Inter (Part-I) 2016

Biology	Group-I	PAPER: I
Time: 20 Minutes	(OBJECTIVE TYPE)	Marks: 17

Note: Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink in the answer-book. Cutting or filling two or more circles will result in zero mark in that question.

1-1- The study of parasite is called:

(a) Paleontology (b) Histology
(c) Microbiology (d) Parasitology √

2- In bacterial cells, the water percentage is:

(a) 70% √ (b) 40%
(c) 60% (d) 50%

3- The optimum temperature for enzyme to work at maximum rate in human is:

(a) 35°C (b) 37°C √
(c) 40°C (d) 30°C

4- *Robert Brown* reported the presence of:

(a) Lysosome (b) Ribosomes
(c) Mitochondria (d) Nucleus √

5- *The number of capsomeres present in herpes virus capsid is:*

(a) 252 capsomeres (b) 162 capsomeres √
(c) 250 capsomeres (d) 100 capsomeres

6- The bacteria with a tuft of flagella at one pole is called:

(a) Atrichous (b) Monotrichous
(c) Amphitrichous (d) Lophotrichous √

7- Apicomplexans move by:

(a) Tube feet (b) Cilia
(c) Flexing √ (d) Pseudopodia

8- In fungi, spores are produced inside the reproductive structures called:

(a) Conidia (b) Sporangia √
(c) Basidia (d) Ascocarps

9- **The bryophytes are non-vascular plants:**
(a) Flowering plants (b) Flowerless plants ✓
(c) Gametophytic plants
(d) Sporophytic plants

10- **Carbohydrate digesting enzymes are called:**
(a) Ligase (b) Amylase ✓
(c) Protease (d) Lipase

11- **Respiratory activity which occurs in plants during daytime is called:**
(a) Respiration (b) Transpiration
(c) Photorespiration ✓ (d) Cutinious respiration

12- **In birds, the organ of voice is called:**
(a) Larynx (b) Syrinx ✓
(c) Vocal cord (d) Voice box

13- **Which is the true sequence of bones in the mammalian ear:**
(a) Malleus, incus and stapes ✓
(b) Incus and stapes
(c) Stapes and malleus
(d) Malleus and stapes

14- **The electron transport chain system plays role in generation of ATP by:**
(a) Photosynthesis (b) Chemiosmosis ✓
(c) Photosystem (d) Dark reaction

15- **The exchange of gases (CO_2 and O_2) between the organism and its environment is called:**
(a) Respiration (b) External respiration ✓
(c) Cellular respiration (d) Anaerobic respiration

16- **In the embryonic life, the red blood cells are formed in:**
(a) Red bone marrow (b) Liver and spleen ✓
(c) In bone marrow of sternum and ribs
(d) Bone marrow of vertebrae

17- **The heart is enclosed in a double membranous sac called:**
(a) Epicardium (b) Myocardium
(c) Pericardium ✓ (d) Endocardium

Inter (Part-I) 2016

Biology	Group-I	PAPER: I
Time: 2.40 Hours	(SUBJECTIVE TYPE)	Marks: 68

SECTION-I

2. Write short answers to any EIGHT (8) questions: 16

(i) Define parasitology.

Ans This is the branch of biology which deals with the study of parasites. The structure, mode of transmission, life histories and host-parasite relationships are studied in parasitology.

(ii) Differentiate between deductive and inductive reasoning.

Ans Deductive reasoning:

It moves from general to the specific. It involves drawing specific conclusion from some general principle / assumptions. Deductive logic of "if ..... then" is frequently used to frame testable hypothesis. For example, if we accept that all birds have wings (premise # 1), and that sparrows are birds (premise # 2), then we conclude that sparrows have wings.

Inductive reasoning:

The other way of reasoning used in the formulation of hypothesis is inductive reasoning, which is reasoning from the specific to the general. It begins with specific observations, and leads to the formation of general principle. For instance, if we know that sparrows have wings and are birds, and we know that eagle, parrot, hawk, crow are birds, then we induce (draw conclusion) that all birds have wings. The science also, therefore, uses inductive methods to generalize from specific events.

(iii) What is glycosidic bond?

Ans On hydrolysis, oligosaccharides yield from two to ten monosaccharides. The ones yielding two

be extended. These cytoplasmic projections form a sticky, interconnected net that entangles prey.

