expand isothermally against a constant external pressure of 2.5 atm from an initial volume of 2.5 L to final volume of 4.5 L. The change in internal energy for this process is

- -505 J
- 505 J
- 113.625 J
- 0 J

48. Which of the following has zero value of standard molar enthalpy of formation?

- S (monoclinic)
- C (diamond)
- $\text{H}_2(\text{g})$
- $\text{O}_3(\text{g})$

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

- 27
- 30
- 300
- 270

50. ΔH for $\text{CaCO}_3(\text{s}) \rightarrow \text{CaO}(\text{s}) + \text{CO}_2(\text{g})$ is 176 kJ mol^{-1} at 1240 K . The ΔU for the above change is equal to

- 150 kJ
- 165.7 kJ
- 186.3 kJ
- 180.0 kJ

51. Match List I with List II.

List-I (Process)	List-II (Conditions)
A. Isothermal process	I. No heat exchange
B. Isochoric process	II. Carried out at constant temperature
C. Isobaric process	III. Carried out at constant volume
D. Adiabatic process	IV. Carried out at constant pressure

Choose the correct answer from the options given below:

- A-IV, B-III, C-II, D-I
- A-IV, B-II, C-III, D-I
- A-I, B-II, C-III, D-IV
- A-II, B-III, C-IV, D-I

52. Heat of reaction for $\text{C}_6\text{H}_{12}\text{O}_6(\text{s}) + 6\text{O}_2(\text{g}) \rightarrow 6\text{CO}_2(\text{g}) + 6\text{H}_2\text{O}(\text{l})$ at constant pressure is -651 kcal at 17°C . The heat of reaction at constant volume at 17°C is

- -551 kcal
- -651 kcal
- -350 kcal
- -710 kcal

53. 2 mole of an ideal gas at 127°C undergoes expansion isothermally and reversibly from 1 litre to 10 litre. The entropy change in the process is

- 38.29 J/K
- 32.94 J/K
- 46.34 J/K
- 44.44 J/K

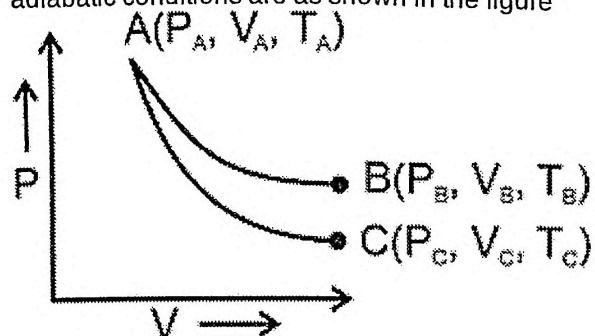
54. For the reaction, $3\text{A}(\text{g}) + 3\text{B}(\text{s}) \rightarrow 3\text{C}(\text{g})$, if $\Delta U^\circ = -20 \text{ kJ}$ and $\Delta S^\circ = -80 \text{ JK}^{-1}$, then value of ΔG° at 298 K will be

- 2.87 kJ
- 3.84 kJ
- 5.67 kJ
- 1.28 kJ

55. The enthalpy of formation of XY is -100 kJ mol^{-1} . If the bond dissociation enthalpy of X_2 and Y_2 are 20 and 40 kJ mol^{-1} respectively then bond dissociation enthalpy of XY (in kJ mol^{-1}) is

- 70
- 200
- 50
- 130

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



Identify the correct option regarding the above-mentioned P – V curve.

- AB is an adiabatic expansion process
- $\Delta S_{AB} > \Delta S_{AC}$
- AC an isothermal expansion process
- $T_C = T_B$

57. The intensive property among the following is

- Density
- Volume
- Mole
- Mass

58. The heat of combustion of P_4 (white) to $P_4O_{10}(s)$ is $-x\text{ kJ mol}^{-1}$. The heat released upon formation of 142 g of P_4O_{10} is

- $1000x\text{ J}$
- $250x\text{ J}$
- $100x\text{ J}$
- $500x\text{ J}$

59. In which case change in entropy is positive?

- Compression of gas at constant temperature
- $2H(g) \rightarrow H_2(g)$
- Stretching of rubber
- Boiling of egg

60. If a process is spontaneous at only high temperature, then

- $\Delta H < 0$ and $\Delta S > 0$
- $\Delta H > 0$ and $\Delta S > 0$
- $\Delta H > 0$ and $\Delta S < 0$
- $\Delta H < 0$ and $\Delta S < 0$

61. Given below are two statements

Statement I: Magnitude of work done in adiabatic expansion is more than work done in isothermal expansion.
Statement II: If temperature of a crystalline solid is raised from 0 K to 115 K, entropy increases.

