DNHE-01: Nutrition for the Community
Guess Paper-I

Q. (a) Define/Explain each of the following:

(i) At-risk children

Ans. An at-risk youth is a child who is less likely to transition successfully into adulthood. Success can include academic success and job readiness, as well as the ability to be financially independent. It also can refer to the ability to become a positive member of society by avoiding a life of crime.

(ii) Anabolism

Ans. The synthesis of all compounds needed by the cells. Anabolism is the term used to refer to all the chemical reactions by which simple substances are used to manufacture more complicated ones. Anabolism is the building-up aspect. These reactions require energy, known also as an endergonic process. an anabolic pathway used to build macromolecules such as nucleic acids, proteins, and polysaccharides, uses condensation reactions to join monomers. Macromolecules are created from smaller molecules using enzymes and cofactors. Anabolic processes build organs and tissues. These processes produce growth and differentiation of cells and increase in body size, a process that involves synthesis of complex molecules. Examples of anabolic processes include the growth and mineralization of bone and increases in muscle mass.

(iii) Malnutrition

Ans. Malnutrition is a condition that results from eating a diet in which one or more nutrients are either not enough or are too much such that the diet causes health problems. It may involve calories, protein, carbohydrates, vitamins or minerals

(iv) Beta-carotene

Ans. Beta carotene is a red-orange pigment found in plants and fruits, especially carrots and colourful vegetables. The name beta carotene comes from the Greek "beta" and Latin "carota" (carrot). It is the yellow/orange pigment that gives vegetables and fruits their rich colours.

(v) Pectin

Ans. Pectin is a naturally occurring substance (a polysaccharide) found in berries, apples and other fruit. When heated together with sugar, it causes a thickening that is characteristic of jams and jellies.

(b) Fill in the blanks:

(i) The adult form of vitamin D deficiency is called_____.

(ii) _____are chemical substances which helps in fighting infections in the body.

(iii) The normal fasting blood glucose level is_____.

(iv) A meal plan for labourer would have more of rich foods.

(v) Ragi is rich source of_____

Ans. (i) osteomalacia, **(ii)** phagocytes **(iii)** mg/100ml **(iv)** carbohydrate **(v)** fibre.

(c) List five clinical signs of vitamin A deficiency.

Ans. Clinical signs of vitamin A deficiency are:

Dry Skin: Vitamin A is important for the creation and repair of skin cells. It also helps fight inflammation due to certain skin issues.

Not getting enough vitamin A may be to blame for the development of eczema and other skin problems

Dry Eyes: Eye problems are some of the most well-known issues related to vitamin A deficiency.

In extreme cases, not getting enough vitamin A can lead to complete blindness or dying corneas, which are characterized by marks called Bitot's spots.

Dry eyes or the inability to produce tears, is one of the first signs of vitamin A deficiency.

Night Blindness: Night blindness (nyctalopia) is the inability to see well at night or in poor light. Its causes include glaucoma medications and cataracts.

Infertility and Trouble Conceiving: Vitamin A is necessary for reproduction in both men and women, as well as proper development in babies.

If you are having trouble getting pregnant, a lack of vitamin A may be one of the reasons why. Vitamin A deficiency can lead to infertility in both men and women.

Delayed Growth: Children who do not get enough vitamin A may experience stunted growth. This is because vitamin A is necessary for the proper development of the human body.

Several studies have shown that vitamin A supplements, alone or with other nutrients, can improve growth.

Q. Vitamin B_{12}-An essential nutrient

Ans. A **vitamin** is an organic molecule (or related set of molecules) that is an essential micronutrient that an organism needs in small quantities for the proper functioning of its metabolism. Essential nutrients cannot be synthesized in the organism, either at all or not in sufficient quantities, and therefore must be obtained through the diet. The "vita" part of the word "vitamin" means "life". Vitamins are in fact vital and essential for life and health. They regulate metabolism, help in the growth and maintenance of our body and protect against disease. Some of the vitamins are soluble in water while others are soluble in fat. They are hence classified into two categories: water-soluble vitamins and fat-solublevitamins. Vitamin C can be synthesized by some species but not byothers.

The vitamins are of two types:

(1) Fat Soluble Vitamins: Vitamins A, D, E and K are known as the fat-soluble vitamins. A vitamin that can dissolve in fats and oils. Fat-soluble vitamins are absorbed along with fats in the diet and can be stored in the body's fatty tissue. They come from plant and animal foods or dietary supplements. Once absorbed into the body, fat-soluble vitamins are stored in fatty tissues and liver. The body can use these stores for future use. Each type of fat-soluble vitamin promotes different functions in the body. People deficient in the fat-soluble vitamins may require supplements to boost their supply. It is possible to take in too much of a fat-soluble vitamin, which could lead to toxicity and adverse reactions.

(a) Vitamin A(RETINOL): Vitamin A plays an important role in maintaining healthy vision. Without vitamin A, a person would suffer from severe vision issues. Vitamin A or retinol is found only in the foods of animal origin. Animal foods like milk, butter, ghee, egg, fish and liver are rich sources of vitamin A plant food do not contain retinol. They contain certain orange or yellow colored pigments called carotenoids which can be converted to retinol in the body. Beta carotene is the most widely distributed carotenoid in plant foods. Most of the yellow and orange color of vegetables and fruits is due to these carotenoid pigments. Ripe fruits such as mango, papaya and yellow/orange vegetables like carrot and pumpkin are rich in beta carotene. Green leafy vegetables also contain carotenoid pigments. Here the yellow and the orange color of the carotenoid pigments is masked due to the presence of another pigment called chlorophyll.

Functions of vitamin A are:

(a) It helps form and maintains healthy teeth, skeletal and soft tissue, mucus membranes, and skin. It is also known as retinol because it produces the pigments in retina of theeye.

(b) It promotes good vision, especially in low light.

(c) It may also be needed for reproduction and breastfeeding.

(d) Retinol is an active form of vitamin A. It is found in animal liver, whole milk, and some fortified foods.

(b) Vitamin D: Vitamin D is produced naturally in the human body when the skin is exposed to the sun. Vitamin D aids in bone health and development. Vitamin D is also called the "sunshine vitamin". This is because it is manufactured from a substance present in our skin on exposure to sunlight. As a result of this, we do not necessarily have to depend on dietary sources of vitamin D. The easiest way of obtaining the vitamin is, in fact, enough exposure to sunlight foods like egg, liver, and butter contains vitamin D.

