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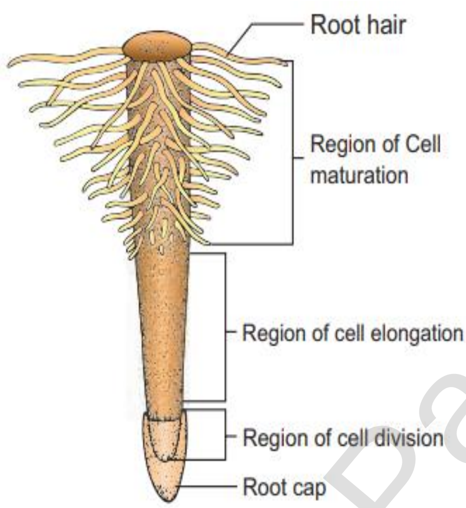
XI COMMON PUBLIC EXAMINATION, MARCH -2024 (18-03-2024)

TENTATIVE ANSWER KEY
Question type A

SUB: BIO-BOTANY MARKS: 35

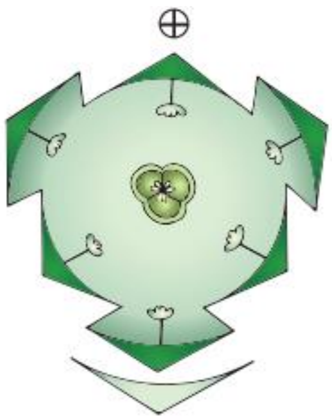
Q.NO	CONTENT	MARKS	MODE OF QUESTION
	PART -I		
I.	CHOOSE THE CORRECT ANSWER	8 X 1 = 8	BOOK BACK / BOOK INSIDE/ CREATIVE
1	**b) 3 inches**	1	BOOK INSIDE
2	**d) Multicarpellary, apocarpous ovary**	1	BOOK BACK
3	**Calcium**	1	BOOK BACK
4	**d) Mitochondria**	1	BOOK INSIDE
5	**c) Chlorella**	1	BOOK BACK
6	**d) Cambium for secondary growth**	1	BOOK INSIDE
7	**b) Cuticular**	1	BOOK BACK
8	**d) PSI and PSII involved in the formation of NADPH + H^+**	1	BOOK BACK

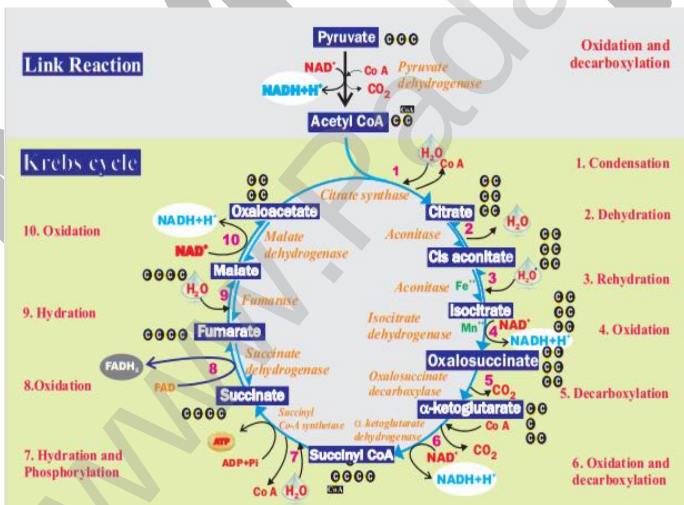
Q.NO	CONTENT	MARKS	MODE OF QUESTION
II.	**PART -II** ANSWER **ANY FOUR** OF THE FOLLOWING	4 X 2 = 8	BOOK BACK / BOOK INSIDE/ CREATIVE
9	**Differentiate Dendrochronology and Dendroclimatology** **Dendrochronology:** Each annual ring corresponds to one year's growth and on the basis of these rings, the age of a particular plant can easily be calculated. The determination of the age of a tree by counting the annual rings is called dendrochronology. **Dendroclimatology:** It is a branch of dendrochronology concerned with constructing records of past climates and climatic events by analysis of tree growth characteristics, especially growth rings.	2	BOOK INSIDE
10	**Non-living Characters of Virus (any 2 point)** • Can be crystallized. • Absence of metabolism. • Inactive outside the host. • Do not show functional autonomy. • Energy producing enzyme system is absent.	2	BOOK INSIDE
11	**Synapsis** Pairing of homologous chromosomes takes place and it is known as synapsis.	2	BOOK INSIDE
12	**Respiratory quotient is zero in succulent plants** In some succulent plants like Opuntia, Bryophyllum carbohydrates are partially oxidised to organic acid, particularly malic acid without corresponding release of CO2 but O2 is consumed hence the RQ value will be zero **(or)** RQ of glucose in succulents= $\frac{\text{zero molecule of } CO_2}{\text{3 molecules of } O_2}$ = 0 (zero)	2	BOOK BACK
13	**(a) A Sterile stamen** Sterile stamens are called Staminodes. **(b) Stamens are united in one bundle** Monadelphous	2	BOOK BACK
14	**parameters which control water potential** (i) Solute concentration or Solute potential (Ψs) (ii) Pressure potential (Ψ p)	2	BOOK BACK

