YAKEEN 2.0 TEST-07 (Physics)

1. The volume of an air bubble is doubled as it rises from the bottom of lake to its surface. The atmospheric pressure is 75 cm of mercury. The ratio of density of mercury to that of lake water is $\frac{40}{3}$. The depth of the lake in metre is

(A) 10 (B) 15
(C) 20 (D) 25

2. A beaker containing a liquid of density ρ moves up with an acceleration '*a*'. The pressure due to the liquid at a depth *h* below free surface of the liquid is

(A) hρg
(B) hρ (g – a)
(C) hρ (g + a)
(D) $2h\rho g\left(\frac{g+a}{g-a}\right)$

3. Viscous drag force depends on

(A) Size of body
(B) Velocity with which it moves
(C) Viscosity of fluid
(D) All of these

4. The terminal velocity of a small sized spherical body of radius r falling vertically in a viscous liquid is given by the proportionality

(A) $v \propto \frac{1}{r^2}$ (B) $v \propto r^2$
(C) $v \propto \frac{1}{r}$ (D) $v \propto r$

5. If the linear density of a rod of length $3m$ varies as $\lambda = 2 + x$, then the position of the center of mass of the rod is at a distance of

(A) $\frac{7}{3}m$ (B) $\frac{10}{7}m$
(C) $\frac{12}{7}m$ (D) $\frac{9}{7}m$

6. A wooden cube just floats inside water with a 200 gm mass placed on it. When the mass is removed, the cube floats with its top surface 2 cm above the water level. What is the side of the cube ?

(A) 6 cm (B) 8 cm
(C) 10 cm (D) 12 cm

7. A block of steel of size 5 × 5 × 5 cm3 is weighed in water. If relative density of steel is 7, its apparent weight is

(A) 6 × 5 × 5 × 5 g wt
(B) 4 × 4 × 4 × 7 g wt
(C) 5 × 5 × 5 × 7 g wt
(D) 4 × 4 × 4 × 6 g wt

8. A cubical block is floating in a liquid with one fourth of its volume immersed in the liquid. If whole of the system accelerates upward with acceleration *g*/4, the fraction of volume immersed in the liquid will be

(A) 1/4 (C) 1/2
(C) 3/4 (D) 2/3

9. If the next external forces acting on the system of particles is zero, then which of the following may vary?

(A) Momentum of the system
(B) Velocity of centre of mass
(C) Position of centre of mass
(D) None of the above

10. A block of ice is floating in a liquid of specific gravity 1.2 contained in a beaker. When the ice melts completely, the level of liquid in the vessel

(A) Increases
(B) Decreases
(C) Remain unchanged
(D) First increases then decreases

11. Two liquids having densities d_1 and d_2 are mixed in such a way that both have same mass. The density of the mixture is

(A) $\frac{d_1 + d_2}{2}$ (B) $\frac{d_1 + d_2}{d_1 d_2}$
(C) $\frac{d_1 d_2}{d_1 + d_2}$ (C) $\frac{2d_1 d_2}{d_1 + d_2}$

12. Consider a system of two identical particles. One of the particles is at rest and the other has an acceleration a. The centre of mass has an acceleration

(A) Zero (B) 1/2a
(C) a (D) 2a

13. Water (ρ = 1000 kg/m^3) and kerosene (σ = 800 kg/m^3) are filled in two identical cylindrical vessels. Both vessels have small holes at their bottom. The speed of the water and kerosene coming out of their holes are v_1 and v_2 respectively. Select the correct alternative

(A) $v_1 = v_2$ (B) $v_1 = 0.8\ v_2$

(C) $0.8\ v_1 = v_2$ (D) $v_1 = \sqrt{0.8}\ v_2$

14. A tank is filled with water to a height H. A hole is made in one of the walls at a depth D below the water surface. The distance x from the foot of the wall at which the stream of water coming out of the tank strikes the ground is given by

(A) $x = 2\ [D\ (H - D)]^{1/2}$

(B) $x = 2\ (gD)^{1/2}$

(C) $x = 2\ [D\ (H + D)]^{1/2}$

(D) None of these

15. Due to addition of impurities, the modulus of elasticity

(A) Decreases

(B) Increases

(C) Remains constant

(D) May increase or decrease

16. The shear strain is possible in

(A) Solids (B) Liquids

(C) Gases (D) All of these

17. The ratio of radii of two wires of same material is 2 : 1. If these wires are stretched by equal force, the ratio of stresses produced in them is

(A) 2 : 1 (B) 1 : 2

(C) 1 : 4 (D) 4 : 1

18. A load of 2 kg produces an extension of 1 mm in a wire of 3 m in length and 1 mm in diameter. The Young's modulus of wire will be

(A) 3.25×10^{10} Nm^{-2}

(B) 7.48×10^{12} Nm^2

(C) 7.48×10^{10} Nm^{-2}

(D) 7.48×10^{-10} Nm^{-2}

19. Select the correct alternative(s)

(A) Elastic forces are not always conservative

(B) Elastic forces are always conservative

(C) Elastic forces are conservative only when Hooke's law is obeyed

(D) Elastic forces are not conservative

20. Young's modulus depends upon

(A) Stress applied on material

(B) Strain produced in material

(C) Temperature of material

(D) All of these

21. The value of Young's modulus for a perfectly rigid body is

(A) 1 (B) Less than 1

(C) Zero (D) Infinite

22. A wire of length L and cross-sectional area A is made of material of Young's modulus Y. The work done in stretching the wire by an amount x is

(A) $\frac{YAx^2}{L}$ (B) $\frac{YAx^2}{2L}$

(C) $\frac{2YAx^2}{L}$ (D) $\frac{4YAx^2}{L}$

23. A spherical ball contracts in volume by 0.01% when subjected to a normal uniform pressure of 100 atm. The Bulk modulus of its material is

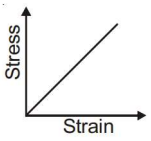
(A) 1.01×10^{11} Nm^{-2}

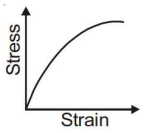
(B) 1.01×10^{12} Nm^{-2}

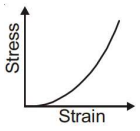
(C) 1.01×10^{10} Nm^{-2}

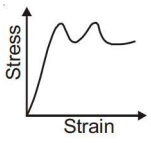
(D) 1.0×10^{13} Nm^{-2}

24. Which of the following is the graph showing stress-strain variation for elastomers?

(A) 

(B) 

(C) 

(D) 

25. A steel rod has a radius 10 mm and a length of 1.0 m. A force stretches it along its length and produces a strain of 0.32%. Young's modulus of the steel is 2.0×10^{11} Nm^{-2}. What is the magnitude of the force stretching the rod?

(A) 100.5 kN (B) 201 kN

(C) 78 kN (D) 150 kN

26. The proportional limit of steel is 8×10^8 N/m^2 and its Young's modulus is 2×10^{11} N/m^2. The maximum elongation, a one metre long steel wire can be given without exceeding the elastic limit is

(A) 2 mm (B) 4 mm

(C) 1 mm (D) 8 mm

27. In a series combination of copper and steel wires of same length and same diameter, a force is applied at one of their ends while the other end is kept fixed. The combined length is increased by 2 cm. The wires will have
(A) Same stress and same strain
(B) Different stress and different strain
(C) Different stress and same strain
(D) Same stress and different strain

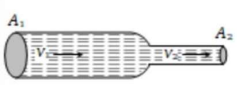
28. It is easy to wash clothes in hot water because
(A) Surface tension is more
(B) Surface tension is less
(C) Consumes less soap
(D) None of these

29. At which of the following temperatures, the value of surface tension of water is minimum?
(A) 4°C (B) 25°C
(C) 50°C (C) 75°C

30. A cylinder of height 20 m is completely field with water. The velocity of efflux of water (in m/s) through a small hole on the side wall of the cylinder near its bottom is
(A) 10 (B) 20
(C) 25.5 (D) 5

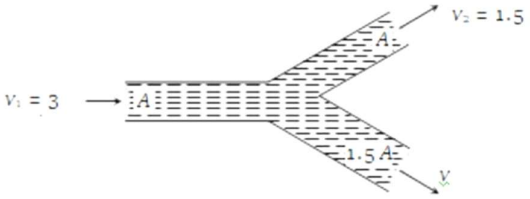
31. An application of Bernoulli's equation for fluid flow is found in
(A) Dynamic lift of an aeroplane
(B) Viscosity meter
(C) Capillary rise
(D) Hydraulic press

32. A liquid flows in a tube from left to right as shown in figure. A_1 and A_2 are the cross-sections of the portions of the tube as shown. Then the ratio of speeds v_1/v_2 will be



(A) A_1 / A_2 (B) A_2 / A_1
(C) $\sqrt{A_2} / \sqrt{A_1}$ (D) $\sqrt{A_1} / \sqrt{A_2}$

33. An incompressible liquid flows through a horizontal tube as shown in the following fig. Then the velocity v of the fluid is



(A) 3.0 m/s (B) 1.5 m/s
(C) 1.0 m/s (D) 2.25 m/s

34. The velocity of kerosene oil in a horizontal pipe is 5 m/s. If $g = 10\ m/s^2$ then the velocity head of oil will be
(A) 1.25 m (B) 12.5 m
(C) 0.125 m (D) 125 m

35. Equation of continuity based on:
(A) Conservation of mass
(B) Conservation of energy
(C) Conservation of angular momentum
(D) None of these

36. Two water pipes of diameters 2 cm and 4 cm are connected with the main supply line. The velocity of flow of water in the pipe of 2 cm diameter is-
(A) 4 times that in the other pipe
(B) 3 times that in the other pipe
(C) 2 times that in the other pipe
(D) 6 times that in the other pipe

37. A stretched rubber has:
(A) increased kinetic energy
(B) increased potential energy
(C) decreased kinetic energy
(D) decreased potential energy

38. If the force constant of a wire is K, the work done in increasing the length of the wire by / is
(A) $Kl/2$ (B) Kl
(C) $Kl^2/2$ (D) Kl^2

39. If a spring extends by x on loading, then the energy stored by the spring is (if T is tension in the spring and k is spring constant)
(A) $\frac{T^2}{2x}$ (B) $\frac{T^2}{2k}$
(C) $\frac{2x}{T^2}$ (D) $\frac{2T^2}{k}$

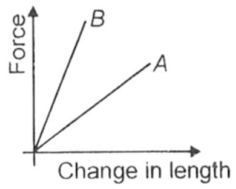
40. Two wires of same diameter of the same material having the length l and 2l. If the force F is applied on each, the ratio of the work done in the two wires will be
(A) 1:2 (B) 1:4
(C) 2:1 (D) 1:1

41. If the potential energy of a spring is V on stretching it by $2\ \text{cm}$, then its potential energy when it is stretched by $10\ \text{cm}$ will be

(A) $V/25$ (B) $5\ \text{V}$

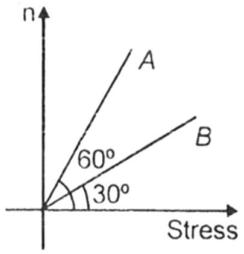
(D) $V/5$ (D) $25\ \text{V}$

42. For two different material wires of the same dimensions, Young's modulus is:



(A) Higher for A
(B) Higher for B
(C) Same for both
(D) Infinite for both

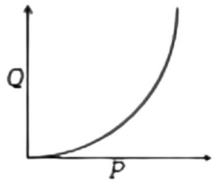
43. The ratio of Young's modulus of wire A to wire B:



(A) 3:1 (B) 1:3

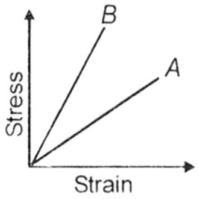
(C) $\sqrt{3}$:1 (D) 1: $\sqrt{3}$

44. The graph shows the behavior of a length of wire in the region for which the substance obeys Hook's law. P and Q represent



(A) P = applied force, Q = extension
(B) P = extension, Q = applied force
(C) P = extension, Q = stored elastic energy
(D) P = stored elastic energy, Q = extension

45. The figure below shows the stress-strain curve for two bodies A and B.



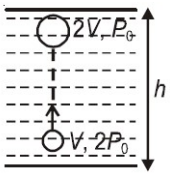
Choose the correct option.
(A) A is having greater elasticity than B.
(B) B is having a greater elasticity than A.
(C) Both A and B have the same elasticity.
(D) A and B both show plasticity.