Functions of vitamin B are:

Your body must have vitamin D to absorb calcium and promote bone growth. Too little vitamin D results in soft bones in children (rickets) and fragile, miss happen bones in adults (osteomalacia). You also need vitamin D for other important body functions.

(c) Vitamin E: Vitamin E is antioxidants that can help the body destroy free radicals. Free radicals are unstable atoms that may cause the formation of cancer cells. As such, vitamin E could play an important part in preventing cancer. Vitamin E is present in almost all foodstuffs Vegetable oils like groundnut, soya, cottonseed and safflower are rich sources of vitamin E.

Functions of vitamin E: Vitamin E in our body is for the protection it gives to other substances like unsaturated fatty acids, vitamins A and C. It prevents their destruction in the body as well as in foods.

(d) Vitamin k: Vitamin K helps the body form blood clots. This necessary function prevents a person from bleeding out from small scratches. Among plant foods, green leafy vegetables like spinach, cabbage and lettuce are rich sources of vitamin K. After absorption from the upper part of the small intestine the vitamin is distributed to various body tissues. Vitamin K is stored in very small amounts.

Functions of vitamin k: Phylloquinone, also known as vitamin K1, is found in plants. When people eat it, bacteria in the large intestine convert it to its storage form, vitamin K2. It is absorbed in the small intestine and stored in fatty tissue and the liver. Without vitamin K, the body cannot produce prothrombin, a clotting factor that is necessary for blood clotting and bone metabolism.

(2) Water soluble vitamins: Water-soluble vitamins dissolve in water, which means these vitamins and nutrients dissolve quickly in the body. Unlike fat-soluble vitamins, water-soluble vitamins are carried to the body's tissues, but the body cannot store them. Any excess amounts of water-soluble vitamins simply pass through the body. Because these vitamins are needed by our bodies, we need to make sure we intake these vitamins on a regular basis. Water soluble vitamins include Vitamin C and the vitamin B complex.

(a) Vitamin C: The benefits of vitamin C may include protection against immune system deficiencies, cardiovascular disease prenatal health problems, eye disease, and even skin wrinkling. Vitamin C, also known as ascorbic acid is necessary for the growth, development and repair of all body tissues. Fruits like Amla, guava, green leafy vegetables and green chilies are examples, of some of the cheap sources of vitamin C. Amla is the cheapest source and provides 20 times or more ascorbic acid as compared to the expensive citrus.

Functions of vitamin c are:

Vitamin C plays an important role in many physiological processes in humans. It is needed for the repair of tissues in all parts of the body. The important functions of vitamin C include the formation of protein used to make skin, tendons, ligaments, and blood vessels for healing wounds and forming scar tissue, for repairing and maintaining cartilage, bones, and teeth and aid in the absorption of iron. It can also act as a reducing and capping agent for metal nano particles.

(b) Vitamin B complex: This is a group of vitamins with similar functions. Vitamins of the B complex group include: thiamine (B I), riboflavin (B2), folic acid, niacin and vitamin B_{12}. They usually occur together in foods. The B vitamins act as coenzymes and help in the metabolism of carbohydrates, proteins and fats.

- **Thiamine or B_1:** Thiamine is a vitamin, also called vitamin B1. Vitamin B1 is found in many foods including yeast, cereal grains, beans, nuts, and meat. It is often used in combination with other B vitamins, and found in many vitamin B complex products. People take thiamine for conditions related to low levels of thiamine (thiamine deficiency syndromes), including beriberi and inflammation of the nerves (neuritis) associated with pellagra or pregnancy. Thiamine is also used for digestive problems including poor appetite, ulcerative colitis, and on going diarrhea. Thiamine is also used for AIDS and boosting the immune system, diabetic pain, heart disease, alcoholism, aging, a type of brain damage called cerebellar syndrome, canker sores, vision problems such as cataracts and glaucoma, motion sickness, and improving athletic performance. Other uses include preventing cervical cancer and progression of kidney disease in patients with type 2 diabetes.
- **Riboflavin or B_2:** Riboflavin or B2 is widely distributed in plant and animal foods. Milk, liver, kidney, eggs and green leafy vegetables are good sources of riboflavin. Whole grain cereals and pulses contain fair amounts. On refining there is some loss of the vitamin. However, sprouting and fermentation of whole grain cereals and pulses can markedly increase their content of riboflavin and other B vitamins. The riboflavin which we ingest is absorbed from the upper part of the small intestine into the bloodstream and is taken to various body tissues to perform specific functions. Like other water-soluble vitamins, excess riboflavin is excreted in the urine.Riboflavin plays an important role in the metabolism of carbohydrates, fats and proteins.
- **Niacin:** Having enough niacin, or vitamin B3, in the body is important for general good health. As a treatment, higher amounts of niacin can improve cholesterol levels and lower cardiovascular risks niacin can boost levels of good HDL cholesterol and lower triglycerides. Niacin also modestly lowers bad LDL cholesterol. It's often prescribed in combination with statins for cholesterol control, such as Crestor, Lescol, or Lipitor. The good sources of niacin include meat, fish, poultry, cereals, pulses, nuts and oilseeds. One interesting point about niacin is that it can also be formed in the body from an amino acid called tryptophan.
- **Folic acid:** Folic acid is forms of a water-soluble B vitamin. Folic acid is the synthetic form of this vitamin. Folic acid is used for preventing and treating low blood levels of folate (folate deficiency), as well as its complications, including "tired blood" (anemia) and the inability of the bowel to absorb nutrients properly. Folic acid is also used for other conditions commonly associated with folate deficiency, including ulcerative colitis, liver disease, alcoholism, and kidney dialysis.
- **Vitamin B_{12} or Cobalamin:** Vitamin B12, also known as cobalamin, is a water-soluble vitamin that is involved in the metabolism of every cell of the human body: it is a cofactor in DNA synthesis, and in both fatty acid and amino acid metabolism. Vitamin B_{12} can only be absorbed in

the 'presence of a specific chemical substance called intrinsic factor. This is substance is secreted by the cell of the stomach. Vitamin B12 ingested combines with intrinsic factor and is absorbed from the small intestine.

