: 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)**

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

$I = \frac{e}{R} = \frac{1}{100} = 0.09\text{ A}$

5 **(c)**

magnetic flux linked with coil $\phi = \text{Bna}$

$d\phi = \phi_2 - \phi_1 = (B_2 - B_1)n\text{ A}$

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

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

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

$= 0.5\text{V}$

6 **(d)**

ϕ=nBA, so it is independt 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 parellel then the equiva

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

$L_p = 1\text{H}$

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)

$\phi = \text{MI}, d\phi = \text{M dl}$

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

20 (b)

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

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

21 (d)

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

22 (c)

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

23 (b)

$e_0 = \text{nAB}\omega = \text{naB}.\,2\pi n$

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

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

: HINTS AND SOLUTIONS :

1 **(b)**

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

(1) Butan-1-ol

(2) 3-Methyl propan-1-ol

4 **(a)**

$$CH_3CHO + 2[H] \xrightarrow[\Delta]{Na(Hg)+H_2O} CH_3CH_2OH$$

5 **(c)**

$$CH_3 - \overset{\overset{O}{\|}}{C} - OH + 4[H] \xrightarrow[\Delta]{LiAlH_4} CH_3CH_2OH + H_2O$$

8 **(c)**

Formaldehyde + Grignard Reagent $\rightarrow 1^0$ 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 $1^0 > 2^0 > 3^0$.

12 **(a)**

$$-CH_2OH \xrightarrow{[0]} -CHO$$

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 $4CO_2$, $10H_2O$, 2ATP, $2FADH_2$ and $6NADH+H^+$

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_3plants is carboxylation of ribulose 1-5 biposphate 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 property

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 nature 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.