ANSWER KEY

1.	**(A)**	**16.**	**(A)**	**31.**	**(A)**
2.	**(C)**	**17.**	**(C)**	**32.**	**(B)**
3.	**(D)**	**18.**	**(C)**	**33.**	**(V)**
4.	**(B)**	**19.**	**(A)**	**34.**	**(A)**
5.	**(C)**	**20.**	**(C)**	**35.**	**(A)**
6.	**(C)**	**21.**	**(D)**	**36.**	**(A)**
7.	**(A)**	**22.**	**(B)**	**37.**	**(B)**
8.	**(A)**	**23.**	**(A)**	**38.**	**(C)**
9.	**(C)**	**24.**	**(C)**	**39.**	**(B)**
10.	**(A)**	**25.**	**(B)**	**40.**	**(A)**
11.	**(D)**	**26.**	**(B)**	**41.**	**(D)**
12.	**(B)**	**27.**	**(D)**	**42.**	**(B)**
13.	**(A)**	**28.**	**(B)**	**43.**	**(B)**
14.	**(A)**	**29.**	**(D)**	**44.**	**(C)**
15.	**(D)**	**30.**	**(B)**	**45.**	**(B)**

HINT AND SOLUTIONS

1. **(A)**



$2P_0 = P_0 + \rho gh$

$\Rightarrow \quad P_0 + \rho gh$

$\Rightarrow \quad P_0 = 75$ cm mercury [Atmospheric pressure]

$\Rightarrow \quad \rho_{mercury} \times g \times \dfrac{75}{100} = \rho_{water} \times g \times h$

$\Rightarrow \quad \dfrac{\rho_m}{\rho_w} \times \dfrac{75}{100} = h$

$\Rightarrow \quad \dfrac{40}{3} \times \dfrac{75}{100} = h$

$\left[\because \dfrac{\rho_m}{\rho_w} = \dfrac{40}{3} \text{ (given)}\right]$

2. **(C)**

Due to upward acceleration pseudo force will act downwards so value of acceleration due to gravity will increase by 'a'

$\therefore \quad g' = (g + a)$

$P = \rho g' h$

$\Rightarrow \quad P = \rho\,(g + a)h$ (Substitute g')

3. **(D)**

$F = \eta A \dfrac{V}{d}$

Where,
F = Drag Force
η = Viscosity of fluids
A = Area $\propto$ size of body
V = Velocity

4. **(B)**

$v_T = \dfrac{2r^2}{9\eta}[\sigma - \rho]g$

So, $v_T \propto r^2$

5. **(C)**

6. **(C)**

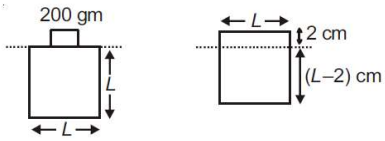
Mass × g = Volume of part of cube × ρ × g

$\Rightarrow$ 200 × g = L2 (2 × ρ_w × g)

$\Rightarrow$ 100 = L^2 $\{\because \rho_w = 1\}$

$\Rightarrow$ 10 cm = L

From the two figures we can see that the 200 gm block is provided with required buoyant force but a part of cube which is afloat in 2nd figure.



7. **(A)**

Apparent weight,

$= \rho_s v_b g - \rho_w v_b g$

$= v_b g (\rho_s - \rho_w)$

$= 5 \times 5 \times 5 \times g \times (7 - 1)$ $\quad \{\rho_w = 1,\ \rho_s = 7$ (given)$\}$

$= 6 \times 5 \times 5 \times 5 \times g$ wt

Where,
ρ_s – density of steel
ρ_w – density of water
v_b – volume of block (side × side × side)

8. **(A)**

Upward acceleration just causes the acceleration due to gravity increases by some value, but since the term of 'g' gets cancelled out in the buoyancy equation.

Volume immersed × ρ_w × g

= Total volume × ρ_{cube} × g

So, increasing it will not have any effect on the immersed volume.

9. **(C)**

10. **(A)**

Density of ice is less than water and density of liquid is more than water. So even when ice melts the level will rise.

If $\rho_{liquid} > \rho_{water}$ then level (liquid + water) will rise.

11. **(D)**

Let each have mass = M and densities d_1 and d_2

$$d_{max} = \frac{M_{mix}}{V_{mix}} = \frac{M + M}{\left(\frac{M}{d_1}\right) + \left(\frac{M}{d_2}\right)} = \frac{2d_1 d_2}{d_1 + d_2}$$

12. **(B)**

13. **(A)**

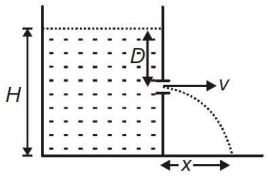
Velocity of efflux for small holes = $\sqrt{2gh}$

Which clearly is independent of 'ρ' (density)

So, $v_1 = v_2$

14. (A)

Velocity of efflux = $\sqrt{2gD} = v$



Using $s = ut + \frac{1}{2}at^2$

We get,

$$'t' = \sqrt{\frac{2(H-D)}{g}}$$

Now, $x = v \times t$

Substituting the values, $x = \sqrt{2gD} \times \sqrt{\frac{2(H-D)}{g}}$

$\Rightarrow \quad x = 2\,[D\,(H-D)]^{1/2}$

15. (D)

It depends on the elastic property of impurities if they themselves more elastic, elasticity will increase. If they are less elastic, elasticity will decrease.

16. (A)

Shear strain is possible in solids only, as only solids have a definite surface.

17. (C)

We know,

$$\text{Stress} = \frac{\text{Force}}{\text{Area}} \qquad \begin{Bmatrix} \text{S = Stress} \\ \text{F = Force} \\ \text{A = Area} \\ r = \text{radius} \end{Bmatrix}$$

So, Stress × Area = Force

S × A = F

$\because$ (Since) Force applied on the wires is equal we can relate two conditions as

$$S_1A_1 = S_2A_2$$

$$\frac{S_1}{S_2} = \frac{A_2}{A_1} = \frac{\pi r_2^2}{\pi r_1^2}$$

$$\frac{S_1}{S_2} = \frac{r^2}{(2r)^2} = \frac{r^2}{4r^2} = \frac{1}{4}$$

Where
S_1 – Stress in 1st wire
A_1 – Area of 1st wire
r_1 – Radius of 1st wire
S_2 – Stress in 2nd wire
A_2 – Area of 2nd wire
r_2 – Radius of 2nd wire

18. (C)

We know

$$\frac{\text{Force} \times \text{Length}}{\text{Area of cross-section} \times \text{elongation}}$$

= Young's Modulus

$$\frac{F \times L}{A \times \Delta L} = Y \quad \begin{Bmatrix} \text{F} = 2\times10\,\text{N}, A = \pi\times(1/2)^2\times10^{-6}\,\text{m}^2 \\ L = 3\,\text{m}, \qquad \Delta\text{L} = 1\times10^{-3}\,\text{m} \end{Bmatrix}$$

Substituting values

$$\frac{20\times3}{\pi\times\frac{1}{4}\times10^{-6}\times1\times10^{-3}}$$

$$\frac{20\times3\times4}{3.14\times10^{-9}} = Y$$

$7.48 \times 10^{10}\ \text{Nm}^{-2} = \text{Y}$

19. (A)

Since at every value of force material is not able to gain its shape. Therefore elastic forces are not always conservative.

20. (C)

Young's modulus is a material property and it also depends on temperature of material.

21. (D)

For perfectly rigid body the condition is that there should not be any elongation ($\Delta L = 0$) for any value of force.

So from the formula we know $\frac{FL}{A.\Delta L} = Y$

If we put $\Delta L = 0$

We get Y as ∞

22. (B)

$\because\ W = \frac{1}{2}Fx$ and $Y = \frac{FL}{Ax}$

$\therefore\ F = \frac{YAx}{L}$

$$W = \frac{1}{2}\left(\frac{YAx}{L}\right)x$$

$$W = \frac{1}{2}\frac{YAx^2}{L}$$

23. (A)

We know $\frac{\Delta V}{V} = -\frac{P}{B}$

Substituting values

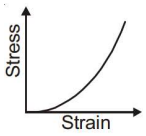
$$\frac{-\frac{0.01}{100}\times\text{V}}{\text{V}} = \frac{-100}{\text{B}}\times1.01\times10^5$$

$\{1\ \text{atm} = 1.01 \times 10^5\ \text{Pa or Nm}^{-2}\}$

$\text{B} = 1.01 \times 10^{11}\ \text{Nm}^{-2}$

24. (C)

In elastomers stress varies exponentially with strain *e.g.,* Rubber



25. (B)

Strain = 0.32%

$$\Rightarrow \frac{\Delta L}{L}\times 100 = 0.32$$

$$\Rightarrow \frac{\Delta L}{L} = \frac{0.32}{100}$$

$$A = \pi r^2 = 3.14\times\left(\frac{10}{1000}\right)^2$$

Y = 2×10^{11} Nm^2

We know

$$\frac{FL}{AY} = \Delta L$$

$$F = \left(\frac{\Delta L}{L}\right)\times A \times Y$$

Substituting values

$$F = \frac{0.32}{100}\times 3.14\times\left(\frac{10}{1000}\right)^2 \times 2\times 10^{11}$$

F = 201 kN

26. (B)

At proportional limit

Stress $\propto$ strain

Stress = Y × strain

Stress = Y × $\frac{\Delta L}{L}$ {Y = Young's Modulus}

Substituting values $\begin{cases} \text{Stress} = 8\times10^8\ \text{N/m}^2 \\ Y = 2\times10^{11}\ \text{N/m}^2 \\ L = 1\ \text{m} \end{cases}$

$$\frac{8\times10^8\times1}{2\times10^{11}} = \Delta L$$

4 mm = ΔL

27. (D)

Stress = $\frac{F}{A}$

Force is same, A is same.