In the light of above statements, choose the most appropriate answer from the options given below

- Statement I is correct but statement II is incorrect
- Statement I is incorrect but statement II is correct
- Both statement I and statement II are correct
- Both statement I and statement II are incorrect

62. ΔC_H° for butane is -2658 kJ mol^{-1} . The amount of heat released by complete combustion of 5.8 g of butane is

- 265.8 kJ
- 458.2 kJ
- 1329 kJ
- 2652.2 kJ

63. If the enthalpy of hydrogenation of cyclohexene is $-x\text{ kJ mol}^{-1}$ and resonance energy of benzene is $-y\text{ kJ mol}^{-1}$ then enthalpy of hydrogenation of benzene in kJ mol^{-1} will be

- $(-x - y)$
- $(-3x - y)$
- $(-3x + y)$
- $(x + y)$

64. Which of the following reactions represents standard enthalpy of formation of $HBr(g)$?

- $H_2(g) + Br_2(g) \rightarrow 2HBr(g)$
- $\frac{1}{2}H_2(g) + \frac{1}{2}Br_2(g) \rightarrow HBr(g)$
- $\frac{1}{2}H_2(g) + \frac{1}{2}Br_2(l) \rightarrow HBr(g)$
- $H_2(g) + Br_2(l) \rightarrow 2HBr(g)$

65. Which among the following are state functions?

- q
 - w
 - $q + w$
 - ΔH
 - ΔS
- (a) and (b) only
 - (a), (b) and (c) only
 - (c), (d) and (e) only
 - (b), (d) and (e) only

66. 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.

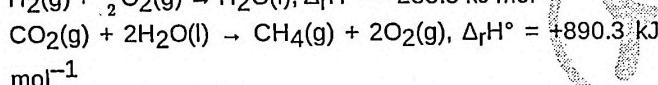
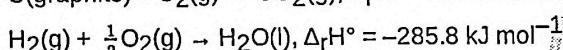
In the light of above statements choose the correct option given below.

- (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

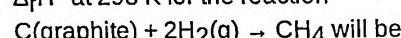
67. If the bond energies of H-H, I-I and H-I are x, y and z kJ mol^{-1} respectively, then ΔH° for the reaction, $\text{H}_2(\text{g}) + \text{I}_2(\text{g}) \rightarrow 2\text{HI}(\text{g})$ in kJ mol^{-1} will be

- (1) $2x + 2y - z$
- (2) $x + y - 2z$
- (3) $2x + y - 2z$
- (4) $x + y - 4z$

68. $\text{C(graphite)} + \text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g}), \Delta_f H^\circ = -393.5 \text{ kJ mol}^{-1}$

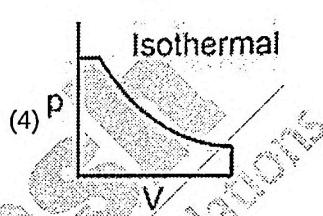
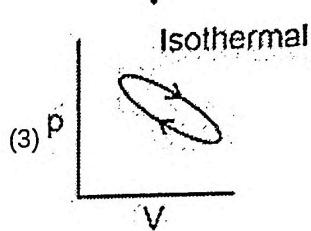
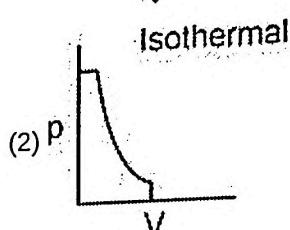
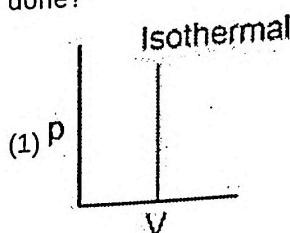


Based on the above thermochemical equation the value of $\Delta_f H^\circ$ at 298 K for the reaction



- (1) $-74.8 \text{ kJ mol}^{-1}$
- (2) $-144.0 \text{ kJ mol}^{-1}$
- (3) 74.8 kJ mol^{-1}
- (4) $144.0 \text{ kJ mol}^{-1}$

69. Which of the following p-V curve represents maximum work done?



70. A gas is allowed to expand in an insulated container against a constant external pressure of 4.0 atm from an initial volume of 0.75 L to a final volume of 6.75 L. The change in internal energy of the gas will be

- (1) -2.43 kJ
- (2) -3.21 kJ
- (3) -1.32 kJ
- (4) -5.45 kJ

71. Which one among the following is the correct option for right relationship between C_P and C_V for one mole of ideal gas?

- (1) $C_V = R C_P$
- (2) $C_P + C_V = R$
- (3) $C_P - C_V = R$
- (4) $C_P = R C_V$

72. For the reaction,
 $N_2H_2(g) + H_2(g) \rightarrow N_2H_4(g)$, $\Delta_rH^\circ = -109 \text{ kJ/mol}$

The bond energy of (N – N) bond will be

Given : BE of (N = N) = 400 kJ/mol

BE of (H – H) = 436 kJ/mol

BE of (N – H) = 391 kJ/mol

(1) 163 kJ/mol

(2) 206 kJ/mol

(3) 90 kJ/mol

(4) 360 kJ/mol

73. The molar heat capacity of water at constant pressure P is $75 \text{ JK}^{-1} \text{ mol}^{-1}$. When 1 kJ of heat is supplied to 100 g of water, the increase in temperature of water is

