02/02/2020

A
CODE

Aakash
Medical | IIT-JEE | Foundations
(Divisions of Aakash Educational Services Limited)

Regd. Office**:** Aakash Tower, 8, Pusa Road, New Delhi-110005, Ph. 011-47623456

MM : 720 **Time : 3:00 Hrs**

Achiever's Course for NEET - 2020

Test - 6

Topics covered in various subjects:

Physics **:** Electric Charges and Field, Electrostatic Potential and Capacitance

Chemistry **:** Hydrocarbons, Haloalkanes and Haloarenes

Botany **:** Plant Growth and Development, Reproduction in Organisms

Zoology **:** Chemical Coordination and Integration

Instructions :

(i) Use blue/black ballpoint pen only to darken the appropriate circle.

(ii) Mark should be dark and should completely fill the circle.

(iii) Dark only one circle for each entry.

(iv) Dark the circle in the space provided only.

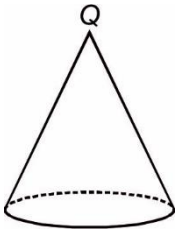
(v) Rough work must not be done on the Answer sheet and do not use **white-fluid** or any other **rubbing material** on Answer sheet.

(vi) Each question carries 4 marks. For every wrong response 1 mark shall be deducted from total score.

PHYSICS

Choose the correct answer :

1. A charge Q is kept at the vertex of a right circular cone as shown. The electric flux passing through the curved surface of cone is



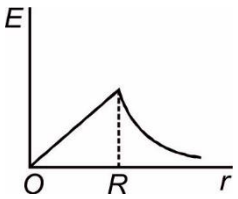
(1) $\frac{Q}{6\varepsilon_0}$

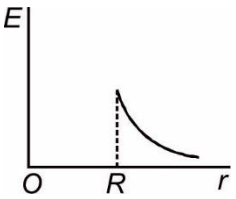
(2) More than $\frac{Q}{2\varepsilon_0}$

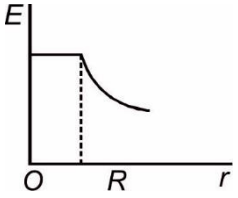
(3) Less than $\frac{Q}{2\varepsilon_0}$

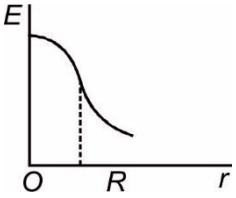
(4) Zero

2. A spherical conductor of radius R is given charge Q. The variation of Magnitude of electric field intensity E with distance r from the centre of conductor is best shown by

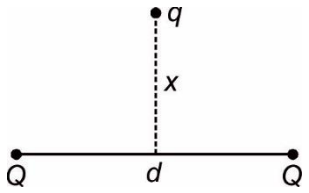
(1) 

(2) 

(3) 

(4) 

3. Two equal charges Q each are separated by a distance d. Another charge q is kept on its perpendicular bisector at a distance x from the midpoint of the line joining the two charges Q as shown in figure for maximum force on q the value of x is



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

(3) $\frac{d}{2}$ (4) $\sqrt{2}d$

4. The electric field at a distance R from the short dipole on axial line is E_1. However on the equatorial line at a distance R from dipole, it is E_2. Ratio of $\frac{E_1}{E_2}$ is approximately

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

(3) 2 (4) 8

5. An electron of charge e and mass m at rest, is accelerated through a potential difference of 2 V. The final speed of electron is

(1) $\sqrt{\frac{eV}{2m}}$ (2) $2\sqrt{\frac{eV}{m}}$

(3) $\sqrt{\frac{2eV}{m}}$ (4) $\sqrt{\frac{mV}{2e}}$

6. Two particles have identical charges Q and identical mass M are kept at initial separation L and released. Speed of each particle when they are separated by a distance $2L$ under mutual electrostatic repulsion is

(1) $\frac{Q}{2\pi\varepsilon_0 ML}$ (2) $\frac{Q}{\sqrt{8\pi\varepsilon_0 ML}}$

(3) $\frac{Q}{\sqrt{2\pi\varepsilon_0 ML}}$ (4) $\frac{Q}{\sqrt{4\pi\varepsilon_0 ML}}$

7. A particle having charge Q and mass M travels from X to Y in a uniform electric field and its velocity increases from v_1 to v_2. Then potential difference between X and Y is

(1) $\frac{M(v_2 - v_1)}{2Q^2}$ (2) $\frac{M(v_2 - v_1)}{2Q}$

(3) $\frac{M(v_2^2 - v_1^2)}{2Q}$ (4) $\frac{M(v_2^2 - v_1^2)}{2Q^2}$

8. Choose the incorrect statement regarding electrostatic field E and electric potential V.

(1) It is possible to have both $E = 0$ and $V = 0$

(2) It is possible to have $E \neq 0$ and $V \neq 0$

(3) E and V are always non-zero

(4) If $V = 0$, then E may be non-zero

9. Two charges $Q_1 = +2\ \mu C$ and $Q_2 = -8\ \mu C$ are 2 m apart. Where should you place third charge q so that it stays in equilibrium?

(1) 2 m from Q_2 (2) 2 m from Q_1

(3) 3 m from Q_2 (4) 3 m from Q_1

10. Choose the incorrect statement regarding electrostatic induction.

(1) Attraction is not possible between two charged bodies with charges of similar nature

(2) Uncharged body may be attracted to a charged body

(3) Electrostatic induction is not possible in point charges

(4) Both (2) & (3)

11. Two charges $Q_1 = 2\ \mu C$ and $Q_2 = 4\ \mu C$, of same mass, are kept some distance apart. Ratio of their acceleration if free to move is

(1) 1 : 2 (2) 1 : 4

(3) 1 : 8 (4) 1 : 1

12. Two short dipoles having dipole moments p_1 and p_2 are kept $2R$ distance apart and they apply force F on each other. If their separation is made R, then force between them is approximately

(1) $8F$ (2) $\frac{F}{8}$

(3) $\frac{F}{16}$ (4) $16F$

13. A charged coin of mass 1 g is held stationary under the effect of gravity and uniform electric field of 1 N/C. The number of electrons removed from the coin is ($g = 10\ m/s^2$)

(1) 6.25×10^{15} (2) 6.25×10^{16}

(3) 6.25×10^{18} (4) 6.25×10^{19}

14. Two identical simple pendulum with identical charges on their bobs are hanging from same point. Bobs lie at some separation due to mutual electrostatic repulsion. If the entire apparatus is submerged in some liquid, then the separation between bobs

(1) May decrease (2) Must decrease

(3) Must remain same (4) Must increase

15. Which of the following properties is not possessed by electric charge?
(1) Quantization
(2) Conserved nature
(3) Variance with speed
(4) Additive in nature

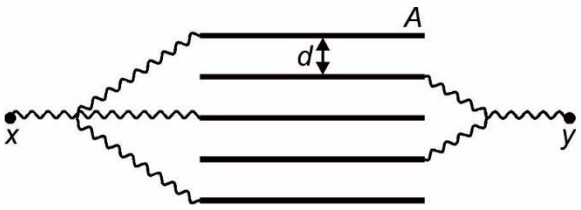
16. Choose the correct statement regarding electrostatic lines of force.
(1) They do not cross each other
(2) Crowding of lines indicates stronger electric field
(3) A charge left on electric field line follows it
(4) Both (1) & (2)