So same stress

Strain = $\frac{\Delta L}{L}$

L is same, but due to different young's modulus (Material's different)

ΔL would be different so strain is different.

28. (B) **29. (D)**
30. (B) **31. (A)**
32. (B) **33. (C)**
34. (A) **35. (A)**
36. (A) **37. (B)**
38. (C) **39. (B)**
40. (A) **41. (D)**
42. (B) **43. (B)**
44. (C) **45. (B)**

YAKEEN 2.0

PRACTICE TEST -07

Q.1 Allyl isocyanide contains σ and π bonds, as-

(A) 9σ and 3π (B) 9 σ and 9π

(C) 3 σ and 4π (D) 5 σ and 7π

Q.2 Among the following compounds, which will react with acetone to give a product containing > C=N – ?

(A) $C_6H_5NH_2$ (B) $(CH_3)_3$ N

(C) $C_6H_5NHC_6H_5$ (D) $C_6H_5NHNH_2$

Q.3 A positive carbylamine test is given by

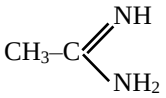
(A) N, N-Dimethylaniline

(B) 2,4 -Dimethylaniline

(C) N- Methyl-o-methylaniline

(D) o-Methylbenzylamine

Q.4 The correct order of basicities of the following compounds is



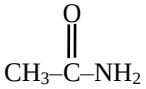
(1)

$CH_3CH_2NH_2$

(2)

$(CH_3)_2NH$

(3)

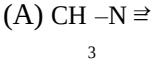
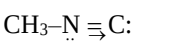


(4)

(A) 2 > 1 > 3 > 4 (B) 1 > 3 > 2 > 4

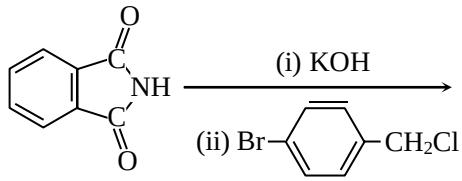
(C) 3 > 1 > 2 > 4 (D) 1 > 2 > 3 > 4

Q.5 $CH_3NH_2 + CHCl_3 \xrightarrow{KOH}$ Product, Product is :

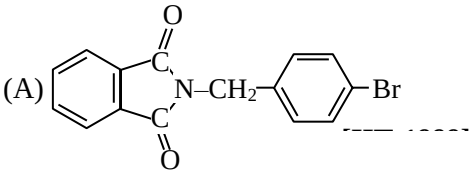
(A)  (B) 

(C) CH_3 –NH–CH_3 (D) CH_3–C ≡ N

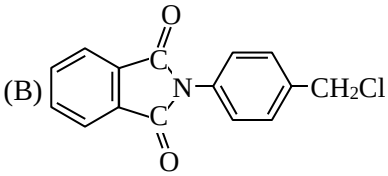
Q.6 The major product of the following reaction is



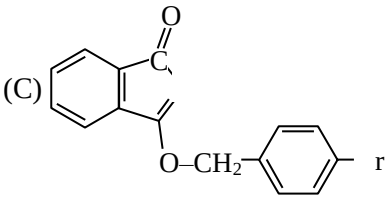
(A)



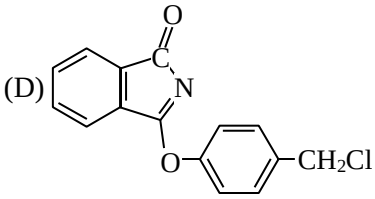
(B)



(C)

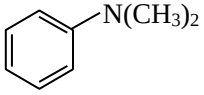


(D)

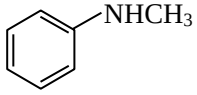


Q.7 Amongst the compounds given, the one that would form a brilliant colored dye on treatment with $NaNO_2$ in dil. HCl followed by addition to an alkaline solution of β-naphthol is -

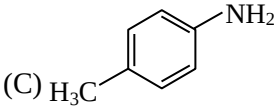
(A)



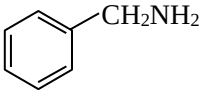
(B)



(C)



(D)



Q.8 For the elimination of $-\overset{\overset{O}{\|}}{C}-$ group of amide following reaction is used -

(A) Hoffmann hypobromite reaction

(B) Kolbe reaction

(C) Hunsdiecker reaction

(D) Liebermann's reaction

Q.9 N-Ethyl pthalimide on hydrolysis gives -

(A) Methyl alcohol (B) Ethyl amine

(C) Dimethyl amine (D) Diethyl amine

Q.10 Which amine will not react with nitrous acid -

(A) Methyl amine

(B) Ethyl amine

(C) Dimethyl amine

(D) N, N Dimethyl ethane amine

Q.11 The major product of nitration of Benzoic acid is -

(A) 3-Nitrobenzoic acid

(B) 4-Nitrobenzoic acid

(C) 2-Nitrobenzoic acid

(D) 2,4-Dinitrobenzoic acid

Q.12 The organic product formed in the reaction

$C_6H_5COOH \xrightarrow[II.\ H_2O]{I.\ LiAlH_4}$

(A) $C_6H_5CH_2OH$

(B) C_6H_5COOH & CH_4

(C) $C_6H_5CH_3$ & CH_3OH

(D) $C_6H_5CH_3$ & CH_4

Q.13 Which of the following carboxylic acids undergo decarboxylation easily –

(A) C_6H_5CO — CH_2COOH

(B) $C_6H_5COCOOH$

(C) $C_6H_5\underset{\underset{OH}{|}}{CH_2}-COOH$

(D) $C_6H_5\underset{\underset{NH_2}{|}}{CH_2}-COOH$

Q.14 The molecular weight of benzoic acid ; in benzene as determined by depression in freezing point method corresponds to –

(A) Ionization of benzoic acid

(B) Dimerisation of benzoic acid

(C) Trimerisation of benzoic acid

(D) Solvation of benzoic acid

Q.15 $CH_3CH_2COOH \xrightarrow[Red\ P]{Br_2} X \xrightarrow{NH_3(alc.)} Y$

Y in the above reaction is-

(A) Lactic acid (B) Ethylamine

(C) Propylamine (D) Alanine

Q.16 When propionic acid is treated with aqueous $NaHCO_3$, CO_2 is librated. The 'C' of CO_2 comes from

(A) Methyl group (B) Carboxylic acid group

(C) methylene group (D) bicarbonate

Q.17 Benzoyl chloride is prepared from benzoic acid by –

(A) Cl_2, hν (B) SO_2Cl_2

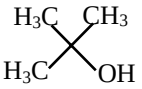
(C) $SOCl_2$ (D) Cl_2, H_2O

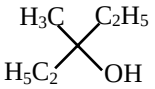
Q.18 Which of the following acids has the smallest dissociation constant ?

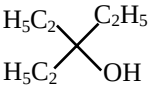
(A) $CH_3CHFCOOH$ (B) FCH_2CH_2COOH

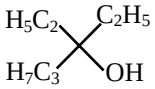
(C) $BrCH_2CH_2COOH$ (D) $CH_3CHBrCOOH$

Q.19 Ethyl ester $\xrightarrow[excess]{CH_3MgBr}$ P. The product P will be :

(A) 

(B) 

(C) 

(D) 

Q.20 Which of the following acids on heating gives acetic acid -

(A) Malonic acid (B) Maleic acid

(C) Malic acid (D) None of these

Q.21 How will you convert butan-2-one to propanoic acid ?

(A) Tollen's reagent (B) Fehling's solution

(C) $NaOH/I_2/H^+$ (D) $NaOH/NaI/H^+$

Q.22 In the reaction sequence

$$A \xrightarrow{H_3O^{\oplus}} B \xrightarrow[\Delta]{NH_3} C \xrightarrow[KOH]{Br_2} CH_3NH_2$$

A, B, C are respectively -

(A) CH_3CONH_2 , CH_3COONa, CH_3COONH_4

(B) CH_3COCl, CH_3COONH_4, CH_3CONH_2

(C) CH_3CN, CH_3COOH, CH_3CONH_2

(D) $CCl_3.CH_3$, CH_3COOH, $C_2H_5NH_2$

Q.23 The pair of compounds in which both the compounds give positive test with Tollen's reagent is:

(A) Glucose and Sucrose

(B) Fructose and Sucrose

(C) Acetophenone and Hexanal

(D) Glucose and Fructose

Q.24 The two forms of D-glucopyranose obtained from the solution of D-glucose are called:

(A) Isomers (B) Anomers

(C) Epimers (D) Enantiomers

Q.25 –N–C– group is characteristic of-

(A) Cellulose (B) Nucleic acid

(C) Proteins (D) Phospholipids

Q.26 The pH value of a solution in which a polar amino acid does not migrate under the influence of electric field is called-

(A) Isoelectronic point

(B) Isoelectric point

(C) Neutralisation point

(D) None

Q.27 The main structural feature of protein is–

(A) Ester linkage (B) Ether linkage

(C) Peptide linkage (D) All of these

Q.28 The main point of difference between DNA and RNA is-

(A) Presence of thymine in DNA and RNA

(B) Presence of deoxyribose and thymine in DNA, ribose and uracil in RNA

(C) Presence of ribose and thymine in DNA, deoxybribose and uracil in RNA

(D) Presence of deoxyribose in DNA and ribose in RNA

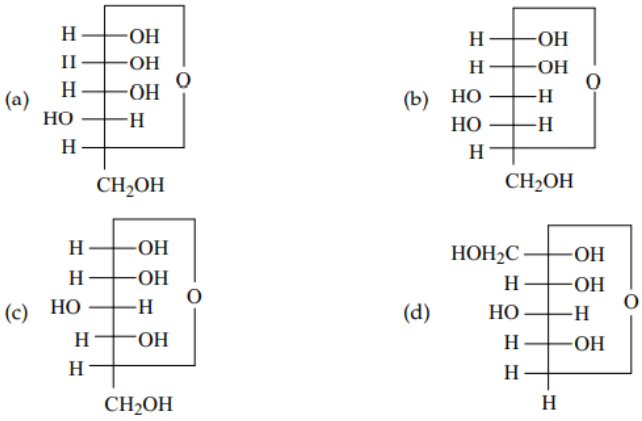
Q.29 Ring structure of glucose is due to formation of hemiacetal and ring formation between-

(A) C_1 and C_5 (B) C_1 and C_4

(C) C_1 and C_3 (D) C_2 and C_4

Q.30

Identify structure of α-D-Glucopyranose



Q.31 In the chemical reaction, $CH_3CH_2NH_2 + CHCl_3 + 3KOH \rightarrow$ (A) + (B) + $3H_2O$, the compounds (A) and (B) are respectively -

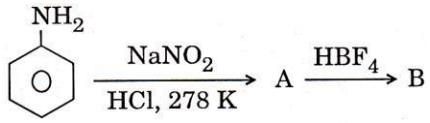
(A) C_2H_5CN and 3KCl

(B) $CH_3CH_2CONH_2$ and 3KCl

(C) C_2H_5NC and K_2CO_3

(D) C_2H_5NC and 3KCl

Q.32 In the chemical reactions.