Q. Absorption and utilisation of calcium in the body

Ans. Research shows that calcium needs to be absorbed in an acid medium. As reported over the years, a great number of our population is achlorhydric estimated 40% under age 40 and 90% over age 60. How do we diagnose achlorhydria (under production of hydrochloric acid) by the stomach? Physical symptoms are bloating and upper GI gas after eating. These symptoms seem especially worse with raw vegetables, whole grains and heavy proteins. Looking at blood chemistry SMAC 24, the albumin globulin ratio (A/G) will usually be under 1.7 as reported by Melvin Page. This has some significant impact in that 1) low stomach acid decreased calcium absorption, but even more important, 2) with an alkylating calcium supplement it will drive the individual's system more alkylin aggravating other metabolic problems while still decreasing calcium absorption. Here is a list of the calcium sources and their systemic PH affects.

Q. Write the concept of balanced diet and list the steps involved in balanced diets.

Ans. A balanced diet is one that gives your body the nutrients it needs to function correctly. To get the proper nutrition from your diet, you should consume the majority of your daily calories. A balanced diet can be defined as one which contains different types of foods in such quantities and proportions that the need for calories, minerals, vitamins and nutrients is adequately met and a small provision is made for extra nutrients, withstand short durations of leanness.

The needs of balanced diets are:

(1) A balanced diet consists of different types of food items: This can be achieved by first classifying food into groups each group supplying certain specific nutrients and then selecting items from each food group to plan a balanced meal or diet. Including items from each food group ensures that all the nutrients will be supplied.

(2) A balanced diet meets the nutrient needs: A balanced diet meets nutrient needs because of the amounts and proportions of the foods selected. This would be based on the recommended dietary intakes (RDls) laid down for the individual for whom the diet isplanned.

(3) Balanced diets provide for periods of leanness: Balanced diets also provide for periods of leanness. This implies that there is a "safety margin" or a "little extra" for those times when you do not meet your nutrient needs adequately. A normal individual consumes a variety of foods. It is possible that on a given day he may not consume foods in the amounts he requires. So, we do not need to make any special adjustments because RDls already include a margin of safety. Planning diets on the basis of RDIs would take care of this aspect as well.

A balanced diet is very specific. To an individual of a given age (age-range) and sex. In the case of adults,it is also specific to a given activity level-sedentary, moderate or heavy work. Abalanced diet for a sedentary worker (e.g. typist or clerk) would differ from thatof a heavy worker (e.g. construction laborer). A balanced diet for an infantwould be very different from that of an adult (influence of age). A diet for anadolescent girl would be different compared to one for an adolescent boy(influence of sex).

Also, balanced diets are always region-specific. The particular foods availablein a region can be used in planning; using others would be impractical andunsuitable. There is no point in including a cereal like ragi in a diet meant for aNorth Indian because ragi 'is grown only in the south. A balanced diet for aparticular region must reflect the characteristic meal patterns, the social andreligious practices of that region. These factors are taken to consideration toensure that the diet planned is acceptable.

Lastly, income is also a factor that influences a balanced diet, Balanced diets for an individual of agiven age and sex (and activity level where relevant) vary depending on income.A balanced diet would imply the use of all food groups Energy-giving, bodybuilding and protective/regulatory - in each and every meal. However, the selection of foods and the amounts in which they are consumed would vary depending on income. As income increases, consumption of cereals reduces and consumption of milk and other animal protein foods, vegetables and fruits, fat and sugar tend to increase. While planning balanced diets for the affluent these trends are kept in mind but excessive amounts of fat and sugar are not recommended. Having more money does not mean spending more on fat, sugar and expensive foods like- Meat, cheese, nuts and dry fruits. It means consuming the amounts absolutely necessary so as to maintain good health and avoid putting on weight and developing other health problems. Having more money, however, enables a person to add more variety to the diet; unusual foods or foods not locally available can be purchased or ordered from elsewhere. Judicious selection of food is, however, as important for the rich as for the poor. The ultimate aim is always to meet the nutritional requirements.

The major steps in planning balanced diets are as follows:
(1) Individuals Character: It includes age, sex, activity level income, religion etc.
Individual's characteristics and background would determine the type of diet planned. Income, socio-economic background, religion and the region where the individual stays are also important.
(2) RDI's for energy and protein: The diets which meet energy and protein needs meet the needs of other nutrients as well if care is taken to include rich sources of vitamins and minerals.
(3) Number of meals to be consumes: Meals frequency varies depending on income, the work school schedule and convenience. People belonging to the higher income group consume more ideals.
(4) Decide on the amount of energy-giving, body-building, protective group: The amounts of cereals, fat, sugar, milk, meat, fish, poultry, eggs, pulse, vegetables and fruits to be consumed are decided based on the income. The amount included would be such that RDl's can be met for energy and protein.
(5) Distribute total amount decided between meals: The total amount of each food group decided must be distributed over the day's meal.
(6) Decide on items and their amounts within each group for each meal: The dishes to be included for each meal are decided on the amount of each item in each of the three food groups.

Q. Distinguish between 'requirements' and 'recommended dietary intake', giving suitable examples.

Ans. The Recommended Dietary intake (RDI) is the amount of a nutrient to be actually consumed in order to meet the requirements of the body. Recommended dietary intakes are based on requirements. The requirements for a particular nutrient are the minimum amount that needs to be consumed to prevent symptoms of deficiency and to maintain satisfactory level of the nutrient in the body. Requirements is the minimum amount of a nutrient required to prevent deficiency and maintain satisfactory body levels of that nutrient for the majority of people. An additional safety margin individual variation, cooking losses, period of low intake is added to the requirement figure to arrive at RDI.

The higher the RDI for a particular nutrient, the more should be the consumption of foods rich in that nutrient. The amount of cereal consumed by a heavy worker. For example, should be more than that consumed by a light worker. This is because of the fact that energy requirements are far more for heavy workers and because cereals are a source of carbohydrates and, therefore, energy detailed information on planning balanced diets for infants, children, pregnant women are different. The amount of food to be consumed would be dependent primarily on the RDls.

The safety margin is added on to cover factors like:
1. variation in requirement from individual to individual.
2. periods of low intake.
3. nature of diet.
4. cooking losses.