Q.NO	CONTENT	MARKS	MODE OF QUESTION
III.	**PART -III** ANSWER **ANY THREE** OF THE FOLLOWING **19 COMPULSORY**	3 X 3 = 9	BOOK BACK / BOOK INSIDE/ CREATIVE
15	**Hydroponics or Soilless culture** In hydroponics roots are immersed in the solution containing nutrients and air is supplied with help of tube	3	BOOK INSIDE
16	**Regions of root** 	3	BOOK BACK
17	**Differentiate Haplontic Life Cycle and Diplontic Life Cycle** **Haplontic Life Cycle**: Gametophytic phase is dominant, photosynthetic and independent, whereas sporophytic phase is represented by the zygote. Zygote undergoes meiosis to restore haploid condition. Example: Volvox, Spirogyra. **Diplontic Life Cycle**: Sporophytic phase (2n) is dominant, photosynthetic and independent. The gametophytic phase is represented by the single to few celled gametophyte. The gametes fuse to form Zygote which develops into Sporophyte. Example: Fucus, Gymnosperms and Angiosperms	3	BOOK INSIDE

18	<u>**Properties of Water (Any 3 points)**</u> • Adhesion and cohesion property • High latent heat of vaporisation • High melting and boiling point • Universal solvent • Specific heat capacity	3	BOOK INSIDE
19	<u>**Functions of the nucleus (Any 3 points)**</u> • Controlling all the cellular activities • Storing the genetic or hereditary information. • Coding the information in the DNA for the production of enzymes and proteins. • DNA duplication and transcription takes place in the nucleus. • In nucleolus ribosomal biogenesis takes place.	3	BOOK INSIDE

Q.NO	CONTENT	MARKS	MODE OF QUESTION
IV.	PART –IV ANSWER ALL THE QUESTION	2 X 5 = 10	BOOK BACK / BOOK INSIDE/ CREATIVE
20 (a)	<u>**Botanical description of Allium cepa**</u> <u>Habit</u>: Perennial herb with bulb. <u>Root</u>: Fibrous adventitious root system <u>Stem</u>: Underground bulb <u>Leaf</u>: a cluster of radical leaves emerges from the underground bulb, cylindrical and fleshy having sheathy leaf bases with parallel venation. <u>Inflorescence</u>: Scapigerous i.e. the inflorescence axis (peduncle) arising from the ground bearing a cluster of flowers at its apex. Pedicels are of equal length, arising from the apex of the peduncle which brings all flowers at the same level. Flower: Small, white, bracteate, ebrcteolate, pedicellate, complete, trimerous, actinomorphic and hypogynous. Flowers are protandrous. <u>Perianth:</u> Tepals 6, white,arranged in two whorls of three each, syntepalous showing valvate aestivation. <u>Androecium:</u> Stamens 6, arranged in two whorls of three each, epitepalous, apostamenous /free and opposite to tepals. Anthers dithecous, basifixed, introse, and dehiscing longitudinally. <u>Gynoecium:</u> Tricarpellary and syncarpous. Ovary superior, trilocular with two ovules in each locule on axile placentation. Style simple, slender with simple stigma. <u>Fruit:</u> A loculicidal capsule. <u>Seed:</u> Endospermous	5	BOOK INSIDE