17. A charged ring of radius R carries positive charge Q. An electron at rest is released on its axis at a distance R from its centre. The motion of electron will be
(1) Oscillatory
(2) Periodic
(3) Simple harmonic
(4) Both (1) & (2)

18. An electric dipole is kept in uniform electric field
(1) It must experience no net force
(2) It may not experience net torque
(3) It must experience net force
(4) Both (1) & (2)

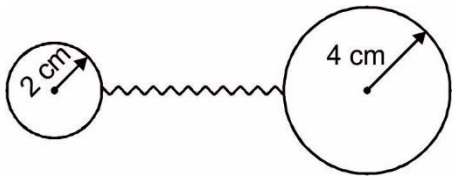
19. 1000 identical spherical drops each of potential V coalesce to form a large spherical drop. The potential of larger drop will be
(1) $10V$
(2) $100V$
(3) $1000V$
(4) V

20. Five plates each of area A are kept parallel to each other with separation d between them. They have been interconnected as shown. The equivalent capacitance between x and y is



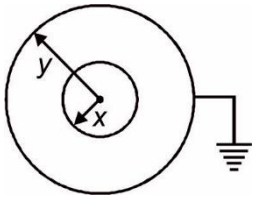
(1) $\frac{5\varepsilon_0 A}{d}$ (2) $\frac{4\varepsilon_0 A}{d}$
(3) $\frac{2\varepsilon_0 A}{d}$ (4) $\frac{\varepsilon_0 A}{d}$

21. A conducting sphere of radius 2 cm has charge 6 μC on it. Another metal sphere of radius 4 cm has no charge on it. Now the two spheres are joined by metal wire externally as shown. The charge flown through the connecting wire is



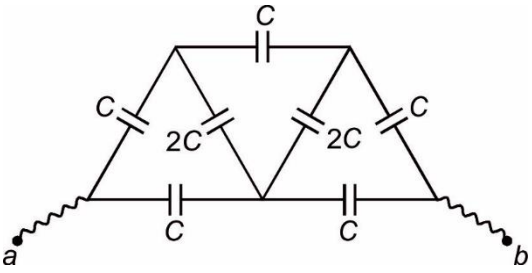
(1) 1 μC (2) 2 μC
(3) 3 μC (4) 4 μC

22. Shown in the diagram is a spherical capacitor of inner and outer radii x and y respectively ($x<y$). If outer shell is grounded, then the capacitance of the capacitor is



(1) $\frac{4\pi\varepsilon_0 x^2}{(y-x)}$ (2) $\frac{4\pi\varepsilon_0 xy}{(y-x)}$
(3) $\frac{4\pi\varepsilon_0 y^2}{(y-x)}$ (4) $4\pi\varepsilon_0 y$

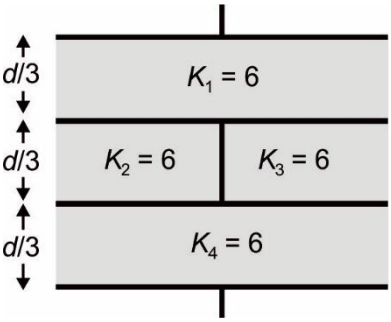
23. The equivalent capacitance of combination between points a and b in the circuit shown is



(1) $\frac{7C}{6}$ (2) $\frac{9C}{10}$
(3) $\frac{6C}{7}$ (4) $\frac{3C}{4}$

24. A capacitor C_1 = 2 μF is charged completely by 12 volt and another capacitor C_2 = 4 μF is charged completely by 3 volt. Now the positive plate of C_1 is connected to negative plate of C_2 and negative plate of C_1 is connected to positive plate of C_2. The common potential of the two capacitors is
(1) 2 V (2) 4 V
(3) 6 V (4) 3 V

25. The capacitance of an air parallel plate capacitor is C. It is now filled with dielectric as shown. The new capacitance of the capacitor will be



(1) $3C$ (2) $6C$

(3) $9C$ (4) $18C$

26. When the separation between two negative charges is increased, the electric potential energy of the system.

(1) Increases

(2) Decreases

(3) Remains the same

(4) May increase or decrease

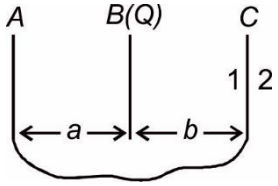
27. The electric field in a region is given by $\vec{E} = \frac{k}{x^2}\hat{i}$.

If the potential at infinity assumed to be 10 V, then the electric potential at point having coordinates (2, 2, 2) is

(1) $\frac{k}{2}+10$ (2) $\frac{k}{4}-10$

(3) $\frac{-k}{2}+10$ (4) $\frac{-k}{4}-10$

28. Charge on the face 2 of conductor C is



(1) $\frac{Qa}{b}$ (2) $\frac{Qb}{a}$

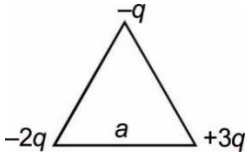
(3) $\frac{Q}{2}$ (4) $\frac{Qb}{a+b}$

29. Four particles, each having a charge q are placed at the four consecutive vertices of a regular hexagon. Distance of each corner from the centre is a. Find the electric field at the centre of the hexagon

(1) $\frac{\sqrt{3}q}{4\pi\varepsilon_0 a^2}$ (2) $\frac{q\sqrt{2}}{4\pi\varepsilon_0 a^2}$

(3) $\frac{q}{\sqrt{2}\pi\varepsilon_0 a^2}$ (4) $\frac{q}{\sqrt{3}\pi\varepsilon_0 a^2}$

30. Three charges are arranged at the vertices of an equilateral triangle as shown in figure. The dipole moment of the combination is



(1) $\sqrt{7}\,qa$ (2) $qa\sqrt{2}$

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

31. The electric potential at the equatorial point of the line joining the two charges of an electric dipole with dipole moment p will be

(1) Zero (2) p

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

32. The kinetic energy of a charged particle decreases by 10 J as it moves from a point at potential 200 V to a point at potential 250 V. Find the charge on the particle.