(x) **What are kelps?**

Ans The largest brown algae, called the kelps are tough and leathery in appearance. They possess leaflike blades, stemlike stipes, and rootlike anchoring holdfast.

(xi) **Differentiate between obligate and facultative parasites.**

Ans Obligate parasites can grow only on their living host and cannot be grown on available defined growth culture medium. Various mildews and most rust species are obligate parasites.

Facultative parasites can grow parasitically on their host as well as by themselves on artificial growth media.

(xii) **Name the type of hypha and sexual spores in sac fungi.**

Ans

Phylum	Sexual	Hyphae
Ascomycota (Ascomycetes or sac-fungi)	Ascopores Inside sac-like asci	Septate, lengthy dikaryotic phase

3. Write short answers to any EIGHT (8) questions: 16

(i) **What is endocytosis?**

Ans In many animal cells, the cell membrane helps to take in materials by infolding in the form of vacuoles. This type of intake is termed as endocytosis.

(ii) **Write the role of glyoxysomes.**

Ans Plants contain an organelle, which in addition to glycolic acid oxidase and catalase also possess a number of enzymes that are not found in animal cells. This organelle, called glyoxysomes are most abundant in plant seedlings, which rely upon stored fatty acids to provide them with the energy and material to begin the formation of a new plant. One of the primary activities in these germinating seedlings is

the conversion of stored fatty acids to carbohydrates. This is achieved through a cycle, glyoxylate cycle, the enzymes of which are located in the glyoxysomes.

(iii) Write basic characters of chordates, give an example.

Ans All chordates possess three basic characters which are as follows:

1. As already mentioned all possess the notochord.
2. All chordates have central nervous system that is dorsal in position and is hollow.
3. All chordates develop paired gill openings in embryonic stage. In some, these are non-functional, while, in others, they are functional for some period in their life history e.g., frogs, etc. in still other, these are functional throughout life e.g., amphioxus, and fishes, etc.

(iv) What are coral reefs?

Ans The stony masses that are formed in this way are called coral reefs. These are mostly formed of calcium carbonates (limestone).

(v) What is regeneration? Give an examples.

Ans Regeneration, the ability to reform lost organs is common among echinoderms, starfish, sea cucumber, sea lily, brittle star and sea-urchin exhibit this characteristics.

(vi) How sponges reproduce asexually?

Ans The asexual reproduction in sponges is by budding. The buds may be external or internal. The internal buds are called gemmules. Both types of buds develop into new sponges.

(vii) What is glycolysis? Where it takes place in the cell?

Ans Glycolysis occurs in the cytosol for which oxygen is not essential. Glycolysis is the breakdown of glucose up to the formation of pyruvic acid. Glycolysis can take place both in the absence of oxygen (anaerobic condition) or in the presence of oxygen (aerobic condition). In both, the end product of glucose breakdown is pyruvic acid. The

breakdown of glucose takes place in a series of steps, each catalyzed by a specific enzyme.

(viii) How action spectra can be obtained?

Ans Action spectrum can be obtained by illuminating plant with light of different wavelengths (or colours) and the estimating relative CO_2 consumption or oxygen release during photosynthesis.

(ix) What is cellular respiration?

Ans The cellular respiration is the process by which energy is made available to cells in a step by step breakdown of C-chain molecules in the cells.

(x) What is emphysema?

Ans Emphysema is a break down of alveoli. This respiratory problem is more common among smokers. The substances present in the smoke of the tobacco weaken the wall of alveoli. The person suffering from emphysema cannot oxygenate his blood properly and least exertion makes him breathless and exhausted.

(xi) What is inspiration?

Ans During inspiration, passive expansion of elastic lungs occurs and expiration is due to a passive contraction of lungs.

(xii) What is respiratory distress syndrome?

Ans Respiratory distress syndrome is common, especially for infant with a gestation age of less than 7 months. This occurs because enough surfactant is not produced to reduce the tendency of the lungs to collapse.

4. Write short answers to any SIX (6) questions: 12

(i) What are pocks?

Ans In smallpox, raised fluid-filled vesicles are formed on the body, which become pustules later on and form pitted scars, the pocks. By 1950s, immunization and other control measures had largely decreased the danger, but it

is still present in the third world countries where many people are affected.

(ii) Write down misuses of antibiotics.