Q. Besan Atta roti and moong dal

Ans. Moong Dal is considered to be the healthiest in the world of beans. Packed with protein and low on carbs, moong dal is one of the most recommended vegetarian superfoods.
Benefits of eating moong daal are as follows:
1. Make you look Young
2. Regulates your Metabolism Levels
3. Keeps a command on your Cholesterol levels
4. Gives you Strong Bones
5. Gives you a Good Oral Health
6. Improvises Your Eye Sight
7. Initiates Growth in your body
8. Protects your Liver

The health benefits of gram flour/besan are as follows:

1. Helps Lower Cholesterol: Gram flour contains healthy unsaturated fats which help in lowering the cholesterol level of the body.

2. Controls Diabetes: Owing to its low glycemic index, it is a great food for diabetics. Use it in your rotis, paranthas as a replacement for flour. Glycemic index of chickpea is just 10.

3. Helps improve health of the heart: Besan has high soluble fiber content which is beneficial for the health of the heart. It is also endorsed by the Heart Care Foundation.

4. Healthy alternative for Gluten: Since besan does not contain gluten, it is a great substitute to wheat and other gluten containing grains, for those people who are allergic to gluten.

5. Helps getting rid of iron deficiency: Being rich in iron, consumption of besan on a daily basis can help your body recover from iron deficiencies like anaemia.

There are many more benefits of besan and moong daal, hence we can say that it is a balance diet.

Q. A glass of milk and banana

Ans. Banana milkshake is one of those preparations that everyone loves, regardless of age or taste preferences. However, due to the general perception of "it's sweet...must be unhealthy", its fan following is relatively low. Banana milkshake is basically banana blended in milk – two simple ingredients, neither of which is unhealthy on its own. Banana has negligible fat content, whereas milk being a dairy product helps in reducing the storage of belly fat and neither adds unnecessary sugar to blood stream.

Health benefits of banana

- Bananas are a healthy source of carbohydrates and help our body produce energy.
- They are a good source of potassium and magnesium and help in maintaining normal blood pressure while promoting bone health along with optimal electrolyte balance.
- They are rich in the soluble fibre, pectin – which aids healthy digestion and relieves constipation.

Health benefits of milk

- Milk has rich calcium content, which helps in maintaining bone density.
- Phosphorus in milk helps generate energy in the body's cells and strengthen bones.
- It contains potassium, which is essential for muscle activity and contractions.
- vitamin A in milk regulates cell growth, integrity of the immune system and maintains normal vision and healthy skin.

Q. Describe the various psychological changes that take place into women's body during pregnancy.

Ans. The period from conception to birth. After the egg is fertilized by a sperm and then implanted in the lining of the uterus, it develops into the placenta and embryo, and later into a fetus. Pregnancy usually lasts 40 weeks, beginning from the first day of the woman's last menstrual period, and is divided into three trimesters, each lasting three months.

Following are some physiological changes that take place in the woman's body during pregnancy:

(1) Changes in body weight during pregnancy: Continuing weight increase in pregnancy is considered to be one favorable indication of maternal adaptation and fetal growth. However, routine weighing of the mother during pregnancy is not now thought to be necessary, because it does not correlate well with pregnancy outcomes. For example, there can be a slight loss of weight during early pregnancy if the woman experiences much nausea and vomiting (often called 'morning sickness').A woman who is pregnant with more than one baby will have a higher weight gain than a woman with only one fetus. She will also require a higher calorie diet.A lack of significant weight gain may not be a cause for concern in some women, but it could be an indication that the fetus is not growing properly.The entire period of pregnancy is actually divided into three trimesters:

- 1st trimester - 0-3 months
- 2nd trimester - 3-6 months
- 3rd trimester - 6-9 months

(2) Changes in the cardiovascular system: The cardiovascular system consists of the heart, the blood vessels (veins and arteries), and the blood that circulates around the body. It is the transport system that supplies oxygen and nutritive substances absorbed from the gastrointestinal tract to all the cells, tissues and organs of the body, enabling them to generate the energy they need to perform their functions. It also returns carbon dioxide, the waste product of respiration, to the lungs, where it is breathed out. The chemical processes that go on in the body generate many waste products, which the blood transports to the kidneys and liver, where they are removed. Other functions of the cardiovascular system include the

regulation of body temperature, and the circulation and delivery of hormones and other agents that regulate body functions. There are several significant changes in this complex system during pregnancy.

(3) Changes in the urinary system during pregnancy: The urinary system consists of the kidneys (a pair of organs on either side of the abdomen near the back), the tubes connecting the kidneys to the bladder where urine is stored, and a tube called the urethra that passes urine out of the body.The kidneys extract waste from the blood and turn it into urine. They must work extra hard to filter the mother's own waste products from her blood, plus those of the fetus, and get rid of them in her urine. Therefore, there is also an increase in the amount of urine produced duringpregnancy.

(4) Changes in body metabolism: The basal metabolic rate (BMR) increases during pregnancy. Pregnancy is characterized by rapid growth and development of the foetus and the mother tissues. Due to this rapid growth and development the basal metabolismincreases.

(5) Changes in the uterus, cervix and vagina: After conception, the uterus provides a nutritive and protective environment in which the fetus will grow and develop. It increases from the size of a small pear in its non-pregnant state to accommodate a full-term baby at 40 weeks of gestation. The tissues from which the uterus is made continue to grow for the first 20 weeks, and it increases in weight from about 50 to 1,000 gm (grams). After this time, it doesn't get any heavier, but it stretches to accommodate the growing baby, placenta and amniotic fluid. By the time the pregnancy has reached full term, the uterus will have increased to about five times its normal size.

(6) Changes in digestive functioning: One important adaptation of the body during pregnancy is the increased rate of absorption of certain important nutrients like calcium and iron. The absorption increases so as to meet the increased demands of the body.

Q. List six simple tips on how to ensure successful lactation.

Ans. Tips to ensure successful lactation are:

Let your baby set the pace: For the first few weeks, most new-borns breast-feed every two to three hours round-the-clock. Watch for early signs of hunger, such as stirring, restlessness, sucking motions and lip movements.

Let your baby nurse from the first breast thoroughly, until your breast feels soft — typically about 15 to 20 minutes. Keep in mind, however, that there is no set time. Then try burping the baby. After that, offer the second breast. If your baby's still hungry, he or she will latch on. If not, simply start the next breast-feeding session with the second breast. If your baby consistently nurses on only one breast at a feeding during the first few weeks, pump the other breast to relieve pressure and protect your milk supply.

