BOTANY

I

1) Phyllotaxy

2) c) Biosynthesis of glucose

3) Leucoplast

4) a) Gemmae

II

5) a) Plant growth promoters are involved in growth promoting activities such as cell division, cell enlargement, flowering, fruiting and seed formation.

b) Auxins, Gibberellins, cytokinins (any two)

6) a) The compound that are oxidised during respiration are known as respiratory substrate

b) Carbohydrates

7) a - Bryophytes

b - This plants can live in soil but are dependent on water for Sexual reproduction.

8) a - Ethylene

b - Ethylene is highly effective in fruit ripening. It enhance the respiration rate during ripening of the fruits. This rise in rate of respiration is called respiratory climatic.

9) a - Some cells in the adult animals do not appear to exhibit division (eg: Heart cells) and many other cells divide only occasionally, as needed to replace cells that have been lost because of injury or cell death. These cells that do not divide further exit G_1 phase to enter an inactive stage called quiescent stage (G_0) of the cell cycle.

b) S or Synthesis phase phase marks the period during which DNA synthesis or replication take 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.

10) Used in polishing, filtration of oils and syrups.

11) a) If a chemical process is affected by more than on factor, then it's rate will be determined by the factors which is nearest to it's minimal value: It is the factor which directly affects the process if it's quantity is changed.

b) The number, size, age, and orientation of leaves, mesophyll cells and chloroplasts, internal CO_2 concentration and the amount of chlorophyll are the internal factors which affect rate of photosynthesis.

12)

Metaphase	Anaphase
Spindle fibres attach to kinetochores of chromosomes. chromosomes are moved to spindle equator and get aligned along metaphase plate through spindle fibres to both poles	Centromeres split and chromatids separate. Chromatids move to opposite poles.

13

Stem	Root
Endarch xylem Conjoint Vascular-bundle	Exarch xylem Radial Vascular bundle.

14) a) In C_3 plants some O_2 does bind to RuBISCO and hence CO_2 fixation is decreased. Here the RuBp instead of being converted to 2 molecules of PGA binds with O_2 to form one molecule of phosphoglycerate and phosphoglycolate in a pathway called photorespiration.

b) They have a special type of leaf anatomy called 'kranz' anatomy.

15) a - In dicotyledonous stems, cambium is present between phloem and xylem. Such vascular bundles because of the presence of cambium possess the ability to form secondary xylem and phloem tissues, and hence are called open vascular bundles.

b) In monocotyledons, the vascular bundles have no cambium present in them. Hence they do not form secondary tissues they are reffered to as closed.

III

16) a) A - Metacentric
B - Submetacentric
C - Acrocentric
D - Telocentric

b) Sometimes a few chromosomes have non staining secondary constrictions at a constant location. This gives the appearence of a small fragments called the satellite.

17) a) The Ratio of the volume of CO_2 evolved to the volume of O_2 consumed in respiration.

$$RQ = \frac{\text{Volume of } CO_2 \text{ evolved}}{\text{Volume of } O_2 \text{ consumed}}.$$

b) RQ of carbohydrates = 1

18) a) Arrangement of ovules within the ovary is known as placentation.

b) 1 - Marginal
2 - Axile
3 - Parietal
4 - Free Central.

19)

Light reaction	Dark reaction
Photochemical phase	Biosynthetic phase
Take place in grana	Take place in Stroma
ATP and NADPH are produced	ATP and NADPH are utilized.

I Zoology

1) Carolus Linnaeus
2) Ichthyophis
3) Lyases
4) Corpus luteum
5) Tetany.

II

6) A) Cnidoblast : Coelenterata
   B) Placoid scales : Chondrichthyes
   C) Platyhelminthes : Acoelomates
   D) Radula : Mollusca.

7) a) pristis

b) chondrichthyes

c) . Cartilaginous endoskeleton
- Ventrally located mouth
- Notochord is persistent throughout life
- Gill slits are separate and without operculum.
- Contain minute placoid scales
- Due to absence of air bladder, they have to swim constantly to avoid sinking

(any two)

8) The members of Subphylum vertebrata possess notochord during embryonic period. The notochord is replaced by a cartilaginous or bony vertebral column in the adult. Thus all vertebrates are chordates but all chordates are not vertebrates.

9) a) The non protein part of an enzyme called cofactors are bound to the enzyme to make the enzyme catalytically active.

b) prosthetic group, co-enzyme, metal ion

Prosthetic group : Prosthetic groups are organic compounds they are tightly bound to the apoenzyme. For example : in peroxidase and catalase, which catalyze the breakdown of hydrogen peroxide to water and oxygen, haem is the prosthetic group and it is a part of the active site of the enzyme.