Ans Misuse of antibiotic such as penicillin can cause allergic reactions. Similarly, streptomycin can affect auditory nerve, thus causing deafness. Tetracycline and its related compounds cause permanent discoloration of teeth in young children.

(iii) Differentiate between microphylls and megaphylls.

Ans In lycopods (*e.g.*, Lycopodium) the leaves are small in size. Each leaf has a single undivided vein (vascular supply). Such a leaf is called microphyll.

Large leaves having divided veins and veinlets with an expanded leaf blade or lamina are known as megaphylls.

(iv) Define double fertilization.

Ans Double fertilization is a special process found in Angiosperms. In this, two male gametes fuse with two cells simultaneously. A male gamete (n) fuses with egg (n) to form a diploid zygote (2n) which develops later into an embryo and second male gamete (n) fuses with another female cell called fusion nucleus (2n) resulting into a triploid (3n) endosperm cell, which develops into food storing endosperm tissue. It is an important evolutionany advancement in which food storage in fertilized ovule is made only on fertilization *i.e.*, formation of zygote. This actually helps the plant to economize its food resources.

(v) Name three pairs of salivary glands.

Ans Saliva is secreted by three pairs of salivary glands namely sublingual glands situated below the tongue; submaxillary glands behind the jaws and parotid glands in front of the ears. Saliva produced by these glands contains three important ingredients:

(i) Water and mucous.
(ii) Sodium bicarbonate and some other salts.

(iii) Carbohydrate digesting enzyme, Amylase or ptyalin.

(vi) What is detritus feeding? Give example.

Ans The animals which feed on detritus are called detritivores. Earthworm is the common example of detritius feeders. It ingests fragments of decaying organic matter, especially vegetation either at the soil surface or during burrowing activity.

(vii) Write down symptoms in plants caused by deficiency of phosphorus and potassium.

Ans Deficiency of phosphorus causes stunted growth of roots. Soil deficient in potassium causes leaf margins yellow and brown in colour and premature death of the plant. Deficiency of magnesium results in chlorosis.

(viii) What are blue babies?

Ans Failure of interatrial foramen (an opening in the inter-atrial septum) to close or of ductus arteriosus to fully constrict results in cyanosis (blueness of skin) of new born. This is due to mixing of blood between two atria and the mixed blood is supplied to the body of newborn babies resulting in blueness of skin; thus the name blue babies.

(ix) Differentiate between apoplast and symplast pathway.

Ans **Apoplast pathway:**

It is the pathway involving system of adjacent cell walls which *is continuous* throughout the plant roots. In the roots, apoplast pathway becomes discontinuous in the endodermis due to the presence of casparian strips.

Symplast pathway:

It is the system of interconnected protoplasts in the *root cells.* The cytoplasm of neighbouring cells (*Protoplasts*) is connected with one another by *Plasmodesmata* which are cytoplasmic strands that *extend through* pores in adjacent cell walls. In the cells of *root,* the cell membrane and cytoplasm (and

plasmodesmata) can be regarded as acting together as one partially permeable membrane.

SECTION-II

NOTE: Attempt any Three (3) questions.

Q.5.(a) What is cloning? Describe process of cloning in detail. (4)

Ans Cloning:

Cloning is a technology for achieving eugenic aims. A clone is defined as a cell or individual and all its asexually produced offspring. All members of a clone are genetically identical except when a mutation occurs.

In 1997, scientists in Scotland succeeded in cloning a sheep. Other mammalian species (mice and cows) have since been cloned. In this procedure, the nucleus from a fertilized egg is removed and a nucleus from a cell of a fully developed individual is inserted in its place. The altered zygote is then implanted in a suitable womb, where it completes its development. The new individual formed in this way is a genetically identical clone of the individual whose nucleus was used. Thus, cloning could make multiple copies of a desired genotype.

Another type of cloning is the division of a single egg or early embryo into one or more separate embryos. This is the same process that normally creates identical twins. Offspring from this types of cloning are genetically identical but carry chromosomes from each of the two parents. This type of cloning has already been used to produce genetically identical cattle and other farm animals.

Man is likely to adopt cloning techniques for commercial production of valuable animals of known pedigree such as horses etc.