Have your baby sleep in your room: Ideally, the baby should sleep in the same room as the parents for the first year of life — or at least for the first 6 months — to decrease the risk of SIDS. This can also make feeding easier.

Your baby should sleep alone in his or her own crib, bassinette or other surface designed for infants. Adult beds aren't safe for infants. A baby can become trapped and suffocate between the headboard slats, the space between the mattress and the bed frame, or the space between the mattress and the wall. A baby can also suffocate if a sleeping parent accidentally rolls over and covers the baby's nose and mouth.

Hold off on a pacifier: Some babies are happiest when they're sucking on something. Enter pacifiers — but there's a caveat. Giving your baby a pacifier too soon might interfere with breast-feeding, since sucking on a breast is different from sucking on a pacifier.

The American Academy of Pediatrics recommends waiting to introduce a pacifier until breast-feeding is well-established, usually three to four weeks after birth. Once you've settled into a breast-feeding routine, keep in mind that sucking on a pacifier at naptime or bedtime might reduce the risk of SIDS.

Gauge your success: When your baby is latched on successfully, you'll feel a gentle pulling sensation on your breast — rather than a pinching or biting sensation on your nipple. Your breasts might feel firm or full before the feeding, and softer or emptier afterward. Look for your baby to gain weight steadily, produce at least six wet diapers a day and be content between feedings. Your baby's stools will become yellow, seedy and loose.

Take care of your nipples: After each feeding, it's OK to let the milk dry naturally on your nipple. The milk can soothe your nipples. If you're in a hurry, gently pat your nipple dry. If your breasts leak between feedings, use bra pads — and change them often.

When you bathe, minimize the amount of soap, shampoo and other cleansers that might contact your nipples. If your nipples are dry or cracked, use purified lanolin (such as Lansinoh or Tender Care Lanolin) after each feeding. This can soothe cracked nipples, as well as help your nipples retain moisture.

Make healthy lifestyle choices: Your lifestyle choices are just as important when you're breast-feeding as they were when you were pregnant. For example:

- **Eat a healthy diet:** To keep up your energy, stick to healthy-eating basics, such as choosing plenty of fruits, vegetables and whole grains. Your health care provider might recommend taking a daily multivitamin as well.
- **Drink plenty of fluids:** Water, juice and milk can help you stay hydrated. Moderate amounts of caffeine are generally considered OK as well — but scale back if you suspect that too much caffeine is interfering with your baby's sleep. If you have an alcoholic drink, avoid breast-feeding for two hours afterward.
- **Rest as much as possible. If you can, sleep when the baby sleeps.**
- **Don't smoke:** Smoking during breast-feeding exposes babies to nicotine, which can interfere with your baby's sleep, as well as risks a cigarette burn to the baby. Secondhand smoke also increases the risk of sudden infant death syndrome (SIDS), as well as respiratory illnesses.
- **Be cautious with medication:** Many medications are safe to take while you're breast-feeding. Still, it's best to get your health care provider's OK first. If you have a chronic health condition, ask your health care provider if it's OK to breast-feed your baby.

Q. What is colostrum? Why is it important to feed colostrum to the baby?

Ans. During the first days after birth, the breasts produce thick and yellowish fluid called colostrum. It's high in protein, low in sugar and loaded with beneficial compounds.Colostrum is the ideal first milk and helps the new-born's immature digestive tract develop. After the first few days, the breasts start producing larger amounts of milk as the baby's stomach grows. Colostrum provides high amounts of immunoglobulin A (IgA), as well as several other antibodies. Colostrum, the yellowish, sticky breast milk produced at the end of pregnancy, is recommended by WHO as the perfect food for the new-born and feeding should be initiated within the first hour after birth. Exclusive breastfeeding is recommended up to 6 months of age, with continued breastfeeding along with appropriate complementary foods up to two years of age or beyond. Breastfeeding decreases the risk of respiratory tract infections and diarrhoea, both in developing and developed countries.

Q. Define budget. List the steps in preparing a family budget.

Ans. A budget is an estimation of revenue and expenses over a specified future period of time and is usually compiled and re-evaluated on a periodic basis. Budgets can be made for a person, a family, a group of people, a business, a government, a country, a multinational organization or just about anything else that makes and spends money. At companies and organizations, a budget is an internal tool used by management and is often not required for reporting by external parties. The process of preparing a budget is called budgeting.

The steps for making budget are:

- Make a list of the items on which you need to spend money.
- Arrange these items in the order of preference. The essential ones like food, clothing, shelter, health and education get top priority.
- Estimate the probable expenditure on each of these items.
- Estimate the total money that will be available.
- Make an estimate of the maximum essential expenditure that you can incur on each of the items of expenditure with the assured income.

Now balance the budget to bring your expenditure into line with the income.

Q. Describe the causes and clinical features of the following:

(i) PEM

Ans. Protein–energy malnutrition (PEM) is a form of malnutrition that is defined as a range of pathological conditions arising from coincident lack of dietary protein and/or energy (calories) in varying proportions. The condition has mild, moderate, and severe degrees. Protein energy malnutrition (PEM) is widely prevalent among young children (0-6 years) but is also observed as starvation in adolescents and adults, mostly lactating women, especially during periods of famine or other emergencies. PEM has serious consequences for the health of individuals particularly children and can even result in death.

Clinical features of PEM:

(Q) Kwashiorkor (protein malnutrition predominant)-Kwashiorkor is a form of severe protein malnutrition characterized by edema, and an enlarged liver with fatty infiltrates. Sufficient calorie intake, but with insufficient protein consumption, distinguishes it from marasmus. Kwashiorkor cases occur in areas of famine or poor food supply. Cases in the developed worlare rare.

Symptoms of kwashiorkor are:

- **Oedema:** Oedema is the excessive accumulation of fluid in the intercellular spaces of the tissues. Oedema is usually observed on the lower limbs, but it may also be distributed all over the body including the face. Remember kwashiorkor should not be diagnosed without the presence of oedema. We can detect oedema by pressing the skin over the shin of the leg with your fingers. Because of accumulation of fluid under the skin, when you press there will be a depression at the place where the pressure is applied.
- **Failure of growth:** Growth failure is an early sign and we can notice this by taking body weight. Children with kwashiorkor weigh only about 60 per cent of the weight of normal children for their age.
- **Skin changes:** There may be characteristic skin changes. The skin becomes thick and appears as though it has been varnished. The skin of the child may peel off easily leaving behind cracks or sores.
- **Hair Changes:** The hair may become sparse and can be easily pulled off. The hair usually loses its black color and appears reddish brown.
- Tiredness or irritability.
- Ridged or cracked nails.

