

: HINTS AND SOLUTIONS :

3 (b)

$$e = n \frac{dB}{dt}$$

$$\therefore dt = \frac{nAB}{e} = \frac{50 \times 100 \times 10^{-4} \times 2 \times 10^{-2}}{5}$$

$$= 0.1 \text{ s}$$

4 (c)

$$e = \frac{d\phi}{dt} = \frac{1 - 0.1}{0.1} = \frac{0.9}{0.1} = 9 \text{ V.}$$

$$I = \frac{e}{R} = \frac{1}{100} = 0.01 \text{ A}$$

5 (c)

magnetic flux linked with coil $\phi = Bna$

$$d\phi = \phi_2 - \phi_1 = (B_2 - B_1)nA$$

$$= (0.1 - 0.05) \times 100 \times (10 \times 5 \times 10^{-4})$$

$$= 250 \times 10^{-4}$$

emf induced in coil $e = \frac{d\phi}{dt} = \frac{d\phi}{dt} = \frac{250 \times 10^{-4}}{0.05}$

$$= 0.5 \text{ V}$$

6 (d)

$\phi = nBA$, so it is independent in density.

11 (b)

$$e = -L \frac{dI}{dt} = -5 \times 2 = -10 \text{ V}$$

12 (a)

$$E = \frac{1}{2} LI^2 = \frac{1}{2} \times 50 \times 10^{-3} \times (4)^2$$

$$= \frac{1}{2} \times 50 \times 10^{-3} \times 16$$

$$= 50 \times 10^{-3} \times 8 = 0.4 \text{ J}$$

14 (a)

Inductors are connected in parallel then the equivalent

$$\frac{1}{L_p} = \frac{1}{L_1} + \frac{1}{L_2} + \frac{1}{L_3} = \frac{1}{3} + \frac{1}{3} + \frac{1}{3} = \frac{3}{3} = 1$$

$$L_p = 1 \text{ H}$$

16 (d)

$V_p = 200 \text{ volt}, V_s = 25 \text{ volt}, I_s = 2 \text{ A}, I_p = ?$

$$\frac{V_s}{V_p} = \frac{I_p}{I_s}$$

$$I_p \frac{V_s}{V_p} \times I_s = \frac{25}{200} \times 2 = 0.25 \text{ A} = 250 \text{ mA}$$

17 (a)

$$V_s = \frac{n_s}{n_p} \times V_p = \frac{5000}{500} \times 20 = 200 \text{ V frequency}$$

remains unchanged

18 (d)

$$\frac{V_s}{V_p} = \frac{n_s}{n_p}; \frac{V_s}{V_p} = \frac{I_p}{I_s}; \frac{I_p}{I_s} = \frac{n_s}{n_p} = \frac{4}{5}$$

19 (a)

$\phi = MI, d\phi = M dI$

$$M = \frac{d\phi}{dI} = \frac{1.6}{8} = 0.2 \text{ H}$$

20 (b)

$$e = -M \frac{dI}{dt} \Rightarrow 15 \times 10^{-3} = M \times \frac{3}{10}$$

$$\Rightarrow M = 0.05 \text{ H}$$

21 (d)

$$L = \frac{\phi}{I} = \frac{50}{5} = 10 \text{ H}$$

22 (c)

$$M = \frac{e}{di/dt} = e \cdot dt/di = \frac{1000 \times 0.01}{2} = 5 \text{ H}$$

23 (b)

$e_0 = nAB\omega = naB \cdot 2\pi n$

$$= 2 \times 7 \times 10^{-5} \times 2 \times \frac{22}{7} \times 100 = 88 \text{ mV}$$

Question Numbers – 1, 7,8,9,10,15,25 – All conceptual understanding based

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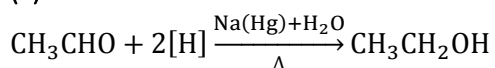
1 (b)

The isomeric primary alcohols of $C_4H_{10}O$ are :

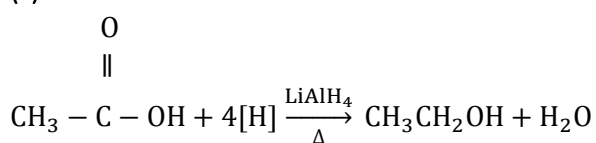
(1) Butan-1-ol

(2) 3-Methyl propan-1-ol

4 (a)



5 (c)



8 (c)

Formaldehyde + Grignard Reagent \rightarrow 1° alcohol

10 (a)

Y on oxidation gives acetone.

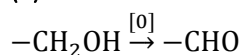
Therefore Y is Propan-2-ol.

X on hydration gives Propan-2-ol. Therefore X is Propene.

11 (a)

During breaking of O - H bond, order of reactivity is $1^\circ > 2^\circ > 3^\circ$.

12 (a)



18 (c)

1 double bond \Rightarrow Sp^2 hybridised.