(1) 0.1 C (2) 0.01 C

(3) 0.2 C (4) 0.02 C

33. Electric potential V at any point having coordinate (x, y, z) in space is given by $V = x^2 + y + z^2$. The magnitude of electric field at point having coordinate (2, 4, 2) will be

(1) $\sqrt{47}$ (2) $\sqrt{33}$

(3) $\sqrt{66}$ (4) $\sqrt{24}$

34. Minimum numbers of 8 μF and 250 V capacitors required to make a combination of 16 μF and 1000 V are

(1) 64 (2) 8

(3) 16 (4) 32

35. A semicircle of length L has charge Q. The electric field at the centre of semicircle will be

(1) $\frac{Q}{4\pi\varepsilon_0 L^2}$ (2) $\frac{Q}{4\varepsilon_0 L^2}$

(3) $\frac{Q}{2\varepsilon_0 L^2}$ (4) $\frac{Q}{\varepsilon_0 L^2}$

36. Two identical pith balls, each carrying a charge q are suspended from a common point by two insulating strings of equal length l. If the mass of each ball is m then the angle between the strings is (assume a very small angular deviation)

(1) $2\left(\frac{q^2}{16\pi\varepsilon_0 mgl^2}\right)^{1/3}$ (2) $\left(\frac{q^2}{16\pi\varepsilon_0 mgl^2}\right)^{1/3}$

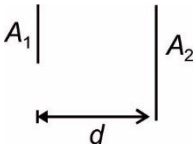
(3) $\left(\frac{q^2}{4\pi\varepsilon_0 mgl^2}\right)^{1/3}$ (4) $\left(\frac{q^2}{2\pi\varepsilon_0 mgl^2}\right)^{1/3}$

37. A proton and α-particle are thrown with same speed against a uniform electric field E. The ratio of kinetic energy after travelling same distance is

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

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

38. The capacitance of the parallel plate capacitor of plate areas A_1 and $A_2(A_1<A_2)$ at a distance d is



(1) $\varepsilon_0 \frac{(A_1 + A_2)}{2d}$

(2) $\varepsilon_0 \frac{A_2}{d}$

(3) $\varepsilon_0 \frac{\sqrt{A_1 A_2}}{d}$

(4) $\varepsilon_0 \frac{A_1}{d}$

39. There are 10 condensers each of capacity 5 μF. The ratio between maximum and minimum capacity obtained from the combination of these condensers will be

(1) 5 (2) 40

(3) 20 (4) 100

40. If dielectric constant and dielectric strength be denoted as k and E respectively, then a material suitable for use as a dielectric in a capacitor must have

(1) Low k and low E

(2) High k and high E

(3) Low k and high E

(4) High k and low E

41. Two conducting plates having large surface area are placed parallel to each other. If charge Q is given to one of the plate and other is neutral then the electric field at a point in between the plates is

(1) $\frac{Q}{A\varepsilon_0}$

(2) $\frac{Q}{2A\varepsilon_0}$

(3) $\frac{Q}{4A\varepsilon_0}$

(4) $\frac{2Q}{A\varepsilon_0}$

42. Two capacitors of capacitances C_1 and C_2 are charged to potentials V_1 and V_2 respectively. When they are connected by a conducting wire, their equivalent capacitance is

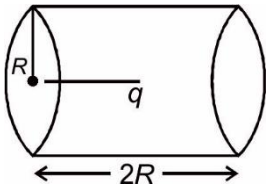
(1) $C_1 + C_2$

(2) Infinity

(3) $\frac{C_1 C_2}{C_1 + C_2}$

(4) Zero

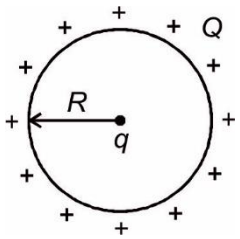
43. A charge is placed at the centre of a cylindrical surface. The total flux passing through curved surface is



(1) $\frac{q}{\varepsilon_0}$ (2) $\frac{q}{2\varepsilon_0}$

(3) $\frac{q}{\sqrt{2}\varepsilon_0}$ (4) $\frac{\sqrt{2}q}{\varepsilon_0}$

44. A charge Q is uniformly distributed on a conducting shell of radius R and another charge q is placed of the centre of the shell as shown in the figure. Electrostatic potential energy stored in the electric field of the system will be $\left(k = \frac{1}{4\pi\varepsilon_0}\right)$



(1) $\frac{kQq}{R}$ (2) $\frac{kQ^2}{2R}$

(3) $\frac{kQ^2}{R}$ (4) $\frac{kQ^2}{2R} + \frac{kqQ}{R}$

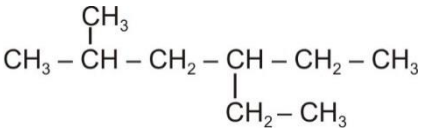
45. A parallel plate capacitor filled with a dielectric of dielectric constant k. The energy density in the volume between the plates is (Symbols have their usual meaning)

(1) $\frac{1}{2}\frac{\varepsilon_0 E^2}{k^2}$ (2) $\frac{1}{2}\frac{\varepsilon_0 E^2}{k}$

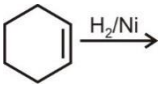
(3) $\frac{1}{2}\varepsilon_0 k E^2$ (4) $\frac{1}{2}\varepsilon_0 k^2 E^2$

CHEMISTRY

46. IUPAC name of the following organic compound is



(1) 3-Ethyl-5-methylhexane
(2) 4-Ethyl-2-methylhexane
(3) 5-Methyl-3-ethylhexane
(4) 2-Methyl-4-ethylhexane

47. 

(1) 1-methylcyclopentane
(2) 1, 2-dimethylcyclobutane
(3) Cyclohexane
(4) 1, 1-dimethylcyclobutane

48. The following reaction

$CH_4 + Cl_2 \xrightarrow{h\nu} CH_3Cl + HCl$ is initiated by

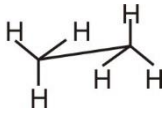
(1) $H_3\dot{C} + \dot{C}H_3 \longrightarrow CH_3 - CH_3$

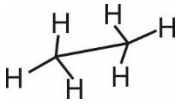
(2) $CH_3Cl + C\dot{l} \longrightarrow \dot{C}H_2Cl + HCl$

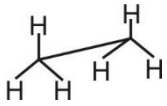
(3) $CH_4 + C\dot{l} \xrightarrow{h\nu} \dot{C}H_3 + HCl$

(4) $Cl - Cl \xrightarrow{h\nu} 2C\dot{l}$

49. Which of the following is/are sawhorse projection of staggered conformation of ethane?

(1) 

(2) 

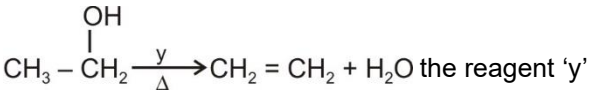
(3) 

(4) Both (1) and (2)

50. Which of the following statements about geometrical isomers of but-2-ene is incorrect?

(1) Cis form of but-2-ene is more polar than the trans form.
(2) Dipole moment of cis-But-2-ene is almost zero.
(3) Trans-But-2-ene is non-polar.
(4) The boiling point of trans-But-2-ene in less than that of cis-But-2-ene.