The compounds 'A' and 'B' respectively are

(A) nitrobenzene and chlorobenzene

(B) nitrobenzene and flurobenzene

(C) phenol and benzene

(D) benzene diazonium chloride and flurobenzene

Q.33 Monomers are converted to polymer by –

(A) Hydrolysis of monomers

(B) Condensation reaction between monomers

(C) Protonation of monomers

(D) None is correct

Q.34 Nylon threads are made of –

(A) Polyamide polymer

(B) Polyethylene polymer

(C) Polyvinyl polymer

(D) Polyster polymer

Q.35 Which of the following is a polyamide ?

(A) Nylon-66 (B) Teflon

(C) Bakelite (D) Terylene

Q.36 Which of the following is fully fluorinated polymer-

(A) Teflon (B) Neoprene

(C) PVC (D) Thiokol

Q.37 Bakelite is obtained from phenol by reacting with

(A) CH_3CHO (B) CH_3COCH_3

(C) HCHO (D) $(CH_2OH)_2$

Q. 38 Buna-N synthetic rubber is a copolymer of -

(A) $H_2C = \underset{\displaystyle Cl}{\underset{|}{C}}H - C = CH_2$ and $H_2C = CH - CH = CH_2$

(B) $H_2C = CH - CH = CH_2$ and $H_5C_6 - CH = CH_2$

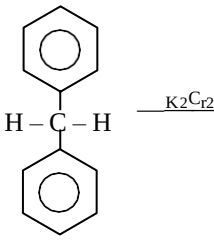
(C) $H_2C = CH - CN$ and $H_2C = CH - CH = CH_2$

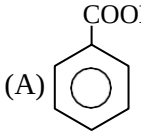
(D) $H_2C = CH - CN$ and $H_2C = CH - \underset{\displaystyle CH_3}{\underset{|}{C}} = CH_2$

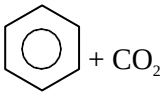
Q.39 Which one of the following compounds is polyester-

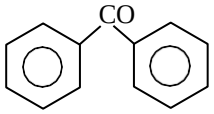
(A) Bakelite (B) Nylon 6,6

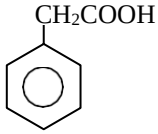
(C) Terylene (D) Rubber

Q.40  $\xrightarrow[[O]]{K_2Cr_2O_7/H_2SO_4}$ product is &

(A) 

(B) 

(C) 

(D) 

Q.41 Acidity follows the order –

(A) $HCOOH > CH_3COOH > C_6H_5COOH$

(B) $HCOOH > C_6H_5COOH > CH_3COOH$

(C) $C_6H_5COOH > CH_3COOH > HCOOH$

(D) $C_6H_5COOH > HCOOH > CH_3COOH$

Q.42 Acidic hydrolysis of which of the following ester will be most slow-

(A) CH_3COOCH_3

(B) $CH_3COOCH_2CH_3$

(C) $CH_3COO - \underset{\displaystyle CH_3}{\underset{|}{CH}} - CH_3$

(D) $CH_3COOC(CH_3)_3$

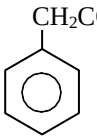
Q.43 In esterification, the reactivity of alcohols is-

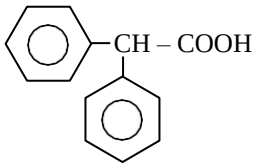
(A) $3^o > 2^o > 1^o$ (B) $1^o > 2^o > 3^o$

(C) Same in all cases (D) None of these

Q.44 Hell Volhard Zelinsky reaction is not shown by -

(A) Benzoic acid

(B) 

(C) 

(D) All of the above

Q.45 Orlon is a polymer of-

(A) Styrene

(B) Tetrafluoroethylene

(C) Vinyl chloride

(D) Acrylonitrile

Answer Key

1 (A)
2 (D)
3 (D)
4 (B)
5 (A)
6 (A)
7 (C)
8 (A)
9 (B)
10 (D)
11 (A)
12 (A)
13 (A)
14 (B)
15 (D)
16 (D)
17 (C)
18 (C)
19 (A)
20 (A)
21 (C)
22 (C)
23 (D)
24 (B)
25 (C)
26 (B)
27 (C)
28 (B)
29 (A)
30 (C)
31 (D)
32 (D)
33 (B)
34 (A)
35 (A)
36 (A)
37 (C)
38 (C)
39 (C)
40 (A)
41 (B)
42 (D)
43 (B)
44 (A)
45 (D)

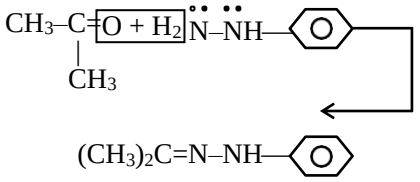
Hint and Solutions

1.[A] $CH_2=CH-CH_2-N \cong C$ (Allyl isocyanide)

Total no. of σ bonds = (Total no. of atom –1)

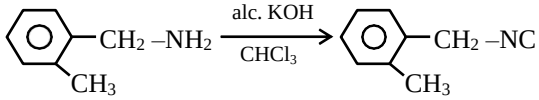
= 10 – 1 = 9σ

2.[D] Due to α effect

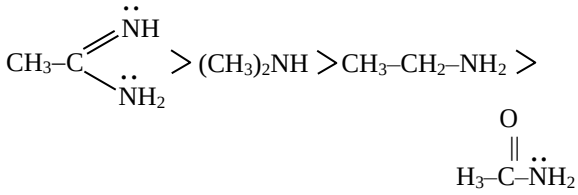


Acetone phenyl hydrazone

3.[D]

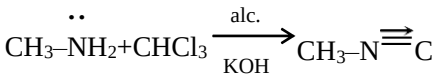


4.[B]



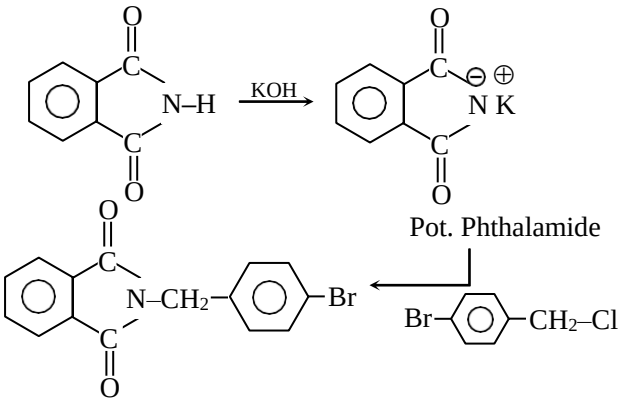
Due to equivalent CA L due to + I effect

5.[A] Hoffmann's iso cyanide test by primary amine

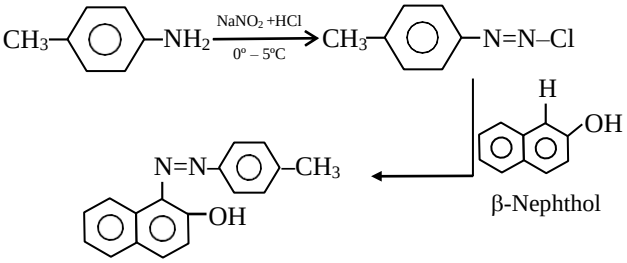


[offensive smell]

6.[A]



7.[C] Dye test by anelines



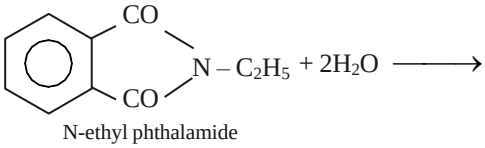
[Brilliant red dye]

8. [A]

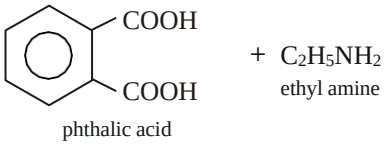
For the formation of RNH_2 from $RCONH_2$, NaOH and Br_2 are used as reagent. It is called Hofmann hypobromite reaction.

9. [B]

N-ethyl pthalimide on hydrolysis forms ethylamine. It is called Gabriel phthalimide reaction. It is an important method of preparing primary amines.



N-ethyl phthalamide

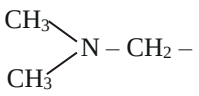


phthalic acid

10. [D]

Primary and secondary amines react with HNO_2, while tertiary amines do not react with HNO_2.

Since N, N dimethyl ethane amine

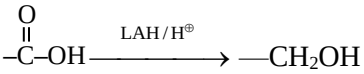


is a tertiary amine,

hence it will not react with HNO_2.

11. [A] Due to –M effect of –COOH group.

12. [A] Due to reduction by LAH

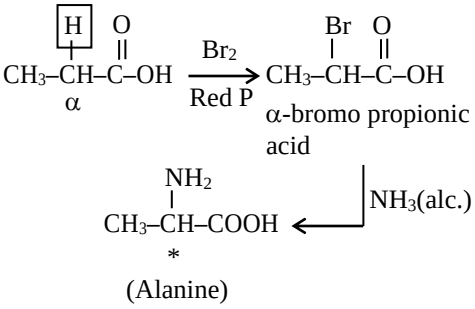


13. [A] β-keto acids decarboxylate easily on heating

[Due formation of stable intermediate]

14. [B] Due to IMHB (intra molecular H-bonding)

15. [D] HVZ reaction

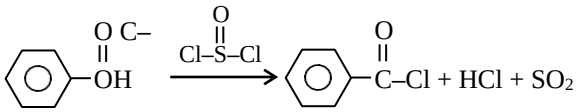


16. [D] $CH_3CH_2COOH \xrightarrow{NaHCO_3} CH_3CH_2COO^{\ominus}Na^{\oplus}$

$HCO_3^{\ominus} \longrightarrow CO_2 + HO^{\ominus}$

Bicarbonate

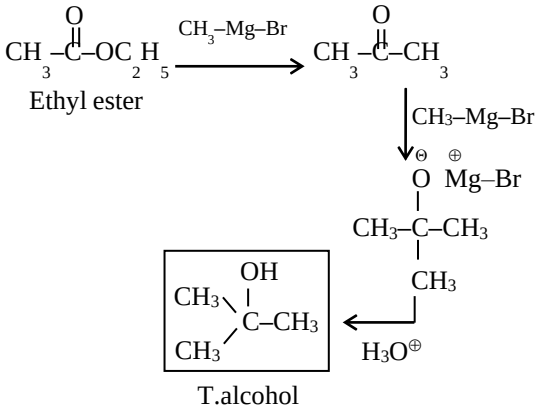
17. [C]



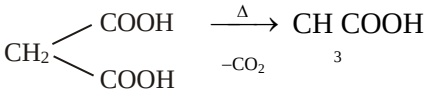
Benzoyl chloride

18. [C] Less stability of CB (Due to weak –I effect)

19. [A]

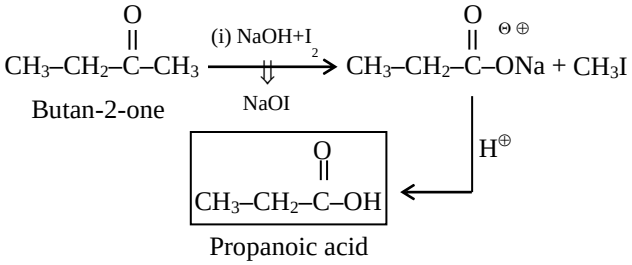


20.[A] Malonic acid on heating produces acetic acid. It is called decarboxylation reaction.



malonic acid acetic acid

21. [C] By Iodoform test



22. [C] In the reaction sequence

$$A \xrightarrow{H_3O^{\oplus}} B \xrightarrow[\Delta]{NH_3} C \xrightarrow[KOH]{Br_2} CH_3NH_2$$

A, B, C are respectively CH_3CN, CH_3COOH, CH_3CONH_2

The reaction takes place as follows :

$$CH_3CN \xrightarrow{H_3O^{\oplus}} CH_3COOH \xrightarrow{NH_3} CH_3COONH_4$$

ethane nitrile — amino methane (A); ethanoic acid (B); ammonium ethanoate

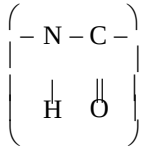
$$\xrightarrow{\Delta} CH_3CONH_2 \xrightarrow{Br_2/KOH} CH_3NH_2$$

ethanamide (C)

23. [D]

24. [B]

25. [C]

Peptide bond  is characteristic of proteins.