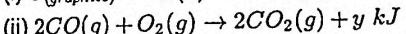
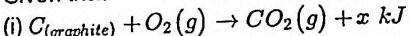
(1) 0.24 K

(2) 0.13 K

(3) 1.2 K

(4) 2.4 K

74. Given that



Then the enthalpy of formation of CO(g) is

(1) $y - x$

(2) $\frac{y-2x}{2}$

(3) $\frac{x-2y}{2}$

(4) $x + y$

75. Heat necessary to raise the temperature of 54.0 g of aluminium from 45°C to 55°C will be (Molar heat capacity of Al is $24 \text{ J mol}^{-1} \text{ K}^{-1}$)

(1) 0.62 kJ

(2) 0.31 kJ

(3) 0.48 kJ

(4) 0.37 kJ

76. 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

77. A system on absorbing heat of 1000 cal does work equivalent to 2000 cal by expanding against atmospheric pressure. The change in internal energy of the system is
- (1) + 1000 cal
 - (2) + 3000 cal
 - (3) - 3000 cal
 - (4) - 1000 cal

78. Bomb calorimeter is used to measure

(1) ΔH

(2) ΔS

(3) W

(4) ΔU

79. Given below are two statements

Statement-I: Heat evolved on neutralisation of 0.1 mol HCl and 0.1 mol NaOH in aqueous medium is nearly 5.71 kJ.

Statement-II: Heat of neutralisation of acid and base is always $-57.1 \text{ kJ mol}^{-1}$.

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

80. 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) $\Delta H > 0, \Delta S > 0$

81. At 47°C , latent heat of fusion of a compound is 11.2 kJ/mol . The entropy change for fusion process of the compound is

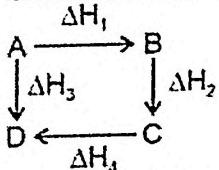
(1) 20 J/mol-K

(2) 45 J/mol-K

(3) 35 J/mol-K

(4) 10 J/mol-K

82. Consider the following reaction path



The correct relation of enthalpies is

(1) $\Delta H_1 + \Delta H_3 = \Delta H_2 - \Delta H_4$

(2) $\Delta H_1 + \Delta H_2 = \Delta H_3 - \Delta H_4$

(3) $\Delta H_1 + \Delta H_4 = \Delta H_2 + \Delta H_3$

(4) $\Delta H_1 + \Delta H_4 = 2\Delta H_2 - 3\Delta H_3$

83. If $\Delta_f G^\circ$ for any reaction is -2.303 J then, the value of equilibrium constant K is

- (1) 10^{RT}
- (2) $10^{2.303/RT}$
- (3) $10^{1/RT}$
- (4) $10^{RT/2.303}$

84. 10 moles of an ideal gas expanded adiabatically into vacuum. Change in internal energy of the system will be (R = Universal gas constant)

- (1) 0
- (2) R
- (3) $10R$
- (4) $\frac{R}{10}$

85. Given below are two statements

Statement I: Adiabatic expansion results into cooling of system.

Statement II: Enthalpy of system remains constant during isothermal expansion of an ideal gas.

In the light of the 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

86. Consider the following statements about reversible process.

- (a) System and surroundings are always in near equilibrium with each other.
 - (b) Process can be reversed by an infinitesimal change, at any moment.
 - (c) It proceeds very fast.
- Correct statements is/are

- (1) (a) and (b) only
- (2) (a), (b) and (c)
- (3) (a) and (c) only
- (4) (b) only

87. 0.2 mol of an ideal gas require 12 calories to raise its temperature by 10°C at constant volume. Find out molar heat capacity at constant pressure.

- (1) 4 cal
- (2) 6 cal
- (3) 8 cal
- (4) 10 cal

88. What is the molar heat capacities of isothermal and adiabatic process respectively?

- (1) $\infty, 0$
- (2) $0, 0$
- (3) $\infty, 1$
- (4) $0, \infty$

89. If enthalpy change for the reaction $4P(g) \rightarrow P_4(g)$ is $-x \text{ kJ mol}^{-1}$, then the bond dissociation energy of P – P bond (in kJ mol^{-1}) is

- (1) x
- (2) $\frac{x}{4}$
- (3) $\frac{x}{6}$
- (4) $4x$

90. 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

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. In arid regions, a fleshy cylindrical modified stem, which carries out photosynthesis can be found in

- (1) Grapevines
- (2) *Opuntia*
- (3) *Colocasia*
- (4) *Euphorbia*

93. Pneumatophores differ from prop roots as the former
 (1) Arises from the lower node of the stem for support
 (2) Can get swollen and store food
 (3) Are the hanging structures of the banyan tree
 (4) Grows vertically upward to get oxygen for respiration

94. Select the odd one out w.r.t. zygomorphic flowers.

- (1) *Datura*
- (2) *Cassia*
- (3) Gulmohur
- (4) Bean

95. The ornamental plant of Solanaceae family is

- (1) Lupin
- (2) *Petunia*
- (3) Tulip
- (4) *Gloriosa*

96. Find the incorrectly matched pair w.r.t. symbols used in floral formula.

- (1) C_n : Gamopetalous corolla
- (2) G_n : Apocarpous ovary

(3)  : Epitepalous stamens

(4)  : Epiphyllous stamens

97. Mango exemplifies (A) type of fruit.

Select the option to correctly fill (A).