(b) Describe the adaptation of bryophytes to land habitat. (4)

Ans In general, bryophytes developed the following adaptive characters for terrestrial environment:

against pathogens. Blood clotting proteins prevent the loss of blood from the body after an injury. Movement of organs and organisms, and movement of chromosomes during anaphase of cell division, are caused by proteins.

Proteins are polymers of amino acids, the compounds containing carbon, nitrogen, oxygen and hydrogen. The number of amino acids varies from a few to 3,000 or even more in different proteins.

(b) Describe any two common diseases related to nutrition. (4)

Ans Piles:

Piles or haemorrhoids are masses of dilated, tortuous veins in the anorectal mucosa. These masses may some times start bleeding during bowel movements. Situation may aggravate when the patient suffers from constipation. The urge to defecate is depressed and it becomes difficult to expel the faeces. This may cause other symptoms of ill-health because of the physical distension of the rectum. The only therapy required is the improvement of the hygiene and the use of food softeners, such as roughage, in food or laxatives. The patients are advised not to sit on hard seats. Depending on severity of the symptoms, sometimes the haemorrhoids have to be removed surgically.

Ulcer:

The inner wall of digestive tract is normally covered with mucus, which protects it from enzymes. When the mucus layer breaks down the digestive enzymes begin to eat away the walls of stomach or duodenum. This results in a sore called ulcer. Occasionally, an ulcer is so severe that a hole develops in the wall of the digestive tract and the contents of the tract spill into the abdominal cavity, leading to severe infections which may prove to be fatal, if immediate medical care is not sought.

Excessive secretion of gastric acid secretion is an important factor of peptic ulcer. Smoking, spicy food,

(i) Formation of a compact multicellular plant body which helped in the conservation of water by reducing cell surface area exposed to dry land conditions. Presence of cuticle further reduces loss of water by evaporation.

(ii) Development of photosynthetic tissues into special chambers for the absorption of carbon dioxide without losing much water and exposure to light.

(iii) Formation of special structures like rhizoids for absorption of water and anchorage.

(iv) Heterogamy (production of two types of gametes) is evolved, forming non-motile egg containing stored food and motile sperms.

(v) Gametes are produced and protected by the special multicellular organs (antheridia and archegonia).

(vi) Multicellular embryo is formed which is retained and protected inside the female reproductive body during its development.

(vii) Alternation of spore-producing generation (sporophyte) with gamete producing generation (gametophyte) enabled the plant to produce and test the best genetic combinations for adapting to the versatile terrestrial conditions.

Q.6.(a) Give the importance of proteins. (4)

Ans Proteins are the most abundant organic compounds to be found in cells and comprise over 50% of their total dry weight. They are present in all types of cells and in all parts of the cell.

Proteins perform many functions. They build many structures of the cell. All enzymes are proteins, and, in this way, they control the whole metabolism of the cell. As hormones, proteins regulate metabolic processes. Some proteins (*e.g.*, haemoglobin) work as carriers and transport specific substances such as oxygen, lipids, metal ions, etc. Some proteins called antibodies, defend the body

alcoholic beverages, coffee, tea and stress should be avoided by the patients suffering from ulcer.

Q.7.(a) Explain structure and function of mitochondria. (4)

Ans Mitochondria are very important organelles of eukaryotic cells, because they are involved in the manufacture and supply of energy to the cell. They are also known as the powerhouses of the cell. Under compound microscope, they appear to be vesicles, rods or filaments. Under an electron microscope, they show complex morphology. Although their number, shape and internal structure vary widely, a mitochondrion is bound by two membranes, the outer membrane is smooth, while the inner membrane forms infoldings into the inner chamber called mitochondrial matrix. These infolds are called cristae. The mitochondrial membranes are similar in structure to other cell membranes. Detailed studies have shown that mitochondria also contain DNA as well as ribosomes.

The presence of ribosomes and DNA indicates that some proteins are synthesized in them. It is a self-replicating organelle.

The inner surface of cristae in the mitochondrial matrix has small knob-like structures known as F_1 particles. Mitochondrial matrix contains in it a large number of enzymes, coenzymes and organic and inorganic salts which help in several vital metabolic processes like Kreb's cycle, aerobic respiration, fatty acid metabolism, etc. As a result of these metabolic processes, the energy extracted from the organic food is transformed into energy-rich compound ATP, and the ATP then provides energy to the cell on demand. The size and number of mitochondria varies and depends on the physiological activity of the cell.