26. [B]

Isoelectric point is the pH at which structure of amino acid has no charge

27. [C]

The main structural feature of proteins is the presence of peptide linkage.

28. [B]

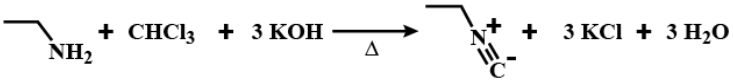
DNA has deoxyribose sugar, RNA has ribose sugar with three bases common as adenine, guanine and cytosine. DNA has fourth base thymine ; RNA has uracil

29. [A]

Pyranose ring structure of glucose is due to hemiacetal formation between C1 and C5 carbon atoms. In general, a pyranose is any cyclic isomer that has a five carbon atoms and one oxygen atom in a ring of six atoms. If a hydroxyl at the 5 position of an aldohexose, such as glucose, forms a hemiacetal with the aldehyde (position 1), the resulting isomer is glucopyranose

30. [C]

31. [D]



32. [D]

33. [B]

34. [A]

35. [A]

36. [A]

37. [C]

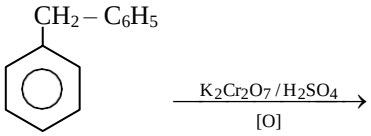
38. [C]

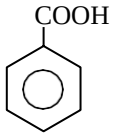
39. [C]

Terylene is a polyester fibre made up of by the polymerisation of ethylene glycol and pterephthalic acid

40. [A]

The product formed in the above reaction is benzoic acid . It involves side chain oxidation





+ $6CO_2 + 3H_2O$

In such oxidation when a long arylalkyl group is attached to the benzene nucleus than it is oxidised to – COOH gp

41. [B]

HCOOH has higher K_a value than benzoic acid.

$HCOOH > C_6H_5COOH > CH_3COOH$

42. [D]

Alcoholic part of this ester offers maximum steric hinderance. Hence its hydrolysis will be slowest

43. [B]

$RCOOH + H\ OR' \longrightarrow RCOOR'$

Alcohol loses H atom and thus reactivity order $3^o < 2^o < 1^o$.

44. [A]

Hell Volhard Zelinsky reaction is not shown by benzoic acid, because it does not have any α-H atom. All other acids have got α-H atoms, hence udergo this reaction

45. [D]

(YAKEEN- 2.0)

Practice Test- 07

91. Mark the correct statement-
(A) Algae is haploid with haplontic life cycle
(B) Bryophytes are diploid with diplontic life cycle
(C) Pteridophyte belong to cryptogemae
(D) In Pteridophyte seed habit is present

92. Consider the following statements-
(a) *Selaginella* and *Salvinia* is heterosporus
(b) Psilotum is haplodiplontic plant
(c) Porphyra have non-motile asexual stage
Which statements are correct-
(A) only a (B) both a and b
(C) all three (D) only b and c

93. Motile sexual stage absent in -
(A) Spirogyra (B) Ectocarpus
(C) Salvinia
(D) Chlamydomonas

94. From given statements, mark the incorrect-
(A) Chl a and Chl b is present in bryophytes
(B) Phycoerythrin is located in plastid of Gelidium
(C) Fucus and volvox is oogamous algae
(D) Moss and liverworts have multicellular rhizoids

95. Mark the examples of haplodiplontic haploid plant-
(A) Pinus and cycads
(B) Sphagnum and Pteris
(C) Ectocarpus and Marchantia
(D) All of the above

96. Which of the following present in Spirogyra?
(A) Protonema
(B) Motile male gametes
(C) Fucoxanthin (D) None

97. During photosynthesis oxygen produce in-
(A) some haplontic plants
(B) all diplontic plants
(C) few haplodiplontic plants
(D) all diploid organism

98. Consider the following statements-
(a) Sporophyll is diploid and develop in Sporophyte
(b) Lycopodium have xylem and phloem
(c) Fucus is haplo-diplontic
Which statements are correct-
(A) only a (B) only b
(C) both a and b (D) all three

99. Mark the correct statement-
(A) Zygotic meiosis occur in bryophyte and Algae
(B) Capsule and foot is haploid in bryophyte
(C) Gemmae cup develop on diploid gametophyte
(D) Haploid sporophyte present in some algae

100. Laminarian is located in chloroplast of -
(A) Chlorophyceae (B) Rhodophyceae
(C) Phaeophyceae (D) Ascomycetes

101. Select the list of items of Column I with Column II and select the correct option from the codes given below:

Column I	Column II
a. Cycas	i. fucoxanthin
b. Psilotum	ii. motile sexual stage
c. Kelp	iii. Diplontic

(A) a-ii, b-i, c-iii (B) a-ii, b-iii, c-i
(C) a-iii, b-ii, c-i (D) a-i, b-iii, c-ii

102. Read the following statements and mark the right option
(a) All red algae are oogamous
(b) All brown algae have fucoxanthin
(c) All Green algae have haploid gametophyte
(A) Only a and b is correct
(B) Only b and c are correct
(C) Only a and c are correct
(D) All a, b and c are correct

103. From the given statements ,mark the incorrect-
(A) Microphyll present in Seleginella
(B) Macrophyll present in Ferns
(C) Archegoniophore is haploid located on female gametophyte
(D) Marchantia have monoceious gametophyte

104. Identify the correct statement
(A) Homosporus condition present in bryophyte
(B) Many Pteridophytes are seed bearing
(C) Heterosporus pteridophyte have dependent sporophyte
(D) Rhizoids are unicellular and diploid in Moss

105. Select the list of items of Column I with Column II and select the correct option from the codes given below:

Column I	Column II
a. Phycoerythin	i. Free living sporophyte
b. Sphagnum	ii. Protonema
c. Pteris	iii. Sea weed

(A) a-ii, b-i, c-iii (B) a-ii, b-iii, c-i
(C) a-iii, b-ii, c-i (D) a-i, b-iii, c-ii

106. Few structures- rhizoids, zoospore, capsule, roots, protonema and prothallus , how many are haploids-
(A) four (B) five
(C) six (D) three

107. Diplontic plant with dependent gametophyte is -
(A) Pteris (B) Ectocarpus
(C) Cycas (D) Kelp

108. In bryophyte, inside Capsule ..... division occur to form spore which undergo ..... to form .....
(A) mitosis ,meisois and sporophyte
(B) meiosis ,mitotis and sporophyte
(C) reduction, mitosis and gametophyte
(D) meiosis, reduction and gametophyte

109. Which statement is not true about moss?
(A) Are haplo-diplontic
(B) Spirally arrange leaf
(C) Prothallus is unicellular
(D) Protonema is absent

110. Soil binders and use as ornamental is feature of -
(A) Pteridophyte (B) Bryophytes
(C) Gymnosperm (D) Angiosprem

111. Select the list of items of Column I with Column II and select the correct option from the codes given below:

Column I	Column II
a. Ulothrix	i. Integumented ovule
b. Ginkgo	ii. Filamentous
c. Volvox	iii. Colonial

(A) a-ii, b-i, c-iii (B) a-ii, b-iii, c-i
(C) a-iii, b-ii, c-i (D) a-i, b-iii, c-ii

112. Feature which is present in angiosperm not in gymnosperm -
(A) Haploid endosperm
(B) Unitegmic ovule
(C) Megasporangia
(D) Single fertilization

113. Female and male gametophyte both are dependent on sporophyte in -
(A) Angiosperm (B) Gymnosperm
(C) Spermetophyta (D) All

114. Which feature is absent in Cycas?
(A) Megasporophyll (B) Female cone
(C) Microsporophyll (D) microsporangia

115. How many feature present in most pteridophyte?
a. tracheophyta b. archegonium
c. heterosporus
d. homosporus
e. free living gametophyte
(A) b, c and e (B) b, d and e
(C) a, b and c (D) a, b and d and e

116. Motile sexual stage is present in-
(A) Spirogyra (B) Pinus
(C) Lycopodium (D) Nostoc

117. Select the mismatch
(A) Chlorella - non-motile
(B) Chlamydomonas - motile
(C) Fucus - Haplontic
(D) Dictyota - Chl c

118. Diploid plant with haplodiplontic life cycle do not have-
(A) free living sporophyte
(B) free living gametophyte
(C) diploid sporangia
(D) corraloid root

119. Sporophyte is independent in all except-
(A) Gymnosperm (B) Bryophyte
(C) Pteridophyte (D) Angiosperm

120. Budding in protonema occur in life cycle of-
(A) Marchantia (B) Funaria
(C) Pteris (D) Salvia

121. Select the mismatch
(A) Cladophora - Filamentous
(B) Volvox - Oogamous
(C) Sargassum - Chl b
(D) Sphagnum - Antheroozoid

122. Which of the following is not haplo-diplontic?
(A) Polysiphonia (B) Sphagnum
(C) Psilotum
(D) Chlamydomonas

123. Consider the following-
(a) All diplontic plant have vascular bundle
(b) Heterosporus plant have dioceiousgametophye
How many correct?
(A) only a (B) only b
(C) both correct (D) both wrong

124. Which of the following pair is haploid?
(A) Archegonium and rhizoids
(B) Foot and prothallus
(C) Capsule and protonema
(D) Nucellus and spore

125. Which may not be feature of heterosporus Pteridophyte?
(A) Vascular
(B) Presence of Archegonia
(C) Spore show mitosis
(D) Monoceious gametophyte

126. Which is incorrect statement?
(A) most haplodiplontic plant have archegonium
(B) some diplontic plant have archegonium
(C) not all seed bearing plant have Archegonium
(D) sporophyte which is dependent and multicellular, have sporangia

127. Consider the following structure- nucellus, archegonium, endosperm in gymnosperm, sporangia, cone , pollen grain, foot , Embryo , prothallus and protonema
How many are haploid-
(A) three (B) four
(C) five (D) six

128. Which is odd one among following in ploidy?
(A) Microsporphyll
(B) Microsporangia
(C) Male cone
(D) Male gametophyte