- (1) Berry
- (2) Drupe
- (3) Capsule
- (4) Legume

98. Testa and tegmen are

- (1) Cotyledons of monocot seed
- (2) Respectively outer and inner layers of seed coat
- (3) Developed from the ovary wall
- (4) Enveloped by endosperm

99. Select the odd one out w.r.t. alternate phyllotaxy.

- (1) China rose
- (2) Mustard
- (3) Sunflower
- (4) Guava

100. The fruits of mango and coconut develop from

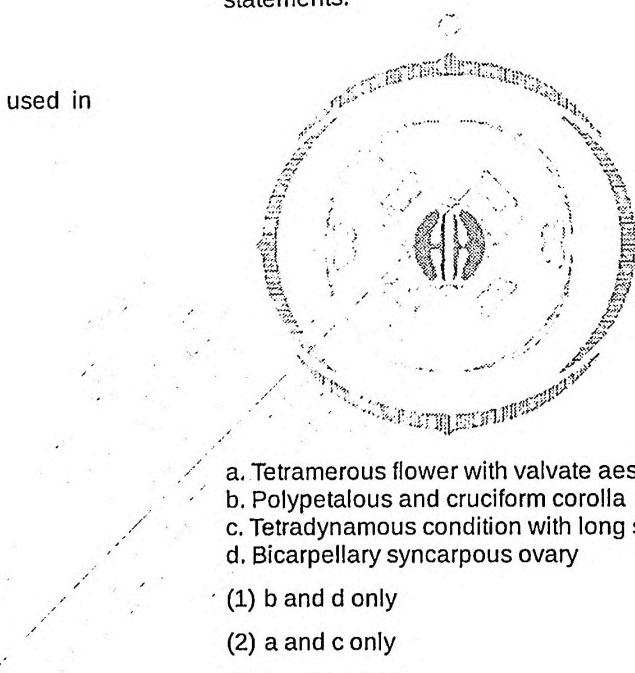
- (1) Monocarpellary superior ovary
- (2) Monocarpellary inferior ovary
- (3) Multicarpellary superior ovary
- (4) Multicarpellary inferior ovary

101. The family with floral formula

$\frac{1}{2} K_{(5)} C_{1+2+(2)} A_{(9)+1} G_1$
is

- (1) Fabaceae
- (2) Solanaceae
- (3) Liliaceae
- (4) Brassicaceae

102. Consider the given floral diagram and select the correct statements.



- a. Tetramerous flower with valvate aestivation in calyx
- b. Polypetalous and cruciform corolla
- c. Tetrady namous condition with long stamens at periphery
- d. Bicarpellary syncarpous ovary

- (1) b and d only
- (2) a and c only
- (3) b, c and d only
- (4) a and b only

103. Match the column I with column II and select the correct option.

	Column I (Types of aestivation in corolla)		Column II (Examples)
(a)	Valvate	(i)	Bean
(b)	Twisted	(ii)	Gulmohur
(c)	Imbricate	(iii)	Lady's finger
(d)	Vexillary	(iv)	<i>Calotropis</i>

- (1) a(iv), b(iii), c(i), d(ii)
- (2) a(iv), b(iii), c(ii), d(i)
- (3) a(iii), b(iv), c(ii), d(i)
- (4) a(ii), b(iii), c(iv), d(i)

104. Read the following assertion(A) and reason(R) and select the correct option.

Assertion(A): In racemose type of inflorescence, the main axis continues to grow.

Reason(R): In racemose inflorescence, the younger flowers are present towards the apex and the older ones are at the base.

- (1) (A) is true but (R) is false
- (2) Both (A) and (R) are false
- (3) Both (A) and (R) are true and (R) is the correct explanation of (A)
- (4) Both (A) and (R) are true but (R) is not the correct explanation of (A)

105. Thorns and spines of plants are similar in being

- (1) Modified structures of the same part of the plants
- (2) The structures for self defence
- (3) The structures for vegetative propagation
- (4) Perennating organs of the plant

106. Select the incorrect match

(1)	Leaf base	-	It may bear two lateral small leaf like structures
(2)	Pulvinus	-	Swollen leaf base in some leguminous plants
(3)	Leaf blade	-	In dicots, it expands into a sheath covering the stem partially or wholly
(4)	Petiole	-	When it is long, thin and flexible, it allows leaf blades to flutter in wind.

- (1) (1)
- (2) (2)
- (3) (3)
- (4) (4)

107. Read the given assertion (A) and reason (R) and choose the correct option.

Assertion (A) : The roots found in wheat plant are known as fibrous roots.

Reason (R) : In wheat, the primary root is short lived and is replaced by a large number of roots originating from base of the stem.