(b) Marasmus (deficiency in calorie intake): Marasmus is a form of severe malnutrition characterized by energy deficiency. It can occur in anyone with severe malnutrition but usually occurs in children. A child with marasmus looks emaciated. Body weight is reduced to less than 62% of the normal (expected) body weight for the age. Marasmus occurrence increases prior to age 1, whereas kwashiorkor occurrence increases after 18 months.

Symptoms of marasmus are:

- The primary symptom of marasmus is an acute loss of body fat and muscle tissues, leading to an unusually low body mass index (BMI). Marasmus is a type of wasting.
- In a child, the main symptom of marasmus is a failure to grow, known as stunted growth.
- In adults and older children, the main symptom may be wasting, or a loss of body tissue and fat. An older child with wasting may have standard height for their age.
- A child with marasmus may also be very hungry and suck on their clothes or hands as if looking for something to eat.
- Some people with marasmus will have anorexia, and they will not want or be able to eat.
- Other symptoms include:
  - Persistent dizziness
  - Lack of energy
  - Dry skin
  - Brittle hair

Diarrhea, measles, or a respiratory infection is serious complications that can be fatal in a child with marasmus. Diarrhea can also be a contributing cause of marasmus.

Q. Iodine deficiency disorder

Ans. Goiter and cretinism are the best known and easily recognizable forms of iodine deficiency.

Goiter: A goitre, or goiter, is a swelling in the neck resulting from an enlarged thyroid gland. Goitre can be associated with a thyroid that is not functioning properly. The word 'Goitre' means swelling/or enlargement of the thyroid gland. The swelling or enlargement can vary in size depending on the severity of the goitre. Monstrous goitre can be seen even from a distance. The prevalence rate (number of cases in 100 individuals) of goitre increases with age reaching a maximum at adolescence. It is more frequent in girls than boys. In fact, if one wants to find out whether goitre is a major problem in an area so as to start a control programme, the goitre rate over the ages 8-14 years is used as an indicator to know whether an area is endemic (highly affected area) for goitre or not. A prevalence of 10% (i.e. 10 girls out of 100 of this age examined) is taken as an indication that goitre is an important health problem in that particular area.

Cretinism: Congenital hypothyroidism (under activity of the thyroid gland at birth), which results in growth retardation, developmental delay, and other abnormal features. Cretinism can be due to deficiency of iodine in the mother's diet during pregnancy.Iodine deficiency interferes with the brain development of the foetus. This means it can cause irreversible brain damage even before birth. If an infant is born to an iodine deficient mother he or she is likely to suffer from a hypothyroidism. If this condition of iodine deficiency or hypothyroidism continues further after birth the child may suffer from a series of disorders which may include mental retardation, growth failure, speech and hearing defects, neuromuscular disorders, paralysis.

We can control it by increasing iodine in our diet because it is mainly due to lack of Iodine.We can use few more methods like:

- **Addition of iodine to salt:** The oldest and the most extensively used method is fortification (enrichment) of common salt with iodine (Potassium iodate).The salt may be used for fortification of iron to control anemia. We consume on an average 10-12 g of common salt every day. For 10 g of common salt about 150µg of iodine is added. In other words, daily consumption of common salt would ensure daily requirements of iodine. The iodized salt (common salt to which iodine is added) smells, tastes and even looks exactly like the common salt.
- **Use of tablets containing potassium or sodium iodide:** Provision of sodium/potassiurn iodate tablets to school children and addition of iodine to the drinking water suppliers have been tried in some countries but this is not a widely accepted method of administering iodine.

Use of iodized oil: Injection of oil to which iodine has been added has been adapted for the control of goiter and cretinism in areas where the IDD is severe. The advantage is that an injection of 1 ml dose of iodized oil can provide protection to an individual for 3-5 years. But this is more expensive and reaching all those at risk by this method is difficult. It is used as a temporary measure particularly in areas which are not easily accessible and iodized salt may not reach due to communication problems.

Q. Describe objectives, target group and method of distribution of the following nutrient deficiency control programmes:

(i) Vitamin A deficiency

Ans. Vitamin A is an important micronutrient for maintaining normal growth, regulating cellular proliferation and differentiation, controlling development, and maintaining visual and reproductive functions. Diet surveys have shown that the intake of Vitamin A is significantly lower than the recommended daily allowance in young children, adolescent girls and pregnant women. Prevalence of clinical and sub clinical vitamin A deficiency in India is among the highest in the world. In the fifties and sixties many of the states reported that blindness due to Vitamin A deficiency was one of the major causes of blindness in children below five years. A five-year long field trial conducted by NIN showed that if massive dose Vitamin A (200,000 units) was administered once in six months to children between one and three years of age, the incidence of corneal Xerophthalmia is reduced by about 80 per cent. In view of the serious nature of the problem of blindness due to Vitamin A deficiency, it was felt that urgent remedial measures in the form of massive dose Vitamin A supplementation covering the entire population of susceptible children should be undertaken. In 1970, the National Prophylaxis Programme against Nutritional Blindness was initiated as a centrally sponsored scheme. Under this scheme, all children between ages of one and three years were to be administered 200,000 IU of Vitamin A orally once in six months. In an attempt to improve the coverage, especially of the first two doses, it was decided to link Vitamin A administration to the on-going immunization programme during the Eighth Plan period. The socio-economic implications of blindness or blind children are tragic for the family as well as for the society. Therefore, a preventive programme of distribution of massive doses of vitamin A is being undertaken in the country. The basis of this programme is the fact that the human liver can store vitamin A consumed in excess of daily requirement. The stored vitamin A is released as and when the body-needs it. In other words the liver acts as a 'saving bank' in which the body saves (stores) its surplus vitamin A and withdraws it when the intake falls short of the requirement. Making use of this knowledge, the National Institute of Nutrition gave 2000 preschool children large doses of vitamin A, two times a year. The do called as the massive or mega (big) dose was calculated to give the child adequacy vitamin A every day for six months. An examination of these children at the end of a year showed most encouraging results. These were:

- None of the children were night-blind
- None developed conjunctival xerosis or Bitot spots
- None developed nutritional blindness.