129. Mark the incorrect –
(A) Leaf of gymnosperm is adapted to withstand extreme of temperature, humidity and wind
(B) In cycas the pinnate leaves persist for a many years
(C) Both cycas and pinus have dioceious gametophyte
(D) Prothallus is conspicuous, multicellular and diploid

130. Which is wrongly matched?
(A) Selaginella – diploid ,heterosporus and vascular
(B) Marchantia- dioceious, haploid and photosynthetic
(C) Equisetum – Cone and roots present, Archegonium
(D) Cycas- dioceius plant, male cone and female cone

131. Which is wrongly matched for chlamydomona?
(A) motile (B) filamentous
(C) Chla (D) chl b

132. Which of the following is haplo-diplontic?
(A) ectocarpus (B) kelp
(C) pteris (D) all of the above

133. Consider the following and mark for cladophora-
(A) Oogamous (B) Filamentous
(C) chl c (D) Diplontic

134. Which of the following are heterosporus and dependent sporophyte-
(A) cycas (B) ficus
(C) marchantia
(D) none of the above

135. Which is true for protonema?
(A) creeping, green and filamentous
(B) green , develop from spore and haploid
(C) filamentous and haploid
(D) all of the above

136. Mark the incorrect statement-
(A) All events of cell cycle are under genetic control
(B) Cell growth in terms of cytoplasmic increase is continuous process
(C) In G0 phase, cells are living
(D) Recombination nodule is form in metaphase

137. Mark the correctly matched-
(A) S-phase – centriole duplication
(B) G_2 phase – DNA replication
(C) M-phase - chromatin appear
(D) G_1 phase – histone synthesis

138. Gap between S-phase and M-phase is -
(A) M-phase (B) Prophase
(C) G_1 phase (D) G_2-phase

139. In which of the following phase one chromosome have Two chromatid-
(A) G_2 phase (B) G_1 phase
(C) S-phase (D) M-phase

140. Which of the following occur in S-phase –
(A) Nuclear membrane disappear
(B) Nucleolus disappears
(C) Amount of DNA become double
(D) Golgi body disappear

141. Amount of DNA is 4c in-
(A) haploid plant cell in G_1
(B) diploid cell in G_1
(C) diploid plant cell in G_2
(D) haploid animal cell in G_2

142. Which phase restore nucleus / cytoplasmic ratio of cell -
(A) G_2 phase (B) G_1 phase
(C) S-phase (D) M-phase

143. Centriole get double during meiosis in-
(A) Interkinesis (B) Metaphase-I
(C) Telophase-I (D) Anaphase-II

144. Two chromatids of chromosome separate in …….. phase of M-phase-
(A) Prophase (B) Metaphase
(C) Telophase (D) Anaphase

145. Recombinase enzyme is functional in ……
(A) Prophase I (B) Metaphase I
(C) Telophase I (D) Anaphase I

146. Aneuploidy is result of non-disjunction process which occurred in -
(A) Prophase I (B) Metaphase I
(C) Anaphase -I (D) Telophase I

147. Plane of alignment of chromosome at metaphase is referred to as
(A) equatorial plate (B) phragmoplast
(C) metaphasic plate (D) none

148. Number of chromosome pair visible in meiosis in human cell
(A) 23 (B) 46
(C) 92 (D) one

149. Total Number of chromatid present in two chromosomes in G_2 phase -
(A) one (B) two
(C) three (D) four

150. In asymmetric spindle which lead to unequal cell formation all are correct except-
(A) equator of spindle not lie at equator of cell
(B) genetic material divides equally
(C) cytoplasm division is unequal
(D) both cytoplasm and genetic material divide unequally

151. Synaptonemal complex form in –
(A) diakinesis (B) diplotene
(C) pachytene (D) zygotene

152. Which of the following phase have checkpoints –
(A) M to G_1 transition
(B) G_1 to S phase transition
(C) G_2 to M transition
(D) both B and C

153. In a Diploid plant number of chromosomes are (2n=40) than number of bivalent and tetrad are in zygotene are –
(A) 40 and 20 (B) 20 and 20
(C) 20 and 10 (D) 10 and 10

154. Metacentric chromosome can show inverted V shape visible in-
(A) Metaphase (B) Anaphase I
(C) Anaphase (D) both B and C

155. Which of the following occur in S-phase-
(A) Histone synthesis
(B) Centriole duplication
(C) DNA replication
(D) All of the above

156. During cytokinesis in plants which is last event among the following –
(A) cell plate formation
(B) primary cell wall formation
(C) plasma membrane formation
(D) phragmoplast formation

157. Chiasmata Appear in phase –
(A) diakinesis (B) diplotene
(C) pachytene (D) zygotene

158. In a haploid cell amount of DNA in G_2 phase is –
(A) 2c (B) c
(C) 4c (D) 8c

159. Which type of chromosome appear as invertedV-shape in anaphase -
(A) metacentric
(B) submetacentric
(C) telocentric
(D) acrocentric

160. Which phase of cell cycle decision to continue cell cycle occur
(A) G_1 (B) G_0
(C) S (D) G_2

161. How many meiosis require to produce 40 pollen grain –
(A) 20 (B) 16
(C) 30 (D) 10

162. Meiosis can take place in:
(A) E. coli (B) Spore
(C) Leaf cell (D) Sporangia

163. What happens in synthesis phase during cell cycle: -
(A) DNA synthesis
(B) Chromosome number becomes double
(C) Formation of two nuclei
(D) Synthesis of proteins & RNA

164. Reappearance of nuclear membrane & nucleolus along with thinning& elongation in chromosomes are diagnostic characters for the phase: -
(A) Anaphase (B) Metaphase
(C) Interphase (D) Telophase

165. What happens in crossing over:-
(A) Duplication of chromosomes
(B) Linkage in chromosomes
(C) Minimization in genetic material
(D) Exchange of genetic material

166. Pairing of homologous chromosomes is called: -
(A) Disjunction (B) Synapsis
(C) Segregation (D) Polytene

167. In mitosis, the inter zonal fibres appear in which stage-
(A) Prophase (B) Metaphase
(C) Anaphase (D) Telophase

168. During cytokinesis in plants middle lamella produced
(A) after cell wall
(B) inner to outer
(C) outer to inner
(D) after cell membrane

169. If the cell is diploid in G_1 than after the S phase cell remain/become: -
(A) n (B) 4n
(C) 8n (D) 2n

170. Cell get arrest in …….. phase in mammalsis :–
(A) Prophase -I (B) Metaphase-I
(C) Anaphase-I (D) Telophase-I

171. Compaction of chromosomal material continued in :-
(A) Leptotene (B) Zygotene
(C) Pachytene (D) Diplotene

172. In bryophytes, meiosis can be observed in-
(A) Root tip (B) Leaf primordia
(C) Capsule (D) Rhizoids

173. In Anaphase number of chromosomes in human is-
(A) 92 (B) 46
(C) 23 (D) 48

174. Gap between division phase and start of DNA-replication is called:-
(A) G_1- phase (B) G_2 - phase
(C) M - phase (D) Interkinesis

175. Longest phase of mitosis is –
(A) Prophase (B) Metaphase
(C) Anaphase (D) Telophase

176. Synthesis of proteins for formation of spindle fibres takes place in -
(A) G_1-phase (B) S-phase
(C) G_2 - phase (D) M-phase

177. How many mitotic divisions will occur in an isolated tip cell to form 64 cells?
(A) 6 (B) 7
(C) 32 (D) 5

178. Nuclear membrane disappearin which phase of Prophase –I -
(A) Pachytene (B) Diplotene
(C) Diakinesis (D) Zygotene

179. Diploid cells in human, where cell division does not occur: -
(a) Heart cell
(b) Muscle cell
(c) Nerve cell
(A) Only c (B) b and c
(C) a and c (D) a, b and c

180. In yeast, duration of cell cycle is about: -
(A) 80 minutes (B) 100 minutes
(C) 1.30 hrs. (D) 120 minutes

ANSWERS KEY

91. (C)
92. (C)
93. (C)
94. (D)
95. (B)
96. (D)
97. (B)
98. (B)
99. (A)
100. (C)
101. (C)
102. (D)
103. (B)
104. (A)
105. (C)
106. (D)
107. (B)
108. (A)
109. (D)
110. (A)
111. (A)
112. (C)
113. (D)
114. (C)
115. (C)
116. (C)
117. (C)
118. (D)
119. (C)
120. (B)
121. (C)
122. (D)
123. (C)
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125. (A)
126. (D)
127. (C)
128. (A)
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130. (D)
131. (B)
132. (D)
133. (A)
134. (B)
135. (D)
136. (D)
137. (A)
138. (D)
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143. (A)
144. (D)
145. (A)
146. (C)
147. (C)
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151. (D)
152. (D)
153. (B)
154. (B)
155. (D)
156. (C)
157. (B)
158. (B)
159. (A)
160. (A)
161. (D)
162. (D)
163. (A)
164. (D)
165. (D)
166. (B)
167. (C)
168. (B)
169. (D)
170. (A)
171. (A)
172. (C)
173. (A)
174. (A)
175. (A)
176. (C)
177. (C)
178. (C)
179. (C)
180. (C)

Hints and Solutions

91. (C)

Hint: NCERT Pg. No.-35,38,

Interestingly, while most algal genera are haplontic, some of them such as Ectocarpus, Polysiphonia, kelps are haplo-diplontic. Fucus, an alga is diplontic. Main plant body of the bryophyte is haploid. It produces gametes, hence is called a gametophyte. ,This event is a precursor to the seed habit considered an important step in evolution.

92. (C)

Hint: NCERT Pg.No-33,38,43

The red algae usually reproduce vegetatively by fragmentation. They reproduce asexually by non-motile spores and sexually by non-motile spores. All pteridophytes exhibit this pattern of haplodiplontic life cycle

93. (C)

Hint: NCERT Pg.No-38

Genera like Selaginella and Salvinia which produce two kinds of spores, macro (large) and micro (small) spores, are known as heterosporous. The megaspores and microspores germinate and give rise to female and male gametophytes, respectively. The female gametophytes in these plants are retained on the parent sporophytes for variable periods.

94. (D)

Hint: NCERT Pg.No-35

The plant body of bryophytes is more differentiated than that of algae. It is thallus-like and prostrate or erect, and attached to the substratum by unicellular or multicellular rhizoids.

95. (B)

Hint: Sphagnum and Pteris belong to the category of bryophytes and pteridophytes and exhibit a haplo-diplontic life cycle while the Pinus and cycads belong to gymnosperms or Ectocarpus thallophytes.

96. (D)

Hint: NCERT Pg. No-32

Spirogyra belongs to Chlorophyceae. Protonema is a characteristic of the bryophytes and Fucoxanthin is the characteristic of Phaeophyceae.

97. (B)

All diplontic plants.