- (1) Both (A) and (R) are true and (R) is the correct explanation of (A)
- (2) Both (A) and (R) are true but (R) is not the correct explanation of (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false

108. Select the correct statement w.r.t. dicotyledonous seeds.

- (1) The seed coat is mostly membranous and fused with the fruit wall

The two cotyledons are often fleshy and full of reserve food materials.

In plants, such as bean and pea, the endosperm that are formed by double fertilisation remains prominent in mature seeds

The micropyle is a scar on the seed coat through which the developing seeds were attached to the fruit.

109. In silk cotton

A number of leaves are present on the midrib, which forms a common axis.

More than two leaves arise at each node and form a whorl or a circle.

The leaflets are attached to a common point at the tip of the petiole.

The leaf blade is not broken into distinct leaflets, and the incisions do not touch the midrib.

110. Aleurone layer in monocotyledonous seeds is

- (1) Triploid and is part of scutellum
- (2) Diploid and is part of embryo
- (3) Diploid and is part of endosperm
- (4) Triploid and is part of endosperm

111. Match the placentation given in Column-I with the plants given in Column-II and select the correct option.

	Column-I		Column-II
(a)	Marginal	(i)	Dianthus
(b)	Axile	(ii)	Lemon
(c)	Parietal	(iii)	Argemone
(d)	Free central	(iv)	Pea

- (1) a(iii), b(ii), c(iv), d(i)
- (2) a(iv), b(iii), c(ii), d(i)
- (3) a(iv), b(ii), c(iii), d(i)
- (4) a(i), b(ii), c(iv), d(iii)

112. Parthenocarpic fruits develop from

- (1) Floral parts other than ovary
- (2) Ovary without fertilization
- (3) Fertilized ovule without the involvement of ovary
- (4) Swollen part of pedicels only

113. In monocotyledonous seeds, the plumule and radicle are enclosed in sheath which are called A and B respectively

- (1) A- Coleoptile, B- Coleorhiza
- (2) A- Coleorhiza, B- Coleoptile
- (3) A- Scutellum, B- Aleurone layer
- (4) A- Aleurone layer, B- Scutellum

114. How many plants among mustard, china rose, brinjal, Petunia, plum, guava and peach have hypogynous flower?

- (1) Four
- (2) Five
- (3) Two
- (4) Three

115. On the basis of following characters select the correct plant family from the options given below.

- (A) Flowers are bisexual and actinomorphic.
- (B) Sepals five, united and show valvate aestivation.
- (C) Stamens five, epipetalous.
- (D) Placenta swollen with many ovules and placentation is axile.
- (E) Seeds are endospermous.

- (1) Liliaceae
- (2) Fabaceae
- (3) Poaceae
- (4) Solanaceae

116. All are the main functions of root, except

- (1) Absorption of water and minerals.
- (2) Performs photosynthesis
- (3) Synthesis of plant growth regulators
- (4) Storing reserve food material

117. In roots, the zone which is proximal to the region of elongation

- (1) Has epidermal cells that form thread like root hairs
- (2) Has thick walled cells that divide repeatedly
- (3) Is covered by a thimble-like structure
- (4) Has cells that undergo enlargement for growth of root in length

118. Stamens are united into two bundles in the flower of

- (1) China rose
- (2) Pea
- (3) Citrus
- (4) Solanum

119. In Primrose

- (1) Ovules are borne on central axis and septa are absent in the ovary
- (2) Ovary is one-chambered but false septum is present
- (3) Ovules develop on the inner wall of the ovary
- (4) Placenta forms a ridge along the ventral suture of ovary

120. State True (T) or False (F) to the given statements.

- (A) In *Monstera*, roots arise from parts of the plant other than radicle.
 - (B) The flowers are borne in an acropetal succession in Solanaceae.
 - (C) Strawberry fruit develops from polycarpellary, apocarpous ovary.
 - (D) There may be a variation in the length of filaments of stamens within a mustard flower.
- Choose the correct option.

- (1) A-(F), B-(F), C-(T), D-(F)
- (2) A-(T), B-(F), C-(T), D-(T)
- (3) A-(T), B-(T), C-(F), D-(T)
- (4) A-(T), B-(F), C-(F), D-(F)

121. Keel, wings and standard petals are seen in the flower of

- (1) Aloe
- (2) Pea
- (3) Tomato
- (4) Chilli

122. Read the following statements and select the correct option.

- Statement A:** A flower is a modified shoot wherein the shoot apical meristem changes to floral meristem.
Statement B: When the shoot tip transforms into a flower it is always solitary.

- (1) Only statement A is correct
- (2) Only statement B is correct
- (3) Both statements are incorrect
- (4) Both statements are correct

123. When stamens are united in a single bundle then it is called

- (1) Monoadelphous
- (2) Monothealous
- (3) Monoecious
- (4) Conjoint

124. Staminode is

- (1) Modification of petiole
- (2) Fleshy stem
- (3) A sterile stamen
- (4) Flattened stem

125.The placentation in which ovules are born on central axis and septa are absent in the ovary is

- (1) Axile
- (2) Parietal
- (3) Basal
- (4) Free central

126.Berry fruit with persistent calyx is a feature of

- (1) Liliaceae
- (2) Fabaceae
- (3) Solanaceae
- (4) Brassicaceae

127.Read the following statements and select the option for correct set of statements.