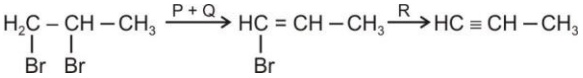
51. In the reaction,



the reagent 'y' is

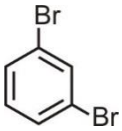
(1) Aq. KOH
(2) Alc. KOH
(3) Zn
(4) Conc. H_2SO_4

52. Consider the reaction,



P, Q and R are, respectively,

(1) $NaNH_2$, C_2H_5OH, KOH
(2) $NaNH_2$, KOH, C_2H_5OH
(3) KOH, H_2O, $NaNH_2$
(4) KOH, C_2H_5OH, $NaNH_2$

53. IUPAC name of the compound  is

(1) 2,4-Dibromobenzene
(2) 1,4-Dibromobenezene
(3) 1,3-Dibromobenzene
(4) 2,3-Dibromobenzene

54. When a primary aromatic amine, dissolved in cold aqueous mineral acid, is treated with sodium nitrite followed by reaction with cuprous chloride, it leads to preparation of chlorobenzene. This reaction is known as

(1) Finkelstein reaction
(2) Swarts reaction
(3) Sandmeyer's reaction
(4) Wurtz reaction

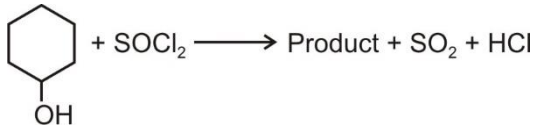
55. Consider the reaction,

$$\text{Bromomethane} \xrightarrow[H]{A} (\text{Haloalkane}) + \text{Other product}$$

A and H are, respectively

(1) NaI, $CH_3CH_2CH_2I$
(2) NaCl, CH_3CH_2Cl
(3) AgF, CH_3CH_2F
(4) Hg_2F_2, CH_3F

56. What is the product of following reaction?



(1) 1,1-Dichlorocyclohexane
(2) Chlorocyclohexane
(3) 1, 2-Dichlorocyclohexane
(4) 1,3-Dichlorocyclohexane

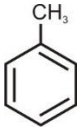
57. Which one of the following statements is incorrect?
(1) Haloalkanes are very slightly soluble in water.
(2) Haloalkanes are insoluble in all organic solvents.
(3) Bromo derivatives of hydrocarbons are heavier than water.
(4) The boiling points of isomeric haloalkanes decrease with increase in branching.

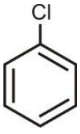
58. Methyl chloride reacts with KCN to form
(1) Ethyl isocyanide
(2) Methyl isocyanide
(3) Ethyl cyanide
(4) Methyl cyanide

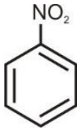
59. CH_3CH_2Br reacts with magnesium in dry ether to give
(1) CH_3CH_2MgBr
(2) $(CH_3CH_2)_2$ Mg
(3) CH_3CH_2– O – CH_2CH_3
(4) CH_3CH_2MgOH

60. Which of the following polyhalogen compounds was once used as a general anaesthetic in surgery but has been replaced by less toxic, safer anaesthetics, such as ether?
(1) CCl_4 (2) $CHCl_3$
(3) CH_2Cl_2 (4) CHI_3

61. Which of the following compound is most reactive towards electrophilic substitution reaction?

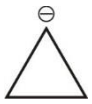
(1) 
(2) 

(3) 

(4) 

62. When propyne is treated with aqueous H_2SO_4 in presence of $HgSO_4$, the major product is
(1) Acetone
(2) Propanol
(3) Propanal
(4) Propanoic acid

63. Antiaromatic species among the following is

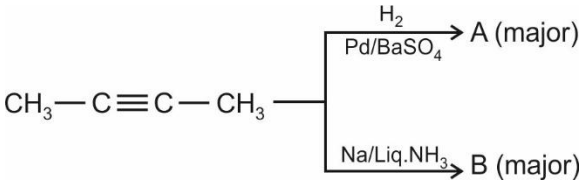
(1) 

(2) 

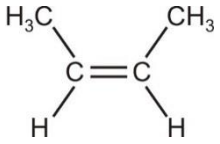
(3) 

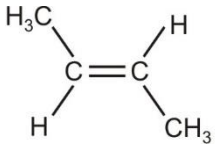
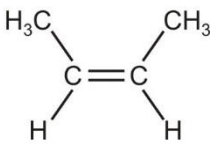
(4) 

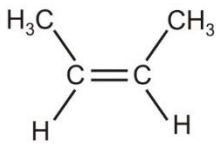
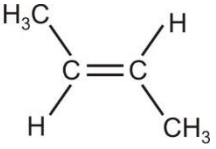
64. Consider the following reaction

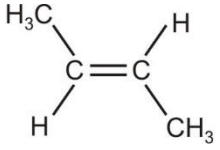
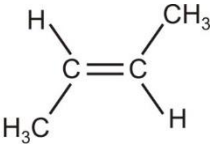


Products A and B respectively are
(1) $CH_3 – CH_2 – CH_2 – CH_3$ and

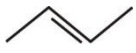
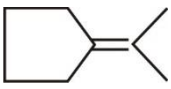
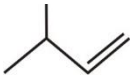


(2)  and 

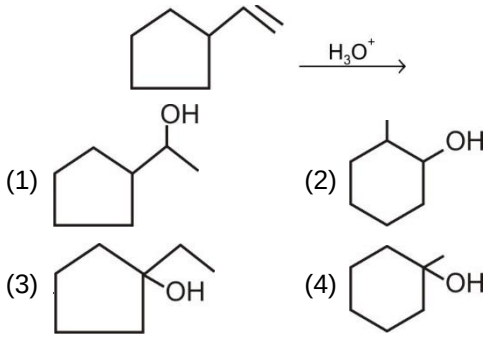
(3)  and 

(4)  and 

65. Which of the following alkenes on reductive ozonolysis gives a mixture of ketones only?

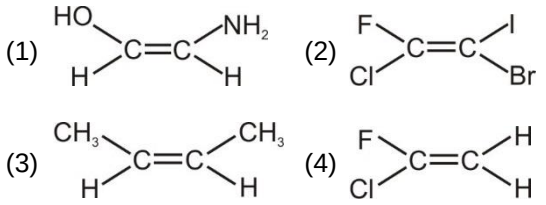
(1) 
(2) 
(3) $H_2C = C = CH_2$
(4) 

66. What is the major product of given reaction?



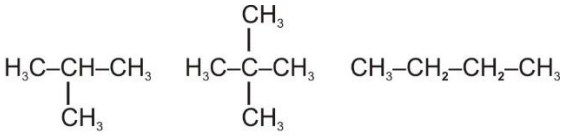
(1) (2) (3) (4)

67. Which of the following alkene can be designated as E–isomer?



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

68. Consider the following hydrocarbons



(I) (II) (III)

The correct order of boiling point is

(1) (III) > (I) > (II) (2) (I) > (II) > (III)

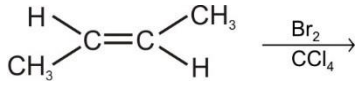
(3) (I) > (III) > (II) (4) (II) > (III) > (I)

69. Which of the following would undergo Wurtz reaction (C —C bond formation) most slowly?

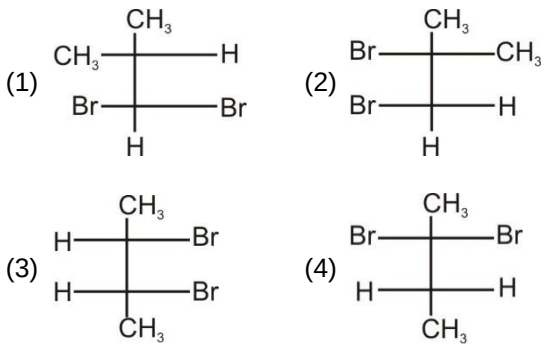
(1) CH_3Br (2) $CH_3–CH_2–Cl$

(3) $(H_3C)_3C–Cl$ (4) $CH_3CH–CH_3$ (Cl)

70.