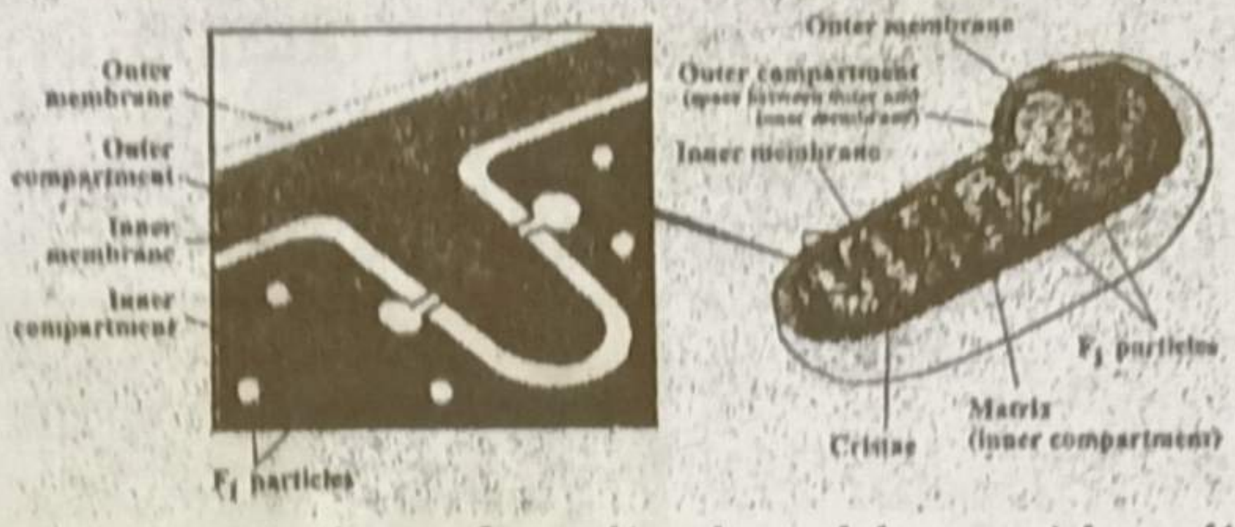

Fig. Diagrammatic representation of a mitochondrion cut longitudinally. The main features are shown. A crista is made of lipoprotein membrane containing different enzymes as well as F1 Particles embedded in it. After a special processing the inner mitochondrial membrane is ruptured and the F1 particles come out on the surface.

Mitochondria extract energy from different components of food and convert it in the form of ATP. This energy is used for various cellular activities. The spent energy, which is in the form of ADP is regenerated by the mitochondria into ATP. Mitochondria is, therefore, described as powerhouse of the cell.

(b) Discuss different methods of asexual reproduction in fungi. (4)

Ans Asexual reproduction:

Asexual reproduction takes place by spores, conidia, fragmentation and budding.

Spores:

Spores are produced inside the reproductive structures called sporangia, which are cut off from the hyphae by complete septa. Spores may be produced by sexual or asexual process, are haploid, non-motile and not needing water for their dispersal. Spores are small, produced in very large number and dispersed by wind to great distances and cause wide distribution of many kinds of fungi, including many plant pathogens. When spores land in a suitable place, they germinate, giving rise to new fungal hyphae. Spores may also be dispersed by insects and other small animals and by rain splashes. Spores are a common means of reproduction in fungi.

Conidia:

Conidia are non-motile, asexual spores which are cut off at the end of modified hyphae called conidiophores, and

not inside the sporangia, usually in chains or clusters. They may be produced in a very large number, can survive for weeks and cause rapid colonization of new food.

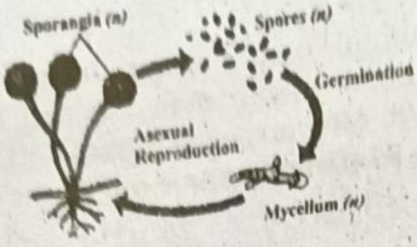

Fig. Spores are released from sporangia and germinate to produce new hyphae.