- (a) Ovary in plum is half inferior.
- (b) In mustard plant, flowers are borne in basipetal succession.
- (c) During the formation of floral meristem, the axis condenses and internodes do not elongate.
- (d) In *Solanum* and *Dianthus* the main axis continue to grow indefinitely

- (1) (a) & (c)
- (2) (b) & (d)
- (3) (a) & (d)
- (4) (b) & (c)

128.Non-endospermous seeds

- (1) Never have embryo with two cotyledons
- (2) Are not produced by double fertilisation
- (3) Are present in bean and gram
- (4) Have triploid nutritive tissue at maturity

129.In a floral formula, K stands for

- (1) Corolla
- (2) Calyx
- (3) Carpel
- (4) Keel

130.Non-essential appendages of flowers are

- (1) Sepals and petals
- (2) Sepals and carpels
- (3) Sepals and gynoecium
- (4) Androecium and gynoecium

131.The standard petal of a papilionaceous corolla is also called

- (1) Pappus
- (2) Vexillum
- (3) Corona
- (4) Carina

132.Simple leaf differs from compound leaf in

- (1) Being green and photosynthetic
- (2) Having bud in the axil of petiole
- (3) Having rachis representing midrib
- (4) Having entire or incised lamina, not divided into leaflets

133.Select the correct features regarding roots.

- a. Root does not have nodes and internodes.
- b. The root bears unicellular root hairs.
- c. Lateral roots are always exogenous in origin.
- d. Usually the root is non-green in colour.

- (1) a, b and c
- (2) b, c and d
- (3) c and d
- (4) All except c

134.When the sepals are fused in a flower, it is called

- (1) Gamopetalous
- (2) Polysepalous
- (3) Gamosepalous
- (4) Polystepalous

135.The outermost whorl of flower is characterised by which of the given features?

- (a) Generally brightly coloured to attract insects for pollination.
- (b) Has role in protection of flower in bud stage.
- (c) Shows valvate type of aestivation in *Solanum*.
- (d) Varies greatly in shape and composed of petals.

Choose the option for correct one(s).

- (1) (a) and (c) only
- (2) (b) only
- (3) (b) and (c) only
- (4) (a), (b) and (d) only

136. Na^+ is least likely to be reabsorbed from which of the following parts of nephron?

- (1) PCT
- (2) DCT
- (3) Ascending limb of loop of Henle
- (4) Descending limb of loop of Henle

137. Kidneys are located close to the dorsal inner wall of the abdominal cavity between the levels of

- (1) 12th thoracic and 3rd lumbar vertebra
- (2) 7th thoracic and 3rd lumbar vertebra
- (3) Last sacral and 1st caudal vertebra
- (4) 1st lumbar and 5th lumbar vertebra

138. The cross bridge formation during muscle contraction occurs just after

- (1) Adrenaline are released at the neuromuscular junction
- (2) Release of Ca^{2+} in the sarcoplasmic reticulum
- (3) Hydrolysis of ADP by the globular head of myosin that act as ATPase
- (4) Binding of Ca^{2+} to a subunit of troponin

139. Dehydration increases the plasma concentration of all the following hormones, except

- (1) Aldosterone
- (2) Vasopressin
- (3) Angiotensin II
- (4) Atrial natriuretic factor

140. 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

141. Select the correct option to complete the analogy w.r.t. the reabsorption of substances by renal tubular epithelial cells in humans.

Active transport : Sodium ions : : Passive transport :

- (1) Glucose
- (2) Nitrogenous wastes
- (3) Valine
- (4) Glutamic acid

142. Choose the correct pair of substances responsible for maintaining the osmolarity gradient in the medullary interstitium of kidney.

- (1) NaCl and HCl
- (2) NaCl and urea
- (3) Urea and KCl
- (4) KCl and NaCl

143. During micturition, all of the given events occur, except

- (1) Contraction of skeletal muscles of urinary bladder
- (2) Relaxation of urethral sphincter
- (3) Release of urine
- (4) CNS passes motor messages to the wall of urinary bladder

144. Which part of nephron reabsorbs maximum water even in the presence of anti-diuretic hormone?

- (1) Distal convoluted tubule
- (2) Proximal convoluted tubule
- (3) Henle's loop
- (4) Bowman's capsule

145. Which segment allows passage of small amounts of urea into the medullary interstitium to keep up the osmolarity of medullary interstitium?

- (1) PCT
- (2) Collecting duct
- (3) DCT
- (4) Henle's loop

146. How many of the actions given in the box below involve both locomotion and movement of animals?

Search of food, search of shelter, search of mate, peristalsis, swallowing

Choose the correct option.