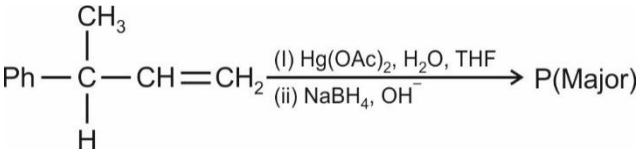


The product of above reaction is

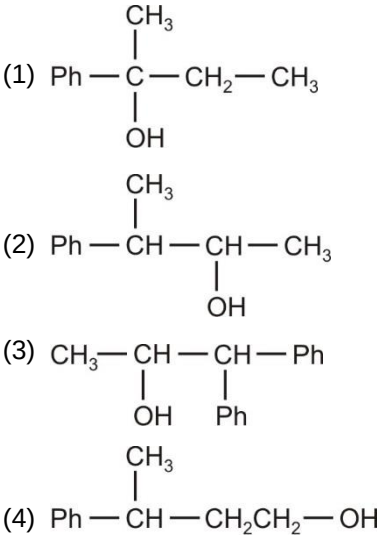


(1) (2) (3) (4)

71. Consider the following reaction

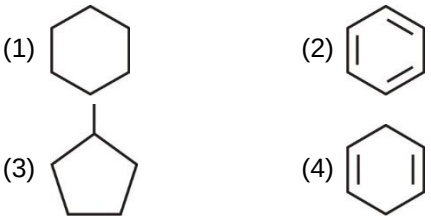


Major product P is



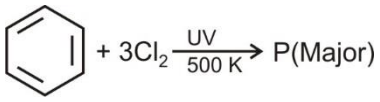
(1) (2) (3) (4)

72. When n-hexane is heated at 500°C in presence of Cr_2O_3 at 10 – 20 atm then the major product formed in the reaction is

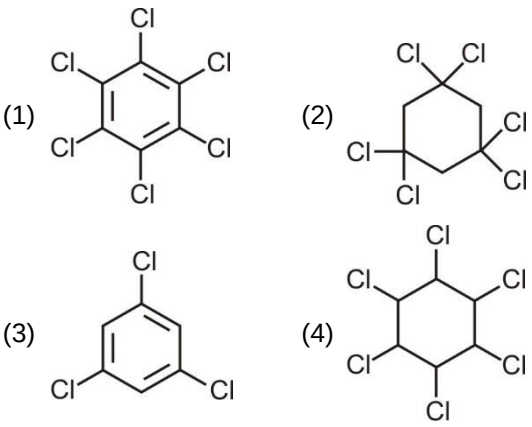


(1) (2) (3) (4)

73. Consider the following reaction

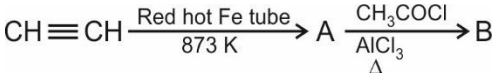


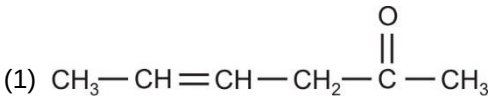
Major product P is

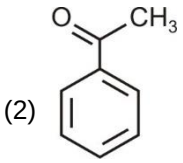


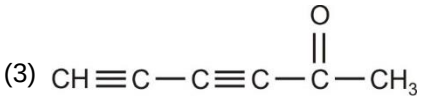
(1) (2) (3) (4)

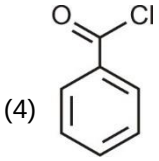
74. In the given reaction sequence the major product B is



(1) 

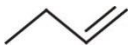
(2) 

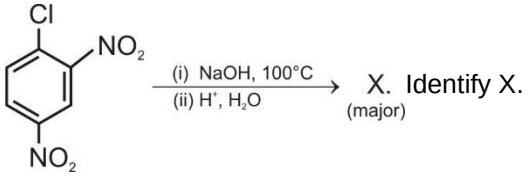
(3) 

(4) 

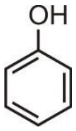
75. The compound which will not decolourise Baeyer's reagent is

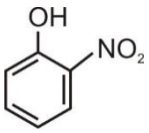
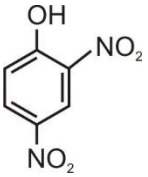
(1)  (2) 

(3)  (4) 

76.  X. Identify X.

(major)

(1)  (2) 

(3)  (4) 

77. Which among the following will react fastest by S_N2 mechanism?

(1) $MeCH_2CH_2 - Br$ (2) $CH_3 - Br$

(3) $Me_2CH - CH_2 - Br$ (4) $Me_3C - CH_2 - Br$

78. Number of optically active isomers of 2, 3-dibromopentane are

(1) 4 (2) 3

(3) 2 (4) 5

79. Correct order of nucleophilicity is

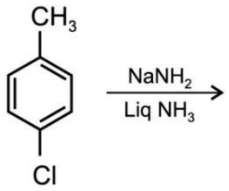
(1) $H_2O > \overset{\ominus}{O}H > CH_3COO^{\ominus}$

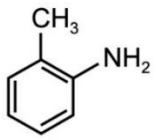
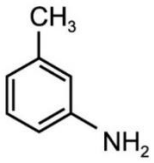
(2) $\overset{\ominus}{O}H > CH_3COO^{\ominus} > H_2O$

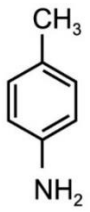
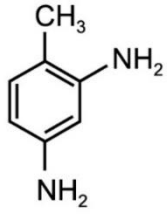
(3) $CH_3COO^{\ominus} > \overset{\ominus}{O}H > H_2O$

(4) $\overset{\ominus}{O}H > H_2O > CH_3COO^{\ominus}$

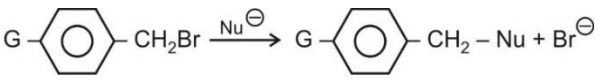
80. The major product of the given reaction will be



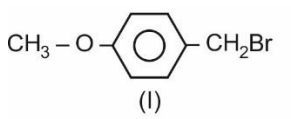
(1)  (2) 

(3)  (4) 

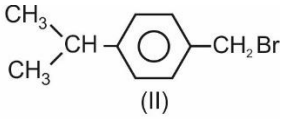
81. *para*-substituted benzyl bromide undergoes S_N1 reaction with nucleophiles.



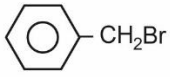
Arrange the given compounds in decreasing order of reactivity for the above reaction.



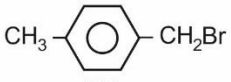
(I)



(II)



(III)



(IV)

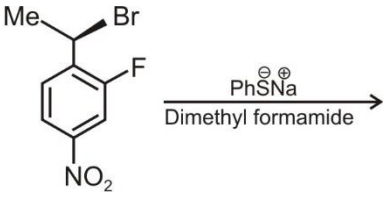
(1) (I) > (IV) > (II) > (III)

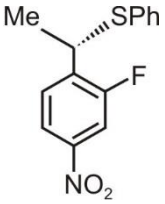
(2) (I) > (II) > (IV) > (III)

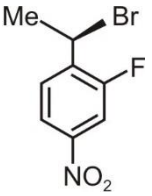
(3) (III) > (II) > (IV) > (I)

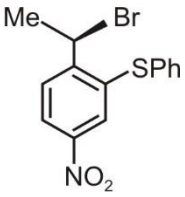
(4) (IV) > (I) > (III) > (II)

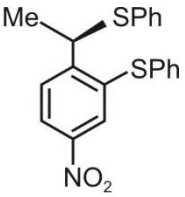
82. The major product of the following reaction is



(1) 

(2) 

(3) 

(4) 

83. Fluorobenzene (C_6H_5F) can be synthesised in the laboratory

(1) By heating phenol with HF and KF

(2) By heating arene diazonium fluoroborate

(3) By direct fluorination of benzene with F_2 gas

(4) By reacting bromobenzene with NaF solution

84. If an equimolar mixture of toluene and chlorobenzene treated with a mixture of conc. H_2SO_4 and conc. HNO_3. Then the correct statement from the following is

(1) p-nitrololuene is formed in excess

(2) Equimolar amounts of p-nitrololuene and p-nitrochlorobenzene are formed.