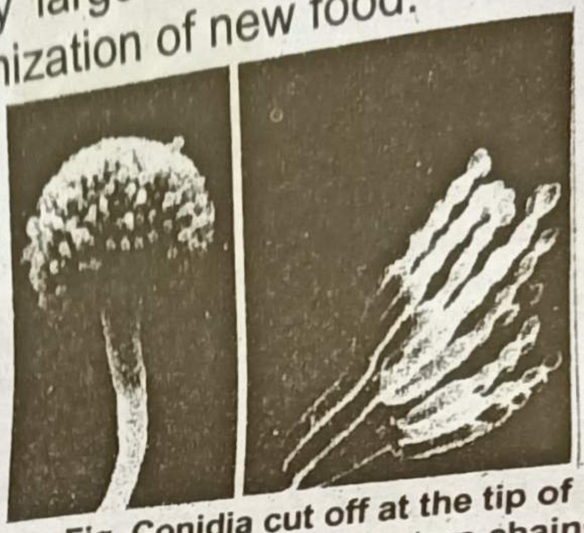

Fig. Conidia cut off at the tip of conidiophores in clusters chains.

Fragmentation:

Fragmentation is simple breaking of mycelium of some hyphal fungi, each broken fragment giving rise to a new mycelium.

Budding:

Unicellular yeasts reproduce by budding (an asymmetric division) in which tiny outgrowth or bud is produced which may separate and grow, or by simple, relatively equal cell division.

Q.8.(a) Write a note on any two viral diseases. (4)

Ans Following are two common viral diseases in Pakistan:

Small pox:

Smallpox, which is caused by pox viruses (the DNA enveloped virus) is an ancient disease that is known to have occurred as epidemic in China as early as the twelfth century B.C. Until the early twentieth century, smallpox was a common disease throughout the world. In smallpox, raised fluid-filled vesicles are formed on the body, which become pustules later on and form pitted scars, the pocks. By 1950s, immunization and other control measures had largely decreased the danger. But it is still present in the third world countries where many people are affected. In

1980, it was declared by World Health Organization that smallpox has been eradicated from the world.

Herpes simplex:

Herpes virus (DNA virus) is responsible for this disease. It is naturally occurring disease of mankind. In this, vascular lesions in the epithelial layers of ectodermal tissues are formed. Most commonly, this disease occurs in the mouth, on the lips, and at other skin sites.

(b) Prove that water is the source of oxygen during photosynthesis. (4)

Ans Oxygen released during photosynthesis comes from water, and is an important source of atmospheric oxygen which most organisms need for aerobic respiration and thus for obtaining energy to live. In 1940s, Van Niel hypothesized that plants split water as a source of hydrogen, releasing oxygen as a by-product. Niel's hypothesis was based on his investigations on photosynthesis in bacteria that make carbohydrate from carbon dioxide, but do not release oxygen.

Niel's hypothesis that source of oxygen released during photosynthesis is water and not carbon dioxide, was later confirmed by scientists during 1940s when first use of an isotopic tracer (O^{18}) in biological research was made. Water and carbon dioxide containing heavy-oxygen isotope O^{18} were prepared in the laboratory. Experimental green plants in one group were supplied with H_2O containing O^{18} and with CO_2 containing only common oxygen O^{16}. Plants in the second group were supplied with H_2O containing common oxygen O^{16} but with CO_2 containing O^{18}.

Q.9.(a) Write a note on nutrition of bacteria. (4)

Ans Feeding on dead and decaying matter such as dead leaves in the soil or rotting tree trunks is called saprophytic nutrition and derives its nutrients from host plants. They

produce extracellular enzymes, which digest the decaying matter and then absorb the soluble products back into their cells. Some bacteria break down the proteins of dead plants and animals and release nitrates which are taken up by the plant roots and then built into new amino acids and proteins, thus helping in nitrogen cycle.

Leguminous plants have nodules on their roots, which contain nitrogen fixing bacteria. The bacteria live on the plant material and fix nitrogen, converting it into nitrates, which the plant uses.

(b) What is myocardial infarction? Explain. (4)

Ans Blockage of blood vessel in the heart by an embolus (or by locally formed thrombus) causes necrosis or damage to portion of heart muscles, a condition known as a heart attack or technically myocardial infarction. Heart attack is due to disruptions of control system of the heart with accompanying arrhythmias, especially ventricular fibrillation.

We can avoid the above mentioned situations, if we:

(i) Avoid too much fatty food (especially rich in cholesterol). Maintain normal body weight.

(ii) Control blood pressure by regular walk and exercise.

(iii) Do not smoke.