- (1) Four
- (2) Three
- (3) Two
- (4) Five

147.If we compare the volume of the filtrate formed per day with that of the urine released per day in a healthy adult human under normal physiological conditions, then the ratio obtained will be most likely

- (1) 99 : 1
- (2) 100 : 1
- (3) 120 : 1
- (4) 200 : 1

148.Based on the location, muscles are classified as

- (1) Voluntary and involuntary
- (2) Striated and smooth
- (3) Skeletal, smooth and cardiac
- (4) Skeletal, visceral and cardiac

149.JGA is a special sensitive region formed by cellular modifications in the 'X' and 'Y' at the location of their contact. Identify 'X' and 'Y' respectively and select the correct option.

- (1) Distal convoluted tubule, afferent arteriole
- (2) Distal convoluted tubule, efferent arteriole
- (3) Proximal convoluted tubule, afferent arteriole
- (4) Proximal convoluted tubule, efferent arteriole

150.On an average, A gm of urea is normally excreted out per day in humans. Select the option that correctly fills the blank A.

- (1) 100-200
- (2) 50-100
- (3) 25-30
- (4) 200-300

151.In counter current mechanism, NaCl is transported by the ascending limb of Henle's loop which is exchanged with the

- (1) Descending limb of Henle's loop
- (2) Desceding limb of vasa recta
- (3) Ascending limb of vasa recta
- (4) Distal convoluted tubule

152.In mammals, the most toxic nitrogenous excretory waste, named 'X', produced by metabolic reactions is converted into _____ in _____. Select the correct option to fill in the blanks respectively.

- (1) Uric acid; Kidney
- (2) Urea; Liver
- (3) Ammonia; Kidney
- (4) Ammonia Liver

153.Read the following statements.

Statement A: The HMM component i.e. head and short arm project outward from the surface of polymerised myosin filament and is known as cross arm.

Statement B: Heavy meromyosin does not contain tail part of a myosin monomer.

Select the correct option.

- (1) Both statements A and B are incorrect
- (2) Only statement A is correct
- (3) Only statement B is correct
- (4) Both statements A and B are correct

154.Which among the following type of muscles assist in the transportation of food through the digestive tract?

- (1) Voluntary muscles
- (2) Smooth muscles
- (3) Skeletal muscles
- (4) Striated muscles

155.Read the following statements and choose the correct answer

Statement (A): Muscle contraction is initiated by a signal sent by the central nervous system via motor neurons.

Statement (B): The length of sarcomere remains same during muscle contraction.

- (1) Both statements (A) and (B) are correct
- (2) Both statements (A) and (B) are incorrect
- (3) Only statements (A) is correct
- (4) Only statements (B) is correct

156.A motor neuron along with muscle fibres connected to it constitute a

- (1) Fasciculus
- (2) Motor unit
- (3) Somatic neural system
- (4) Sarcomere

157.Match column I and II w.r.t structure of skeletal muscle fibres and choose the correct option.

Column I	Column II
a. 'I' band	(i) Has only myosin filaments
b. 'A' band	(ii) Has only actin filaments
c. 'H' zone	(iii) Has both actin and myosin filaments
d. 'Z' line	(iv) A membrane to which actin filaments are attached

- (1) a(i), b(ii), c(iii), d(iv)
- (2) a(ii), b(iii), c(i), d(iv)
- (3) a(iii), b(iv), c(ii), d(i)
- (4) a(iv), b(i), c(iii), d(ii)

158. The first step in urine formation within kidneys of a human is

- (1) Synthesis of urea
- (2) Glomerular filtration
- (3) Selective reabsorption
- (4) Tubular secretion

159. Select the incorrect statement from the options given below.

- (1) The cells of the human body exhibit amoeboid, ciliary and muscular movements.
- (2) Muscle fibre is the anatomical unit of a muscle.
- (3) Sarcomere is the functional unit of myofibril.

Each sarcomere has one central 'A' band made of thick filaments and only one half 'I' band made of thin filaments.

160. When the muscle is in maximally contracted state, which of the given events occur?

- (a) Reduction in the length of 'I' band
- (b) Widening of the 'A' band
- (c) Disappearance of 'H' zone
- (d) The energy released from hydrolysis of ATP into ADP + P_i by myosin is utilised

Choose the correct option

- (1) a, b, c and d
- (2) a, b and c
- (3) b, c and d
- (4) a, c and d

161. How many of the substances mentioned in the box below are secreted by liver in humans?

Vitamins, Certain drugs, Bile, Degraded steroid hormones, Cholesterol, Hydrocarbon

Select the correct option.