(3) p-nitrochlorobenzene is formed in excess

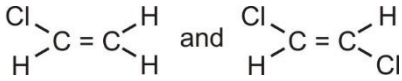
(4) m-nitrochlorobenzene is formed in excess

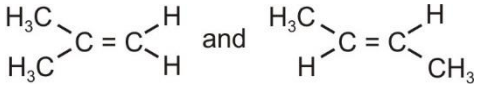
85. The rate of reaction of alkanes with halogens is maximum with

(1) F_2 (2) Cl_2

(3) Br_2 (4) I_2

86. Which of the following pair of structures are geometrical isomers to each other?

(1) 

(2) 

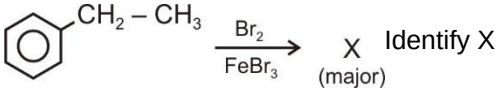
(3) 

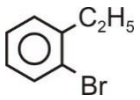
(4) 

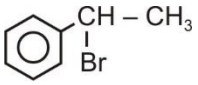
87. The group of atoms which is most deactivating is

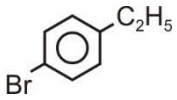
(1) $-NO_2$ (2) –Cl

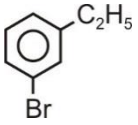
(3) –COOH (4) 

88. 

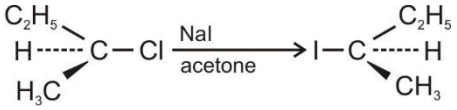
(1) 

(2) 

(3) 

(4) 

89. The given reaction

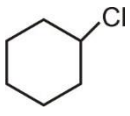


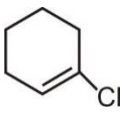
is an example of which reaction?

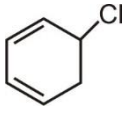
(1) S_N1 (2) S_N2

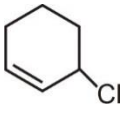
(3) E2 (4) E1

90. Elimination reaction by alcoholic KOH will be fastest in

(1) 

(2) 

(3) 

(4) 

BOTANY

91. Match the following w.r.t. PGRs and select the **correct** option.

	Column-I		Column-II
a.	ABA	(i)	Adenine derivative
b.	C_2H_4	(ii)	Acidic
c.	Kinetin	(iii)	Destruction of chlorophyll
d.	GA_3	(iv)	Breaking of dormancy

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

92. Optimum temperature for the proper growth of most of the plants is
(1) 12° C – 15° C (2) 38° C – 40° C
(3) 42° C – 45° C (4) 28° C – 30° C

93. Find the **odd** one w.r.t. synthetic auxins.
(1) 2, 4-D
(2) NAA
(3) 2, 4, 5-T
(4) IBA

94. Which of the following features are **correctly** matched?
a. Increases the size of apple and improves its shape.
b. Promote flowering in pineapple.
c. Increases length of sugarcane stem.
d. Used as weedicides.
(1) a and c – Gibberellins
(2) a, b and c – Auxins
(3) b, c, d – Cytokinins
(4) a, b, c, d – C_2H_4

95. In water-logging condition, the growth of root is inhibited due to
(1) Reduced availability of minerals
(2) Reduced availability of oxygen
(3) Increased salinity of water
(4) Increased number of harmful microbes

96. When a seed is in the state of dormancy its
(1) Metabolic activity is greatly reduced
(2) Metabolic activity is increased due to unfavourable environmental conditions
(3) Metabolic activity is increased but protein synthesis is checked
(4) Growth becomes fast and it prepares itself for germination

97. The ABA causes senescence of leaves by
(1) Accelerating DNA and RNA synthesis
(2) Increasing the rate of photosynthesis and decreasing the rate of respiration
(3) Inhibiting protein and RNA synthesis and destruction of photosynthetic pigment
(4) Inducing metabolism of proteins and DNA replication

98. All are the functions of adenine derivative phytohormone, **except**
(1) Production of new leaves
(2) Delays leaf senescence
(3) Promote shedding of leaves
(4) Division of cell

99. Choose the **mismatched** pair.
(1) Rooting hormone – Gibberellins
(2) General growth inhibitor – ABA
(3) Modified purines – Cytokinin
(4) Ripening hormone – Ethylene

100. Elongation of root at constant rate can be expressed as
(1) Arithemetic growth; S-curve ; $L_0 = L_1 + rt$
(2) Arithemetic growth; Linear growth, $L_1 = L_0 + rt$
(3) Exponential growth; S-curve; $W_t = W_0 e^{rt}$
(4) Exponential growth ; Linear growth; $W_0 = W_t e^{rt}$

101. Find the **correct** statement w.r.t. Vernalisation.
(1) Induction of flowering by only quantitative exposure to low temperature
(2) Prevents precocious reproductive developement and enables plant to reach maturity in sufficient time
(3) Site of perception is mature leaf
(4) Shown by all annuals, biennials and perennials

102. Select **incorrectly** matched pair.
(1) LDP – Flowers when light period is below critical photoperiod
(2) SDP – Soyabean
(3) DNP – Flowering throughout the year
(4) Low temperature stimulus – Perceived by mature shoot apex

103. Select the **incorrect** statement w.r.t. lifespan
    (1) Period from birth to the natural death
    (2) Necessarily correlated with the size of organism
    (3) Single celled organisms are immortal
    (4) Mango tree has a much shorter lifespan as compared to a peepal tree

104. Select the **odd** one out w.r.t. asexual reproduction
    (1) Offsprings produced by a single parent
    (2) May involve gamete formation
    (3) Produces clones
    (4) Involves complex and elaborate changes

105. Identify the **incorrect** statement.
    (1) Most algae show external fertilisation
    (2) Oogamy is present in *Fucus*
    (3) Isogamy is always associated with internal fertilisation
    (4) Zoospores have apically placed flagella

106. A diploid embryo sac is formed from megaspore mother cell of nucellus which has a diploid egg. This phenomenon is called
    (1) Adventive embryony
    (2) Recurrent agamospermy
    (3) Chalazogamy
    (4) Mesogamy

107. It is very difficult to clearly define juvenile, reproductive and senescent phases in the life cycle of _____ plants.
    (1) Annual
    (2) Biennial
    (3) Polycarpic perennial
    (4) Monocarpic perennial

108. Tapetum is associated with all of these, **except**
    (1) Polyploidy
    (2) Multinucleate condition
    (3) Pollenkitt synthesis
    (4) Dehiscence of anther