Thus the National Prophylaxis Programme for prevention of Nutritional Blindness was born.

- **Objectives:** Refer to the specific aims to be achieved through the programme. The programme aims at preventing blindness due to vitamin A deficiency in children (between 6 months to 5 years) by supplying mega (high) dose of vitamin A.
- **Target group:** Nutrition programmes cater to only vulnerable sections of the community. Each programme targets at some particular vulnerable sections of the community i.e. target group. The method of distribution benefits of National prophylaxis programme for prevention of nutritional

blindness.All children of 6 months to 5 years are eligible (particularly those living in rural, tribal and urban slum areas).

- **Distribution Strategy:** Refer to the method of distribution of benefits of the programme. A liquid preparation of vitamin A in oil providing 200,000 IU (in 2 ml) is given to every child between the ages of 1 and 5 years. Vitamin A solution is kept away from direct sunlight and a bottle once opened is utilized within 6-8 weeks. A child must receive a total of 9 oral doses of vitamin A by fifth birthday. An infant between the ages of 6-11 months is given a dose of 100,000 ZU. The contact with an infant during administration of measles vaccine between the age of 9-12 months is considered practical time for administering the vitamin A supplement of 100,000 IU to infants.

(ii) Iron deficiency

Ans. Anemia is a condition in which you don't have enough healthy red blood cells to carry adequate oxygen to the body's tissues. Having anemia may make you feel tired and weak. There are many forms of anemia, each with its own cause. Anemia can be temporary or long term, and it can range from mild to severe**.**

Objectives: The programme aims at significantly decreasing the prevalence and incidence of anaemia in women in reproductive age group especially pregnant and. Lactating women and preschool children. The programme focuses on the following:

- Promotion of regular consumption of foods rich in iron.
- Provision of iron and folate supplements in the form of tablets to the "high risk" groups.
- Identification and treatment of severely anemic cases.

Target group:

- Pregnant women
- Lactating mothers
- Family planning acceptors (women who accept family planning measures like intrauterine devices (IUD) and tubectomy)
- Children of-both sexes between ages 1 to 5 years.

Distribution Strategy: Supply of iron-folic acid tablets to the target population constitutes the main input. Two types of tablets being distributed are:

- **Big tablets:** Each tablets containing 68 mg of iron (ferrous sulphate) and 500 µg of folic acid (for women). One big tablet per day for 100 days should be given to pregnant woman after first trimester. The contact during the administration of tetanus toxoid should be utilized for distribution of tablets to pregnant woman after the first trimester of pregnancy. Similarly lactating woman and IUD- acceptor should receive one tablet per day for 100 days. Mothers often accompany their infants on immunization sessions.
- **Small tablets:** Each tablets containing 20 mg of iron and 100 µg of folic acid daily for 100 days every year. Register wed for growth monitoring of children can be used to record the intake of tablets also. For young children who cannot swallow tablets, iron and folk add (in the same dose, as in a small tablet) are given in 2 ml of syrupy liquid. The health functionaries like Auxiliary Nurse Midwife (ANM) is responsible for distribution of tablets.

Q. Write short notes on four of the following:

(i) Anthropometric measurements in the assessment of nutritional status of pre-school children

Ans. There are four major methods used to assess nutritional status of individuals and population groups which include.

(a) Anthropometric measurement: Anthropometric measurements are used to assess the size, shape and composition of the human body. Learn about common methods used to gather these measurements, such as BMI, waist-to-hip ratio, skin-fold test and bioelectrical impedance.Anthropometric measurements are useful in many fields. For example, athletes understand that body size and composition are important factors in sports performance. For example, a petite man with a low percentage of body fat will be more successful as a jockey in the Kentucky Derby than he would be as a defensive lineman in the National Football League. Sports coaches can also use these measurements to monitor an athlete's body to ensure they stay in peak physical shape. Health care professionals rely on body measurements to evaluate a patient's overall health. For example, body mass index, or BMI, is a measurement of a person's weight-to-height ratio. Health care providers, insurance companies and government agencies use BMI to determine if a person is underweight, overweight or obese. A BMI of 30 or greater indicates obesity. Because obesity

is linked to chronic diseases, like heart disease, diabetes and certain cancers, knowing this anthropometric measurement can be a lifesaver. Anthropometric measurements can also be used when studying groups of people. This broader approach allows researchers to evaluate health trends and concerns in various populations. For example, anthropometry, which is the scientific study of human body measurements, has been used to assess the nutritional status of children in underdeveloped countries. These measurements can be used to determine the prevalence of under nutrition and evaluate the need for nutritional support.

- **Height for age:** Length or height is a very reliable measure that reflects the total increase in size of the individual up to the moment it is determined.
- **Weight for age:** Weight for age is commonly used indicator of body size, and it reflects the level of food intake.
- **Weight for height:** By relating the weight of a child to its height or length, an objective measure of child's degree of thinness can be obtained.
- **Mid upper arm circumference (MUAC):** The mid upper arm circumference is a useful indicator of nutritional status of individuals and communities. Arm circumference normally increase with age, but between one to five years it does not change much and remains fairly constant. At this time the baby fat is replaced by muscle. Measuring the arm circumference of this age group would give a good idea whether the child is in good health or not. A measurement below 80per cent of the normal i.e. (12.5 cm indicates severe malnutrition. It is an easy and useful measure for assessing thinness or muscle wasting in children in the age group 1-5 years. Like weight for height this measure too has an advantage that one does not need to know the exact age of the child in order to know the nutritional status.

(b) Clinical method: It is one of the simplest methods to assess nutritional status. It involves looking for changes (clinical signs/symptoms) in the body which are indicative of a particular deficiency. For example you might look for Bitot spots and night blindness in children to suggest the possibility of vitamin A deficiency, paleness, lethargy in women to suggest the possibility of anaemia.

(c) Biochemical analysis: Biochemical assessment deals with measuring the level of essential dietary constituents (nutrient concentration metabolite) in the body fluids (blood and urine normally) which is helpful in evaluating the possibility of malnutrition. For example, a measure of the level of Hb in the blood is helpful in evaluating the possibility of iron deficiency anaemia, a measure of the level of thiamine in the urine reflects the intake of thiamine in the diet, and a measure of the level of vitamin A in blood reflects intake and reserve of vitamin A in the body.