98. (B)

Hint: NCERT Pg.No-36

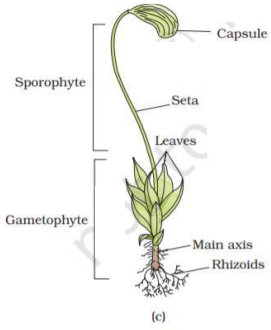
The sporophyll is a spore-bearing leaf. Because it is a sporophyte organ, the sporophyll is **diploid** (2n). The sporophyll grows clusters of specialized 2n structures called sporangia. The sporophytes bear sporangia that are subtended by leaf-like appendages called sporophylls

With the exception of ferns, Lycopodium is the only **lower vascular** plant which exhibits such variations in the pattern of primary xylem and phloem in stems.

Fucus, an alga is diplontic.

99. (A)

Hint: NCERT Pg.No-34



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Gemmae are green, multicellular, asexual buds, which develop in small receptacles called gemma cups located on the thalli. The gemmae become detached from the parent body and germinate to form new individuals. Diploid sporophyte present in some algae.

100. (C)

Hint: NCERT Pg.No-33

Pyrenoids contain protein besides starch. Some algae may store food in the form of oil droplets.

Food is stored as complex carbohydrates, which may be in the form of laminarin or mannitol.

101. (C)

a. Cycas	i. Diplontic
b. Psilotum	ii. motile sexual stage
c. Kelp	iii. fucoxanthin

102. (D)

All red algae are oogamous, All brown algae have fucoxanthin, All Green algae have haploid Gametophyte.

103. (B)

Hint: NCERT Pg.No-38

Genera like *Selaginella and Salvinia* which produce two kinds of spores, macro (large) and micro (small) spores, are known as heterosporous. The megaspores and microspores germinate and give rise to female and male gametophytes, respectively. The female gametophytes in these plants are retained on the parent sporophytes for variable periods.

104. (A)

Hint: NCERT Pg.No-38,35

Genera like Selaginella and Salvinia which produce two kinds of spores, macro (large) and micro (small) spores, are known as heterosporous. The megaspores and microspores germinate and give rise to female and male gametophytes, respectively. The female gametophytes in these plants are retained on the parent sporophytes for variable periods. The development of the zygotes into young embryos take place within the female gametophytes. This event is a precursor to the seed habit. The plant body of bryophytes is more differentiated than that of algae. It is thallus-like and prostrate or erect, and attached to the substratum by unicellular or multicellular rhizoids

105. (C)

a. Phycoerythrin	i. Sea weed
b. Sphagnum	ii. Protonema
c. Pteris	iii. Free living sporophyte

106. (D)

Hint: Rhizoids**,** prothallus, protonema are haploid

107. (B)

Hint: Unlike bryophytes and pteridophytes, in gymnosperms the male and the female gametophytes do not have an independent free-living existence. They remain within the sporangia retained on the sporophytes.

108. (A)

Hint: NCERT Pg.No-36

The capsule contains spores. Spores are formed after meiosis.

109. (D)

Hint: NCERT Pg.No-36

The predominant stage of the life cycle of a moss is the gametophyte which consists of two stages. The first stage is the protonema stage, which develops directly from a spore.

110. (A)

Hint: The Pteridophytes include horsetails and ferns. Pteridophytes are used for medicinal purposes and as soil-binders. They are also frequently grown as ornamentals.

111. (A)

a. Ulothrix	i. Filamentous
b. Ginkgo	ii. Integumented ovule
c. Volvox	iii. Colonial

112. (C)

Hint: NCERT Pg. No-41

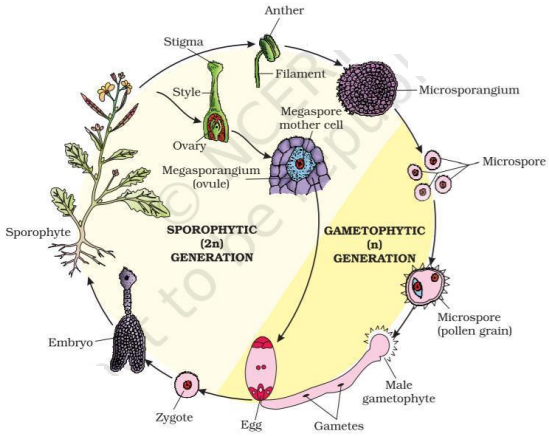


Figure 3.6 Life cycle of an angiosperm

113. (D)

Hint: NCERT Pg.No-39

Unlike bryophytes and pteridophytes, in gymnosperms the male and the female gametophytes do not have an independent free-living existence. They remain within the sporangia retained on the sporophytes.

114. (C)

Hint: NCERT Pg.No-39

However, in cycas male cones and megasporophylls are borne on different trees. The megaspore mother cell is differentiated from one of the cells of the nucellus.

115. (C)

Hint: NCERT Pg.No-38

In majority of the pteridophytes all the spores are of similar kinds; such plants are called homosporous. Genera like *Selaginella and Salvinia* which produce two kinds of spores, macro (large) and micro (small) spores, are known as heterosporous.

116. (C)

Lycopodium (from Greek *lukos*, wolf and *podion*, diminutive of *pous*, foot) is a genus of clubmosses, also known as **ground pines** or **creeping cedars**, in the family Lycopodiaceae.

117. (C)

Hint: NCERT Pg.No-43

Interestingly, while most algal genera are haplontic, some of them such as Ectocarpus, Polysiphonia, kelps are haplo-diplontic. Fucus, an alga is diplontic.

118. (D)

Hint:(Cycas) small specialised roots called coralloid roots are associated with N_2 - fixing cyanobacteria in gymnosperms.

The diploid sporophyte is represented by a dominant, independent, photosynthetic, vascular plant body. It alternates with multicellular, saprophytic/autotrophic, independent but short-lived haploid gametophyte. Such a pattern is known as haplo-diplontic life cycle. All pteridophytes exhibit this pattern

119. (C)

Bryophytes are non-vascular terrestrial plants of moist habitats in which a multicellular diploid sporophyte lives as a parasite on an independent multicellular haploid gametophyte that develops multicellular jacketed sex organs.

In pteridophytes, the main plant body is a sporophyte which is differentiated into true root, stem and leaves and gametophyte is small or inconspicuous, and it is usually independent.

Gymnosperms and Angiosperms do not produce spores.

120. (B)

Hint: NCERT Pg.No-36

The first stage is the protonema stage, which develops directly from a spore. It is a creeping, green, branched and frequently filamentous stage. The second stage is the leafy stage, which develops from the secondary protonema as a lateral bud. They consist of upright, slender axes bearing spirally arranged leaves. *Funaria, Polytrichum and Sphagnum*

121. (C)

Hint: NCERT Pg.No-33

Sargassum (Phaeophyceae Brown algae) - Chl c

122. (D)

Hint: NCERT Pg.No-42,43

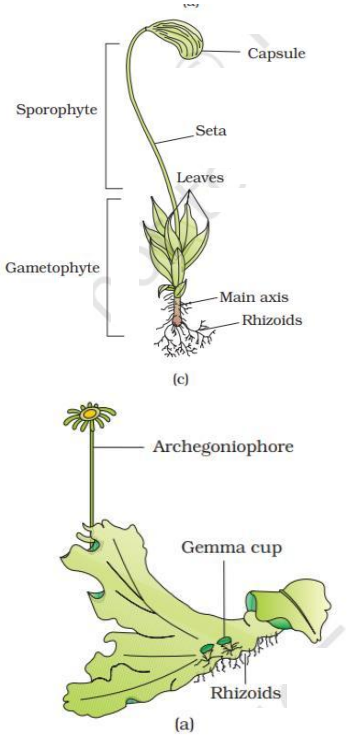
Haplo-Diplontic life cycle observed in 8 in following plants. This life cycle present only in Bryophytes and pteridophytes. So, *Sphagnum, Polytrichum, Marchantia* and R*iccia* belongs to Bryophyta and *Selaginella, Pteris, Dryopteris and* belongs to pteridophyta. *Polysiphonia* is alga That's why they consists Haplo-Diplontic life cylcle.

123. (C)

All seed bearing plants i.e., gymnosperms and angiosperms are having vascular bundles

124. (A)

Hint: NCERT Pg.No-34



125. (A)

Hint: NCERT Pg.No-38

Genera like Selaginella and Salvinia which produce two kinds of spores, macro (large) and micro (small) spores, are known as heterosporous. The megaspores and microspores germinate and give rise to female and male gametophytes, respectively. The female gametophytes in these plants are retained on the parent sporophytes for variable periods. The development of the zygotes into young embryos take place within the female gametophytes.

126. (D)

Hint: NCERT Pg.No-39

Unlike bryophytes and pteridophytes, in gymnosperms the male and the female gametophytes do not have an independent free-living existence. They remain within the sporangia retained on the sporophytes.

127. (C)

Hint: NCERT Pg.No-35,36,38,40

Archaegonium, endosperm in gymnosperm, pollen grain, prothallus and protonema

The endosperm of gymnosperms is **haploid**. It is a pre-fertilization tissue and is equivalent to female gametophyte, hence it is haploid in nature but in angiosperms it is post-fertilization tissue and is generally triploid in nature.

128. (A)

Hint: NCERT Pg.No-39

The strobili bearing microsporophylls and microsporangia are called microsporangiate or male strobili. The microspores develop into a male gametophytic generation which is highly reduced and is confined to only a limited number of cells.

129. (B)

Hint: NCERT Pg.No-38

In Cycas the pinnate leaves persist for a few years

130. (D)

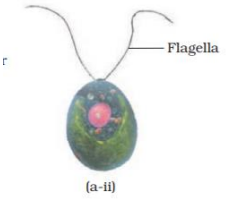
Hint: NCERT Pg.No-39

However, in cycas male cones and megasporophylls are borne on different trees.

131. (B)

Hint: NCERT Pg.No-31

Unicellular cells, spherical or slightly cylindrical, a papilla may be present or absent. Chloroplasts green and usually cup-shaped. A key feature of the genus is its two anterior flagella, each as long as the other The flagellar microtubules may each be disassembled by the cell to provide spare material to rebuild the other's microtubules if they are damaged.



132. (D)

Hint: NCERT Pg.No-43

Ectocarpus, Polysiphonia, kelps are haplo-diplontic.

133. (A)

Hint: NCERT Pg.No-30

Cladophora is a genus of reticulated filamentous Ulvophyceae (gree n algae). The genus Cladophora contains many species that are very hard to tell apart and classify, mainly because of the great variation in their appearances, which is affected by habitat, age and environmental conditions. Fusion between one large, non-motile (static) female gamete and a smaller, motile male gamete is termed oogamous, e.g., Volvox, Fucus.

134. (B)

Ficus belongs to angiosperms.

135. (D)

Hint: NCERT Pg.No-36

The first stage is the protonema stage, which develops directly from a spore. It is a creeping, green, branched and frequently filamentous stage.

136. (D)

Hint: NCERT Pg.No-168

Recombination nodule is form in Pachytene

137. (A)

Hint: NCERT Pg.No-163

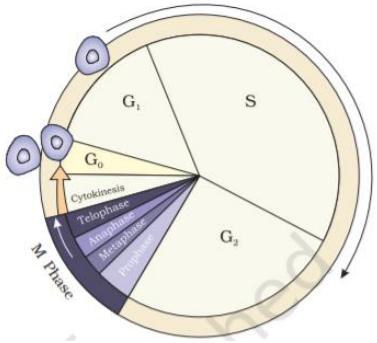
G2 phase, proteins are synthesised in preparation for mitosis while cell growth continues.