- (1) Two
- (2) Three
- (3) Four
- (4) Five

162. Cytoplasmic streaming, a characteristic of Amoeba and white blood cells of vertebrates is caused by

- (1) Sliding microtubules
- (2) Elongating cell walls
- (3) Contracting microfilaments
- (4) Relaxing microtubules

163. Select the correct match w.r.t. organisms and their excretory structures.

(1)	Fasciola	Flame cells
(2)	Ascidia	Green glands
(3)	Amphioxus	Antennal glands
(4)	Prawn	Malpighian tubules

- (1) (1)
- (2) (2)
- (3) (3)
- (4) (4)

164. Select the incorrect option w.r.t. red muscle fibres.

- (1) Contain plenty of mitochondria
- (2) Can utilize large amount of oxygen stored in them for ATP production
- (3) Also known as anaerobic muscles
- (4) Contain less amount of sarcoplasmic reticulum

165. Assertion (A) : Na⁺ reabsorption from glomerular filtrate can occur in PCT, ascending limb of loop of Henle and collecting duct.

Reason (R) : Na⁺ is always reabsorbed by passive process in PCT, ascending limb of loop of Henle and collecting duct. In the light of above statements, choose the correct option

- (1) Both (A) and (R) are true and (R) is the correct explanation of the (A)
- (2) Both (A) and (R) are true but (R) is not the correct explanation of the (A)
- (3) (A) is true statement but (R) is false
- (4) Both (A) and (R) are false statements

166. ATP binding site is present in

- (1) Actin
- (2) Troponin
- (3) Tropomyosin
- (4) Myosin

167. 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

168. Select the odd one w.r.t. animal/cells/tissues performing ciliary movement.

- (1) Paramecium
- (2) Epithelial lining in human trachea
- (3) Swimming of spermatozoa towards ovum in uterus
- (4) Passage of ova through fallopian tube

169. Read the features listed below.

- (a) Excitability (b) Contractility
- (c) Extensibility (d) Elasticity

How many of them are exhibited by muscle fibres present in biceps?

- (1) (a), (b), (c) only
- (2) (a), (b), (d) only
- (3) (a), (b), (c), (d)
- (4) (b), (c), (d) only

170. The specialised cells called podocytes are found in which part of a nephron?

- (1) PCT
- (2) DCT
- (3) Bowman's capsule
- (4) Collecting duct

171. Select the odd one w.r.t composition of secretions of sweat gland.

- (1) NaCl
- (2) Small amounts of urea
- (3) Lactic acid
- (4) Hydrocarbons

172. Each organised skeletal muscle in our body is made of a number of muscle bundles held together by a common collagenous connective tissue layer, called

- (1) Fascicle
- (2) Fascia
- (3) Muscle fibre
- (4) Myofibril

173. Compared to the visceral muscle fibres, the skeletal muscle fibres

- (1) Assist in the transport of food through the digestive tract by peristalsis
- (2) Are involved in locomotory actions and changes of body postures
- (3) Are striated in appearance and involuntary in nature
- (4) Have a single central nucleus

174. Mechanism of muscle contraction is best explained by the sliding filament theory. Select the incorrect statement w.r.t. it.

- (1) Breaking of cross bridge occurs when the myosin head binds to a new ATP molecule.

- (2) Myosin head bound with ADP and Pi is considered as energised state.

- (3) Formation of cross bridge occurs when Ca^{2+} level in the sarcoplasm is low and myosin head is not attached with ATP

- (4) During muscle contraction, actin and myosin filaments do not shorten but actin filaments slide over myosin filaments

175. Which of the following pair of proteins are regulatory in nature?

- (1) Actin and myosin
- (2) Troponin and actin
- (3) Tropomyosin and myosin
- (4) Troponin and tropomyosin

176. Match column I with column II and select the correct option:

Column I	Column II
(a) Ketonuria	(i) Rapid spasm in muscles
(b) Tetany	(ii) Insoluble mass of crystallised salts formed within the kidney
(c) Renal calculi	(iii) Accumulation of urea in blood
(d) Uremia	(iv) Presence of ketone bodies in urine
(1) a(ii), b(iii), c(i), d(iv)	
(2) a(i), b(ii), c(iii), d(iv)	
(3) a(iii), b(ii), c(iv), d(i)	
(4) a(iv), b(i), c(ii), d(iii)	

177. Assertion (A) : The stimulation of JG cells leads to the secretion of renin that eventually increases the blood pressure.

Reason (R) : The increase in blood pressure is the result of more reabsorption of water and decreased reabsorption of sodium from distal parts of the tubule.

In the light of above statements, select the correct option.

- (1) Both (A) and (R) are true and (R) is the correct explanation of (A)
- (2) Both (A) and (R) are true but (R) is not the correct explanation of (A)
- (3) (A) is true but (R) is false
- (4) (A) is false but (R) is true

178. Complete the following analogy

Cockroach : Malpighian tubules ; Prawn : _____
Choose the **correct** option.

- (1) Protonephridia
- (2) Green glands
- (3) Nephridia
- (4) Flame cells

179. The action mechanism of which of the following hormones acts as a check on the renin-angiotensin mechanism?

- (1) Angiotensin I
- (2) ADH
- (3) Vasopressin
- (4) ANF

180. After the process of dialysis, dialysing fluid additionally contains

- (1) Albumin
- (2) Nitrogenous wastes
- (3) Globulin
- (4) Fibrin