	Floral Formula: Br.,Ebrl.,⊕,⚥,$P_{(3+3)}$+A_{3+3},$\underline{G}_{(3)}$  Floral diagram		
20 (b)	**Characteristics Features of DNA** •If one strand runs in the 5'-3' direction, the other runs in 3'-5' direction and thus are antiparallel (they run in opposite direction) The 5' end has the phosphate group and 3'end has the OH group. The angle at which the two sugars protrude from the base pairs is about 120°, for the narrow angle and 240° for the wide angle. The narrow angle between the sugars generates a minor groove and the large angle on the other edge generates major groove. • Each base is 0.34 nm apart and a complete turn of the helix comprises 3.4 nm or 10 base pairs per turn in the predominant B form of DNA. • DNA helical structure has a diameter of 20 A° and a pitch of about 34 A°. X-ray crystal study of DNA takes a stack of about 10 to go completely around the helix (360°). • Thermodynamic stability of the helix and specificity of base pairing includes (i) the hydrogen bonds between the complementary bases of the double helix (ii) stacking interaction between bases tend to stack about each other perpendicular to the direction of helical axis. Electron cloud interactions (∏ – ∏) between the bases in the helical stacks contribute to the stability of the double helix. • The phosphodiester linkages gives an inherent polarity to the DNA helix. They form strong covalent bonds, gives the strength and stability to the polynucleotide chain breaking the entire structure. Whereas in paranemic coiling the two strands simply lie alongside one another, making them easier to pull apart. • Based on the helix and the distance between each turns, the DNA is of three forms – A DNA, B DNA and Z DNA	5	BOOK BACK
21 (a)	**Krebs cycle** Two molecules of acetyl CoA formed from link reaction now enter into Krebs cycle. It is named after its discoverer, German Biochemist Sir Hans Adolf Krebs (1937). The enzymes necessary for TCA cycle are found in mitochondrial matrix except succinate dehydrogenase enzyme which is found in mitochondrial inner membrane CA cycle starts with condensation of acetyl CoA with oxaloacetate in the presence of	5	BOOK INSIDE

	water to yield citrate or citric acid. Therefore, it is also known as Citric Acid Cycle (CAC) or Tri Carboxylic Acid (TCA) cycle. It is followed by the action of different enzymes in cyclic manner. During the conversion of succinyl CoA to succinate by the enzyme succinyl CoA synthetase or succinate thiokinase, a molecule of ATP synthesis from substrate without entering the electron transport chain is called substrate level phosphorylation. animals a molecule of GTP is synthesized from GDP1Pi. In a coupled reaction GTP is converted to GDP with simultaneous synthesis of ATP from ADP1Pi. In three teps (4, 5, 9) in this cycle NAD1 is reduced to NADH1 H1 and at step 7 where FAD is reduce to FADH2. The summary of link reaction and Krebs cycle in Mitochondria is Two molecules of pyruvic acid formed at the end glycolysis enter into the mitochondrial matrix. Therefore, Krebs cycle is repeated twice for every glucose molecule where two molecules of pyruvic acid produces six molecules of CO2, eight molecules of NADH 1 H1, two molecules of FADH2 and two molecules of ATP. $\text{Pyruvic acid} + 4NAD^+ + FAD + 4H_2O + ADP + Pi \xrightarrow{\text{Mitochondrial matrix.}} 3CO_2 + 4NADH + 4H^+ + FADH_2 + H_2O + ATP.$ (Or) 		
21 (b)	**Lichens** The symbiotic association between algae and fungi is called lichens. The algal partner is called Phycobiont or Photobiont., and the fungal partner is called Mycobiont. Algae provide nutrition for fungal partner in turn fungi provide protection and also help to fix the thallus to the substratum through rhizinae. Asexual reproduction takes place through fragmentation, Soredia and Isidia. Phycobionts reproduce by	5	BOOK BACK

	akinetes, hormogonia, aplanospore etc., Mycobionts undergo sexual reproduction and produce ascocarps. Classification • Based on the habitat lichens are classified into following types: Corticolous(on Bark) Lignicolous(on Wood) Saxicolous(on rocks) Terricolous(on ground) Marine(on siliceous rocks of sea) Fresh water(on siliceous rock of fresh water). • On the basis of morphology of the thallus they are divided into Leprose (a distinct fungal layer is absent) Crustose-crust like; Foliose-leaf like; Fruticose- branched pendulous shrub like • The distribution of algal cells distinguishes lichens into two forms namely Homoiomerous (Algal cells venly distributed in the thallus) and Heteromerous (a distinct layer of algae and fungi present). • If the fungal partner of lichen belongs to ascomycetes, it is called Ascolichen and if it is basidiomycetes it is called Basidiolichen. Lichens secrete organic acids like Oxalic acids which corrodes the rock surface and helps in weathering of rocks, thus acting as pioneers in Xerosere. Usnic acid produced from lichens show antibiotic properties. Lichens are sensitive to air pollutants especially to sulphur-di-oxide. Therefore, they are considered as pollution indicators. The dye present in litmus paper used as acid base indicator in the laboratories is obtained from Roccella montagnei. Cladonia rangiferina (Reindeer moss) is used as food for animals living in Tundra regions.		

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