109. Which of the following can be recognised as monocarpic plants?
    a. Wheat
    b. Carrot
    c. *Strobilanthus*
    d. Rose
    The right selection is
    (1) a, b & c only (2) b & c only
    (3) All a, b, c & d (4) b, c & d only

110. Consider the following statements w.r.t. wind pollination.
    a. Quite common in grasses
    b. Light and non-sticky pollen
    c. Well exposed stamens
    d. Large, feathery stigma to trap pollen
    e. Many ovules in each ovary
    f. Solitary flower in inflorescence
    How many of the above statements are **correct**?
    (1) Three (2) Two
    (3) Four (4) All six

111. Severe allergies and bronchial afflictions in some people can be caused by the pollen grains of
    (1) Wheat (2) Rice
    (3) Carrot grass (4) Rose

112. Growth is fundamental property of living being. It is
    (1) Explained as reversible increase in size of an organ
    (2) Explained by swelling of piece of wood when placed in water
    (3) Indeterminate in plants and animals
    (4) A quantitative phenomenon

113. Plant hormone which controls xylem differentiation, also
    (1) Promotes fruit ripening
    (2) Induces internodal elongation
    (3) Causes apical dominance
    (4) Helps to produce new leaves

114. Long day plants are characterized with
    (1) Ability to flower when critical day length is not exceeded
    (2) Flowering response on treatment with auxin in absence of proper photoperiods
    (3) Requirement of long photoperiod above than critical period
    (4) Presence of certain photosynthetic pigments to respond photoperiod

115. Select the **incorrect** match.
    (1) ABA helps seed to withstand desiccation
    (2) ABA acts as antagonist to GAs
    (3) ABA stimulates closure of stomata
    (4) ABA inhibits senescence and abscission of leaves

116. Identify the naturally occurring phytohormones among the following
    (1) Kinetin (2) NAA
    (3) IAA (4) 2, 4, 5, T

117. Which of the following chemical is used as weedicide?
(1) 2, 4 - D (2) Kinetin
(3) ABA (4) GA

118. GA is found to be associated with
(1) Ripening of fruits
(2) Inducing flowering in SDPs and LDPs
(3) Activation of α-amylase
(4) Bushy nature of plants

119. Which of the following plants do **not** require low temperature treatment for flowering?
(1) Sugar beet
(2) Spring wheat
(3) Radish
(4) Winter wheat

120. Which of the following physiological response is **not** related to ethylene?
(1) Triple response
(2) Petiole elongation in deep water rice plants
(3) Flowering in mango
(4) Initiate dormancy in peanut seeds

121. In equation $W_1 = W_0e^{rt}$, W_1 represents
(1) Final size after time t
(2) Initial size at the beginning
(3) Growth rate
(4) Time of growth

122. Find the **odd** one out w.r.t. Auxin.
(1) It was first isolated from human urine
(2) It was also isolated from tips of coleoptile of oat seedlings
(3) Precursor of auxin is tryptophan (amino acid)
(4) Zeatin is a type of auxin

123. Find the **mismatched** pair.
(1) IAA – Induce parthenocarpy
(2) Callus – Cytokinin induce shoot formation
(3) ABA – Induce growth in shoot
(4) NAA – Induce flowering in litchi when used in diluted form

124. Precursor of gibberellins is
(1) Acetyl-Co A (2) Tryptophan
(3) Methionine (4) Isopentenyl adenine

125. Find the **odd** one out w.r.t. ethylene applications.
(1) Ethephon is used in artificial ripening of fruits.
(2) Used in thinning of fruits
(3) Induces sprouting of storage organs
(4) Induces male flowers

126. Which of the following is **not** true about ABA?
(1) Violaxanthin in precursor of ABA
(2) It is also known as stress hormone
(3) ABA is used to break the dormancy
(4) ABA can be used as anti-transpirant

127. Find the **odd** one out w.r.t. LDP.
(1) Wheat (2) Radish
(3) Sugar beet (4) Tobacco

128. Zoospores are
(1) Non-flagellated
(2) Non-motile
(3) Formed on conidiophore
(4) Asexual structures

129. Find the **correctly** matched pair.
(1) Tuber – *Eichhornia*
(2) Bulb – Onion
(3) Sucker – *Pistia*
(4) Runner – Pineapple

130. Heterogametes are **not** found in
(1) *Fucus* (2) *Volvox*
(3) *Chara* (4) *Ulothrix*

131. In *Marchantia* male sex organs are borne on a stalked upright receptacles called
(1) Antheridium (2) Archegonium
(3) Antheridiophore (4) Globule

132. __A__ is diploid, a vital link between two successive generations ensuring the continuity of race from generation to generation?
(1) Zygote (2) Zoospore
(3) Conidiospore (4) Ovum

133. Sexual reproduction
(1) Is always biparental
(2) Involves mitosis only for gamete formation
(3) Is a slow process
(4) Does not bring variations

134. Under unfavourable conditions some unicellular organism secrete a hard layer around themselves called
(1) Cyst and phenomenon is termed as encystation
(2) Zygote and phenomenon is termed as fertilisation
(3) Conidia and phenomenon is termed as sporulation
(4) Zoospore and phenomenon is termed as sporulation

135. *Agave* vegetatively propagate through
(1) Bulbil (2) Bulb
(3) Offset (4) Tuber

ZOOLOGY

136. Which of the following is **not** a hypothalamic hormone?
(1) Gonadotrophins (2) Somatocrinin
(3) Somatostatin (4) GnRH

137. In a non-pregnant female, the remnants of Graafian follicles after ovulation form corpus luteum which is maintained by
(1) FSH (2) LH
(3) Estrogen (4) Progesterone

138. A proteinaceous hormone secreted by thyroid gland is
(1) Triiodothyronine (2) Tetraiodothyronine
(3) Thyrocalcitonin (4) Collip's hormone

139. The process by which the synthesis of a hormone is regulated by its concentration in the blood is usually termed as
(1) Feed-forward excitation
(2) Feedback mechanism
(3) Catabolic regulation
(4) Competitive inhibition

140. Coordination through nervous system and endocrine system respectively occurs by
(1) Neurotransmitters and zymogens
(2) Sugars and neurotransmitters
(3) Neurotransmitters and hormones
(4) Neurotransmitters and enzymes

141. The adrenal corticoids have the common feature that they
(1) All are biogenic amines
(2) Alter gene expression in their target cells
(3) Enhance cAMP levels in the target cells
(4) Bind to membrane receptors on their target cells

142. Progesterone is secreted by
(1) Corpus callosum (2) Corpus luteum
(3) Adrenal medulla (4) Hypothalamus

143. Which one is **not** a tropic hormone?
(1) Prolactin (2) FSH
(3) LH (4) ACTH

144. Androgens are produced by
(1) Adrenal cortex
(2) Parathyroid gland
(3) Anterior pituitary gland
(4) Thymus

145. In females, secretion of estrogen is stimulated by
(1) FSH
(2) Thyroxine
(3) Cortisol
(4) GH

146. Which of the following would **not** result from the release of epinephrine?
(1) Decreased blood flow to skin
(2) Reduced rate and force of heart beat
(3) Increased conversion of glycogen to glucose in liver
(4) Increased breakdown of lipids