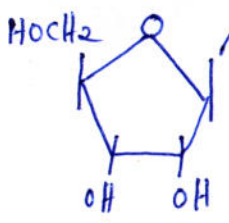
Co-enzyme - These are also organic compounds but their associations with the apoenzyme is only transient, usually occuring during the course of catalysis. The essential chemical components of many Co-enzymes are vitamines eg: Coenzyme nicotinamide adenine dinucleotide (NAD) and NADP contain the vitamin niacin.

metal ion : A number of enzymes require metal ions for their activity which form co-ordination bonds with side chains at the active site and at the same time form one or more cordination bonds with the substrate, eg : zinc is a cofactor for the proteolytic enzyme carboxypeptidase. (any two)

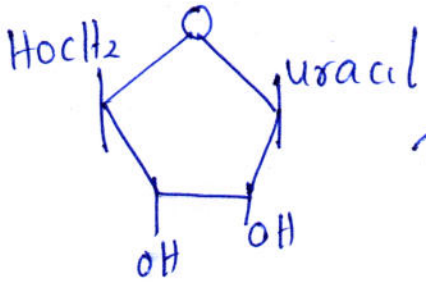
10)

Ammonotelic	Uricotelic
Bony fishes Aquatic amphibians	Birds Reptiles.

11) a) A - Adenine (purine)
B - Uracil (pyramidine)

b) 

Adenosine (Nucleoside of adenine)



uridine (Nucleoside of Uracil)

12) SA node → AV node → Bundle of His → Purkinje fibres → Ventricular contraction.

13)

A	B
Neutrophil	Phagocytic
Basophil	secrete histamine, Serotonin
Eosinophil	Allergic reactions of body
Lymphocytes	immune response of body

14) a) A - Actin

B - Myosin

b) Each actin filament is made of two 'F' (filamentous) actin. 'F' actin is a polymer of monomeric 'G' (globular) actins. Two filaments of another protein, tropomyosin also run close to the 'F' actins throughout its length. A complex protein protein Troponin is distributed at regular intervals on the tropomyosin.

→ Each myosin filament is made up of monomeric protein called meromyosins. Each meromyosin has two important parts, a globular head with a short arm and a tail, the former being called the heavy meromyosin (HMM) and latter the light meromyosin (LMM)

15) a) A - Hormone-receptor complex

B - Genome

b) cortisol, testosterone, estradiol and Progesterone (any two)

16) a) yes, The frog excretes urea and thus is a ureotelic animal.

b) Frogs are not seen during peak Summer and winter. During this period they take shelter in deep burrows to protect them from extreme heat and cold. This is called as Summer Sleep (aestivation) and winter sleep (hibernation)

17) i) A - Coelomate

ii) Aschelminthes

iii) Taenia (Tapeworm)
Fasciola (Liver fluke) (any one)

18) a - oxygen dissociation curve

b - partial pressure of O_2
partial pressure of CO_2
Hydrogen ion concentration
Temparature (any two)

c - This curve is called the oxygen dissociation curve and is highly useful in studying the effect of factors like PCO_2, H^+ concentration etc.. on binding of O_2 with haemoglobin.

19) Glomerular filtration
Reabsorption
Secretion

Glomerular filtration : First step in urine formation. Glomerular filtration occurs in the glomerulus where blood is filtered. On an average 1100 - 1200 ml of blood is filtered by the kidneys per minute. This process occurs across the three layers - The epithelium of Bowman's capsule, the endothelium of glomerular blood vessels, and a membrane between these two layers. Blood is filtered in such a way that all the constituents of the plasma reach the Bowman's capsule, except proteins. Therefore, this process is known as Ultrafiltration.

Reabsorption - Around 99 % of the filtrate obtained is reabsorbed by the renal tubules. This is known as reabsorption. This is achieved by active and passive transport.

Secretion : During urine formation, the tubular cells secrete substances like H^+, K^+ and ammonia into the filtrate. Tubular secretion is also an important step in urine formation as it helps in the maintenance of ionic and acid base balance of the body fluids.

20) a) outer layer : Dura mater
Middle layer : arachnoid mater
inner layer : pia mater.

b) Na^+-K^+ pump :

Ionic gradients across the resting membrane are maintained by the active transport of ions by the sodium potassium pump which transports 3 Na^+ ions outwards for 2 K^+ ions into the cell. As a result outer surface of axonal membrane possesses a positive charge and inner surface become negative charge and therefore is polarised.

Hypothalamus : which controls body temparature, Urge for eating and drinking which also secrete hormones called hypothalamic hormones

Medulla : Medulla contains centers which control respiration, cardiovascular reflexes and gastric secretions.