The M Phase starts with the nuclear division, corresponding to the separation of daughter chromosomes (karyokinesis) and usually ends with division of cytoplasm (cytokinesis).

During G1 phase the cell is metabolically active and continuously grows but does not replicate its DNA

138. (D)

Hint: NCERT Pg.No-163



139. (A)

Hint: NCERT Pg.No-163

S or synthesis phase marks the period during which DNA synthesis or replication takes place. During this time the amount of DNA per cell doubles. If the initial amount of DNA is denoted as 2C then it increases to 4C. In animal cells, during the S phase, DNA replication begins in the nucleus, and the centriole duplicates in the cytoplasm. During the G2 phase, proteins are synthesised in preparation for mitosis while cell growth continues.

140. (C)

Hint: NCERT Pg.No-163

S or synthesis phase marks the period during which DNA synthesis or replication takes place.

141. (C)

Hint: NCERT Pg.No-163

S or synthesis phase marks the period during which DNA synthesis or replication takes place. During this time the amount of DNA per cell doubles. If the initial amount of DNA is denoted as 2C then it increases to 4C. In animal cells, during the S phase, DNA replication begins in the nucleus, and the centriole duplicates in the cytoplasm. During the G2 phase, proteins are synthesised in preparation for mitosis while cell growth continues.

142. (D)

Hint: NCERT Pg.No-167

Cell growth results in disturbing the ratio between the nucleus and the cytoplasm. It therefore becomes essential for the cell to divide to restore the nucleo-cytoplasmic ratio.

143. (A)

Hint: NCERT Pg.No-169

Although in many cases the chromosomes do undergo some dispersion, they do not reach the extremely extended state of the interphase nucleus. The stage between the two meiotic divisions is called interkinesis and is generally short lived. Interkinesis is followed by prophase II, a much simpler prophase than prophase I.

144. (D)

Hint: NCERT Pg.No-166

Centromeres split and chromatids separate. l Chromatids move to opposite poles.

145. (A)

Hint: NCERT Pg.No-168

Pachytene (Prophase I): During this stage bivalent chromosomes now clearly appears as tetrads. This stage is characterised by the appearance of recombination nodules, the sites at which crossing over occurs between non-sister chromatids of the homologous chromosomes. Crossing over is the exchange of genetic material between two homologous chromosomes. Crossing over is also an enzyme-mediated process and the enzyme involved is called recombinase.

146. (C)

Hint: NCERT Pg.No-169

Anaphase I: The homologous chromosomes separate, while sister chromatids remain associated at their centromeres. Aneuploidy is **the presence of an abnormal number of chromosomes in a cell**, for example a human cell having 45 or 47 chromosomes instead of the usual 46.

147. (C)

Hint: NCERT Pg.No-165

The plane of alignment of the chromosomes at metaphase is referred to as the metaphase plate.

148. (A)

Hint: NCERT Pg.No-167

Four haploid cells are formed at the end of meiosis II.

149. (D)

Hint: NCERT Pg.No-163

There is no increase in the chromosome numberin S Phase if the cell had diploid or 2n number of chromosomes at G1 , even after S phase the number of chromosomes remains the same, i.e., 2n. In animal cells, during the S phase, DNA replication begins in the nucleus, and the centriole duplicates in the cytoplasm. During the G2 phase, proteins are synthesised in preparation for mitosis while cell growth continues

150. (D)

Hint: NCERT Pg.No-169

Anaphase II: It begins with the simultaneous splitting of the centromere of each chromosome (which was holding the sister chromatids together), allowing them to move toward opposite poles of the cell.So genetic material separates equally.

151. (D)

Hint: NCERT Pg.No-168

Zygotene:During this stage chromosomes start pairing together and this process of association is called synapsis. Such paired chromosomes are called homologous chromosomes. Electron micrographs of this stage indicate that chromosome synapsis is accompanied by the formation of complex structure called synaptonemal complex.

152. (D)

The G1 checkpoint, at the G1 /S transition.

The G2, at the G2 /M transition.

The spindle checkpoint, at the transition from metaphase to anaphase.

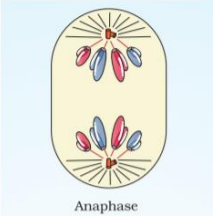
153. (B)

Hint: NCERT Pg.No-168

Synaptonemal complex formed by a pair of synapsed homologous chromosomes is called a bivalent or a tetrad.

154. (B)

Hint: NCERT Pg.No-166



155. (D)

Hint: NCERT Pg.No-163

In animal cells, during the S phase, DNA replication begins in the nucleus, and the centriole duplicates in the cytoplasm.

156. (C)

Hint: NCERT Pg.No-166

In plant cells, wall formation starts in the centre of the cell and grows outward to meet the existing lateral walls. The formation of the new cell wall begins with the formation of a simple precursor, called the cell-plate that represents the middle lamella between the walls of two adjacent cells.and then cell membrane is formed

157. (B)

Hint: NCERT Pg.No-168

The beginning of diplotene is recognised by the dissolution of the synaptonemal complex and the tendency of the recombined homologous chromosomes of the bivalents to separate from each other except at the sites of crossovers. These X-shaped structures, are called chiasmata

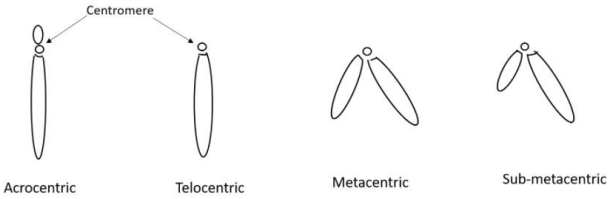
158. (B)

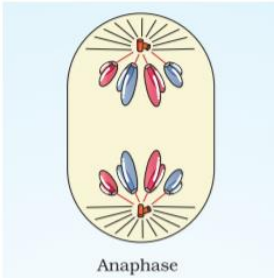
Hint: NCERT Pg.No-163

If the initial amount of DNA is denoted as 2C then it increases to 4C. However, there is no increase in the chromosome number; if the cell had diploid or 2n number of chromosomes at G1 , even after S phase the number of chromosomes remains the same, i.e., 2n. In animal cells, during the S phase, DNA replication begins in the nucleus, and the centriole duplicates in the cytoplasm. During the G2 phase, proteins are synthesised in preparation for mitosis while cell growth continues.For haploid cell it will be C

159. (A)

Hint: NCERT Pg.No-166





160. (A)

Hint: NCERT Pg.No-163

G1 phase corresponds to the interval between mitosis and initiation of DNA replication. During G1 phase the cell is metabolically active and continuously grows but does not replicate its DNA

161. (D)

Hint: NCERT Pg.No-167

Four haploid cells are formed at the end of meiosis II

40/4=10

162. (D)

Hint: NCERT Pg.No-167

We come across meiosis during gametogenesis in plants and animals. This leads to the formation of haploid gametes.

163. (A)

Hint: NCERT Pg.No-163

S or synthesis phase marks the period during which DNA synthesis or replication takes place. During this time the amount of DNA per cell doubles.

164. (D)

Hint: NCERT Pg.No-166

Anaphase is the stage which shows the following key events: l Chromosomes cluster at opposite spindle poles and their identity is lost as discrete elements. l Nuclear envelope assembles around the chromosome clusters. l Nucleolus, golgi complex and ER reform

165. (D)

Hint: NCERT Pg.No-168

Crossing over is the exchange of genetic material between two homologous chromosomes. Crossing over is also an enzyme-mediated process and the enzyme involved is called recombinase

166. (B)

Hint: NCERT Pg.No-168

During zygotene stage chromosomes start pairing together and this process of association is called synapsis. Such paired chromosomes are called homologous chromosomes.

167. (C)

Hint: NCERT Pg.No-165

As each chromosome moves away from the equatorial plate, the centromere of each chromosome is towards the pole and hence at the leading edge, with the arms of the chromosome trailing behind

168. (B)

Hint: NCERT Pg.No-166

In plant cells, wall formation starts in the centre of the cell and grows outward to meet the existing lateral walls. The formation of the new cell wall begins with the formation of a simple precursor, called the cell-plate that represents the middle lamella between the walls of two adjacent cells

169. (D)

Hint: NCERT Pg.No-163

If the initial amount of DNA is denoted as 2C then it increases to 4C. However, there is no increase in the chromosome number; if the cell had diploid or 2n number of chromosomes at G1 , even after S phase the number of chromosomes remains the same, i.e., 2n.

170. (A)

Hint: NCERT Pg.No-168

In oocytes of some vertebrates, diplotene can last for months or years.

171. (A)

Hint: NCERT Pg.No-168

During leptotene stage the chromosomes become gradually visible under the light microscope. The compaction of chromosomes continues throughout leptotene.

172. (C)

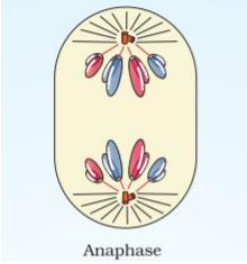
Hint: NCERT Pg.No-36

The capsule contains spores. Spores are formed after meiosis.

173. (A)

Hint: NCERT Pg.No-165,166

At the onset of anaphase, each chromosome arranged at the metaphase plate is split simultaneously and the two daughter chromatids, now referred to as chromosomes of the future daughter nuclei,



begin their migration towards the two opposite poles

174. (A)

Hint: NCERT Pg.No-163

G1 phase corresponds to the interval between mitosis and initiation of DNA replication

175. (A)

Hint: NCERT Pg.No-164

Prophase which is the first stage of mitosis follows the S and G2 phases of interphase. Prophase is marked by the initiation of condensation of chromosomal material. The chromosomal material becomes untangled during the process of chromatin condensation.

176. (C)

Hint: NCERT Pg.No-163

During the G2 phase, proteins are synthesised in preparation for mitosis.

177. (C)

Hint: NCERT Pg.No-166

Mitosis accomplishes not only the segregation of duplicated chromosomes into daughter nuclei (karyokinesis), but the cell itself is divided into two daughter cells by a separate process called cytokinesis at the end of which cell division is complete.

1 cell gives 2 daughter cells (1st mitosis)

2 cells give 4 daughter cells (2nd mitosis)

4 cells give 8 daughter cells (3rd mitosis)

8 cells give 16 daughter cells (4th mitosis)

16 cells give 32 daughter cells (5th mitosis)

32 cells give 64 daughter cells (6th mitosis)

178. (C)

Hint: NCERT Pg.No-168

By the end of diakinesis, the nucleolus disappears and the nuclear envelope also breaks down. Diakinesis represents transition to metaphase.

179. (C)

Hint: NCERT Pg.No-164

Some cells in the adult animals do not appear to exhibit division (e.g., heart cells) and many other cells divide only occasionally, as needed to replace cells that have been lost because of injury or cell death.

180. (C)

Hint: NCERT Pg.No-163

Yeast for example, can through the cell cycle in 90 minutes.