All rest other other Questions are conceptually based

Biology

- 1 (c)
Smoking causes inflammation of lung alveoli, which decreases surface area for gaseous exchange and causes emphysema.
- 2 (a)
- 3 (d)
The drug morphine is obtained from *P. somniferum*.
- 4 (b)
Stimulant drugs increase the excitement, self confidence and mental alertness temporarily. Stimulants include all the drugs that stimulate the nervous system such as caffeine, cocaine and amphetamines.
- 5 (a)
Alcoholism is dependency of a person on regular consumption of alcohol. In this cerebellum becomes affected which results the loss of muscle coordination so, affected person shows staggering gait and incoherent speech.
- 6 (a)
Cocaine is an alkaloid obtained from the leaves of *Erythroxylon coca* of family-
- 7 (a)
Charas is the dried resinous extract from the flowering tops and leaves of *Cannabis sativa*. In some countries, it is called **hashish**
- 8 (b)
Alcoholism is a chronic progressive disease
- 9 (a)
Krebs 'cycle involves 8 steps to oxidize 2 molecules of acetyl Co-A produced in transition reaction completely into 4CO_2 , $10\text{H}_2\text{O}$, 2ATP , 2FADH_2 and $6\text{NADH}+\text{H}^+$
- 10 (c)
Glycolysis is the degradation of glucose molecule with net gain of 2ATP molecules per glucose molecule. It occurs both in **aerobic** and **anaerobic** conditions.
- 11 (d)
RQ is the ratio of volume of carbon dioxide evolved and volume of oxygen consumed.
- 12 (d)
- 13 (c)
- 14 (d)
Plants, unlike animals have no specialised organs for gaseous exchange but they have stomata and lenticels for this purpose
- 15 (c)
- 16 (b)
- | | | |
|-----------------|---|---|
| Glycogenesis | — | Conversion of glucose to glycogen. |
| Glycosuria | — | Excretion of glucose in urine. |
| Glyconeogenesis | — | Conversion of non-carbohydrate sources to glycogen. |
| Glycogenolysis | — | Conversion of glycogen to glucose. |

- 17 (b)
Sugarcane is a C_4 - plant, which shows high efficiency of carbon dioxide fixation due to **Hatch and Slack cycle**.
- 18 (b)
 In C_4 -plants, the Hatch and Slack pathway involves two carboxylation reaction, one taking place in chloroplast of mesophyll cells and other in chloroplast of bundle sheath cells.
- 19 (b)
 90% photosynthesis (CO_2 assimilation) in the world is done by algae (photoplanktons).
- 20 (c)
 The first step in dark reaction of C_3 plants is carboxylation of ribulose 1-5 biphosphate by atmosphere CO_2 in presenic of enzyme, Rubisco to form PGA Ribulose 1-5 bisphosphate+ $CO_2 + H_2O \rightarrow 3$ PGA.
- 21 (a)
Dicker and Tio (1959)
- 22 (a)
Robert Emerson
- 23 (b)
 PS-I is driven by far red light and PS-II by red light.
- 33 (a)
 Apiculture is the rearing of bee or bee keeping for the production of honey and wax
- 34 (d)
 III and IV.
- 35 (c)
 Both (a) and (b).
- 36 (b)
 Pomato is somatic hybrid between potato and tomato and Bomato is somatic hybrid between brinjal and tomato. Somatic hybrid are also produced between rice and carrot
- 37 (c)
 Cultivation of axillary or apical shoot meristem is known as meristem culture.
- 38 (d)
 All of these.
- 39 (a)
 A – Male gamete; B- Antipodal cells; C – Egg cell; D-Pollen tube.
 In angiosperms, the pollen tube carries two male gametes, one fuses with egg to produce zygote, while second fuses with secondary nucleus to produce triploid primary endosperm nucleus.
- 40 (d)
 Double fertilization is the unique feature of flowering plants, whereby, from a single pollen grain, the two sperm nuclei within the pollen tube fuse with different nuclei within the embryo sac of the ovule.

- 41 (b)
The embryo formation without fertilization is known as **apogamy**.
- 42 (c)
- 43 (d)
Both (a) and (c)
Filiform apparatus are the special thickening of synergid cells for guiding the pollen tube and male gametes, so that the fusion takes place properly
- 44 (a)
Nucellus Integuments encloses a mass of cells called nucellus. (a) Parts of the ovule showing a large megaspore mother cell, a dyad and a tetrad of megaspore (b) 2, 4 and 8-nucleate stages of embryo sac and a mature embryo sac (c) A diagrammatic representation of the mature embryo sac
- 45 (c)
Though organogenesis is a part of post fertilization events but it is included in the embryogenesis.
- 46 (a)
Continued self breeding means there is continuation of genetic material to the progeny from the parents. As they are the product of same genotype of same plant.
- 47 (c)
As the seed matures, its water content is reduced and seed becomes relatively dry (10-15% moisture by mass).
- 48 (a)
Androecium Male reproductive part of the flower is called androecium. **Gynoecium** It is the female reproductive part
- 49 (b)
Antibiotic is a substance produced by microorganism that even in low concentration can inhibit or kill other microorganism,
- 50 (c)
CW Hufeland 1819.