147. What would you expect in a patient who has developed a tumour in the zona glomerulosa of adrenal cortex?
(1) Increased blood sodium levels
(2) Increased blood glucose levels
(3) Decreased blood calcium levels
(4) Low blood pressure

148. Among the following, basal metabolic disorders are most directly caused by
(1) Impairment of parathyroid gland
(2) Impairment of thyroid gland
(3) Impairment of thymus gland
(4) Impairment of gonads

149. The hormone progesterone
(1) Stimulates follicle growth
(2) Stimulates FSH production
(3) Is solely responsible for the maintenance of secondary sex characters
(4) Prepare the uterus for implantation

150. When insulin is administered in a diabetic person, which of the following would be likely to occur?
(1) Increased levels of glucose in the blood
(2) Increased glucose concentration in urine
(3) Increased conversion of glucose to glycogen
(4) Dehydration due to increased micturition

151. Choose the hormone that interacts with intracellular receptors and regulates gene expression.
(1) GIP
(2) Cortisol
(3) Insulin
(4) Parathormone

152. Choose the **incorrect** option for the hormone, its source gland/cell and its nature.

	Hormone	Source	Nature
(1)	ANF	Heart	Peptide
(2)	Secretin	Duodenum	Proteinaceous
(3)	Epinephrine	Parasympathetic nerves	Catecholamine
(4)	T_3	Thyroid gland	Iodothyronine

153. The following are secondary messengers used by different hormones, **except**

(1) cAMP (2) IP_3

(3) Ca^{2+} (4) Cl^-

154. Which of the following is **not** a characteristic of a hormone?

(1) These are intercellular, chemical messengers secreted by endocrine glands and by isolated cells in endocrine organs.

(2) Hormones are highly specific in nature

(3) These are required in large amounts to exert their effect.

(4) Chemically, the hormones may be amino acid derivatives, peptides, proteins, steroids and Iodothyronines

155. Choose the **correct** explanation/definition of hormone receptors.

(1) These are proteins that can bind to specific hormones on or in target cells.

(2) These are free proteins in the plasma with hormone binding capacity.

(3) These are located in the endocrine gland where they bind with the hormone for its storage.

(4) These are always present intracellularly in the target cells.

156. The exocrine part of the pancreas is stimulated to secrete water and bicarbonate ions by

(1) Gastrin (2) CCK

(3) Secretin (4) GIP

157. Which of the following hormones will bind to a membrane receptor on its target cell and stimulate generation of second messenger?

(1) LH (2) Estrogen

(3) Cortisol (4) DHEA

158. Which of the following hormones are released from the same gland?

(1) Testosterone and progesterone

(2) Glucagon and somatostatin

(3) CRH and ACTH

(4) FSH and relaxin

159. As long as light falls on the eye and retinal neurons are stimulated, secretion of which hormone from pineal gland will be affected?

(1) Melanin

(2) Estrogen

(3) Melatonin

(4) Catecholamines

160. Select the symptoms common to both Diabetes mellitus and Diabetes insipidus.

(1) Polydipsia and Glycosuria

(2) Polyuria and Polydipsia

(3) Weight loss and Polyuria

(4) Hypoglycemia and weight loss

161. Which is **incorrectly** matched?

(1) Relaxin – Helps in parturition

(2) Parathyroid hormone – Maintains calcium ions in blood plasma

(3) Myxedema – Deficiency of adrenal hormones

(4) Thyroxine – Controls metabolism of proteins, fats and carbohydrates

162. Which gland secretes emergency hormones?

(1) Adrenal gland

(2) Thyroid gland

(3) Thymus gland

(4) Pineal gland

163. Exopthalmic goitre is a form of

(1) Hypothyroidism

(2) Hyperthyroidism

(3) Hyperparathyroidism

(4) Hypoparathyroidism

164. Which of the following is **correct** pair of antagonistic hormones?

(1) Insulin and PTH

(2) Thyroxine and epinephrine

(3) Calcitonin and PTH

(4) Estrogen and progesterone

165. Choose the **wrong** statement.

(1) Sex hormones are cholesterol derivatives

(2) ADH is antidiuretic hormone

(3) Goitre is an endocrine disorder

(4) Deficiency of thyroid hormones produces cretinism in adults

166. Irregular sleep-wake cycle is known to disrupt the activity of hormone secreted from

(1) Thymus gland (2) Pineal gland

(3) Adrenal gland (4) Ovary

167. A hormone which promotes the formation of alveoli and milk secretion through mammary gland is
(1) Aldosterone
(2) Prolactin
(3) Estrogen
(4) Progesterone

168. Choose a peptide hormone which stimulates glycogenolysis and reduces cellular glucose uptake and utilisation.
(1) Insulin (2) Glucagon
(3) Secretin (4) Gastrin

169. Select the **odd one** w.r.t. hormones secreted by endocrine cells present in different parts of the gastro-intestinal tract.
(1) GIP (2) CCK
(3) ANF (4) Secretin

170. Which of the following changes are **not** triggered by adrenaline during a fight-or-flight reaction in the body?
(1) Reduces lipolysis and proteolysis
(2) Dilation of arterioles of skeletal muscles
(3) Increase in alertness
(4) Increase in the heart rate

171. Collip's hormone is
(1) PTH (2) Calcitonin
(3) Melatonin (4) Cortisol

172. Complete the analogy by selecting **correct** option.
Triiodothyronine : Thyroid gland : Epinephrine : _____
(1) Zona reticularis
(2) Adrenal medulla
(3) Zona fasciculata
(4) Zona glomerulosa

173. GHRH stimulates ___a___ to secrete ___b___.
Choose the **correct** option.
(1) a – Pituitary, b – Thyrotropin
(2) a – Pituitary, b – Somatotropin
(3) a – Pituitary, b – Gonadotrophin
(4) a – Hypothalamus, b – Prolactin

174. A parathyroid tumour can result in all **except**
(1) Rise in the concentration of calcium ions in the plasma
(2) Softening of bones
(3) Deposition of calcium in kidney tubules
(4) Mineralisation of bones

175. Hypersecretion of growth hormone in adults results in
(1) Gigantism (2) Acromegaly
(3) Dwarfism (4) Cretinism

176. Water conservation in body is a function associated with
(1) Melatonin (2) Vasopressin
(3) GHIH (4) Glucocorticoids

177. How many of the given glands are purely endocrine?

Adrenal, Ovary, Pancreas, Testes, Thymus, Parathyroid

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

178. Select the **incorrect** statement.
(1) Iodothyronines are lipophilic
(2) The letter T in T-lymphocyte refer to thymus
(3) Diabetes insipidus is due to hormonal deficiency
(4) Leydig cells secrete testosterone under the influence of LH secreted by posterior pituitary gland

179. Read statements A and B and choose the **correct** option.
A: Estrogen shows a cyclic rise and fall during menstrual cycle
B: Relaxin is secreted by corpus luteum near the end of pregnancy.
(1) Only statement A is incorrect
(2) Only statement B is incorrect
(3) Both A and B are incorrect
(4) Both A and B are correct

180. Target of CCK is
(1) Gall bladder
(2) Hepatic lobules
(3) Stomach
(4) Islets of Langerhans

❑ ❑ ❑