(d) Diet survey: When a systematic inquiry into the food supplies and food consumption of individuals and population groups is made, we call it a Diet Survey. Diet survey is nothing but the scientific assessment of pattern of dietary intake or specific foods followed by the estimation of nutrient intake, and finally utilization of the obtained data for the benefit of masses. The dietary intake data can be collected covering a whole nation from families (of different economic classes) or from individuals of special age group or occupation depending on the need.There are various methods of dietary survey. Each is suitable for a different set of circumstances.

- **Weighment of raw foods: The** survey team visits the household and weighs all the food that is going to be cooked and eaten. Also the amount which is left over or discarded is weighed. A surveyor needs to make at least two visits prior to the main meals being cooked.
- **Weighment of cooked foods:** Cooked food is weighed instead of the raw materials. In Indian homes, this is not a very acceptable thing. Hence, this is more appropriate for dietary assessment of institutions, hostels, etc.
- **Food frequency questionnaire method:** This is for assessing how frequently an item is consumed during a fixed time period, e.g., in a week. It is more suitable for studying the diet patterns and dietary habits of a population.
- **Food balance sheet method:** This method is suitable when information regarding the availability and consumption of food is required at a macro level like at the global, national, region, or state levels.
- **24-hour recall method:** It is one of the easiest and most popular methods for conducting a dietary survey. Studies have revealed that if properly conducted, the 24-hour recall method reveals reliable information regarding the food intake amount and quality.It meant enquiring about all the food consumed after the previous morning's breakfast.

It is suggested that the recall should begin from the most recent meal and proceed backward in time. In the first step, the individual is asked to recall the items consumed during the last 24 hours. After this, the amount that was consumed is probed. This has to take into account the leftover portion which is to be

deducted from the total amount cooked. In the third step, the amount of each raw ingredient that went into cooking of the items is asked. Food models and household measuring instruments can be used to guess the portion sizes more accurately. Also, she/he can be asked to demonstrate the spoon and cups which were used to measure the particular ingredient. The interviewer can assess the volume by filling it with water and pouring the same in a measuring cup. It is a good idea to carry measuring spoons set and other measuring instruments such as measuring cups and cylinders.

(ii) Common techniques used in nutrition education

Ans. The nutrition educator has a variety of teaching methods available

These have been grouped as

1. **Individual contacts:** These include what are known as home and farm visits. Since each persons problems are different, the personal approach through such visits result in greater understanding. They help in guessing first-hand information, developing good will, establishing confidence and stimulating interest. Individual contact method has its own limitations. It consumes more time, money and labour than the other methods. However, this is the best method for establishing rapport with people and to impart nutrition education.
2. **Group contacts:** These are the commonly used forms of nutrition education and are quite effective. They include the following
   - **General meeting:** A heterogeneous group is collected and certain information is passed on to the group. A large number of people can be reached by this method but proper discussion is not possible.
   - **Method and result demonstrations:** Demonstration is the oldest and most effective form of education which makes two impressions one on the sense of vision and the other on the sense of hearing. Method demonstrations are useful for teaching skill. In nutrition education this can be used to teach new and better methods of cooking. Result demonstration is a method of teaching designed to show by example, the practical application of an established fact or a group of facts.
   - **Balwadi feeding programmes:** These can be effectively used for educating both mother and child about good nutrition. Good food habits when inculcated in the childhood influencesthem alltheir life. A good method of teaching nutrition to the mother is to make her prepare the supplement by herself and feed the child.
   - **School feeding programmes and school gardens:** Teaching nutrition in the school years will leave significant mark on the minds of the children and influence them throughout their life. Children can be educated and helped to grow the nutrition vegetable and fruits in their garden so that along with nutrition education it improves their health status also.
   - **Nutrition Rehabilitation centers and nutrition wards:** The primary objective of these rehabilitation centers is the improvement of the nutritional status of the affected groups. So , nutrition education to such groups has very important role.
   - **Training to village level workers and other extension personnel:** These personnel can have a definite impact on the thinking of people. Auxillary nurse /midwives are a group who when trained can pass on the knowledge of nutrition to the women, especially pregnant and lactating mothers. Hence these personnel who are trainers should be trained well by group approach.
3. **Mass contacts:** Various studies have shown that the cost of nutrition education is comparatively cheaper, if mass media are used. A larger number of people can be reached in leisure time. The proper use and combination of several media at the same time, on the same subject matter, within a given area has been found to be very effective in stimulating people. Today mass media is the most commonly used media to educate both literate and illiterate population. Mass media include
   - **Print material:** This includes booklets, leaflets, folders, circulars, newspapers, magazines and any other printed material. While these are powerful media in the literature world, their use is limited in an illiterate population group. They involve much effort and money.
   - Radio -Radio is a powerful medium of communication both in the rural and urban societies. Nutrition education can be effectively carried out through this media. Here, one should plan the programme in attractive way by considering the background and their way of life.
   - **Exhibition:** An exhibition is a systematic display of modules, specimens, charts, and posters etc., which are more or less self-explanatory. This is a method of reaching even the illiterate population. It is very appealing to be public but requires much planning and preparation in advance.Dramatizations, puppet shows-One can educate public more effectively by using traditional methods of communication, since public have sentimental appeal. These are more

effective in teaching illiterate groups also. Puppet shows, folk songs and dances, dramatizations proved to be verify effective for nutrition education.

- **Films:** Films are a powerful media, through which education can be given, to both literate and illiterate groups.
- **T.V (Television):** Is also one of the strongest and effective media in educating the public. Popular talks and discussions on important nutritional problems of the region will form effective means of nutrition education
- **Advertisements:** The latest trend in nutrition education is to use advertising techniques to 'sell' nutrition to the masses. If information is disseminated in terms of lessons, people don't accept it easily. But by using social marketing strategies, nutrition messages can be imparted effectively. Advertising through posters, wall paintings, hoardings and films, can be effectively used. Both positive approach, where the benefits of eating a particular food and negative approach, where the dangers of not eating the food can be emphasized, in this approach.

(iii) Common adulterants and there health hazards

Ans. Some health hazards associated with specific food adulteration incudes**:**

Mineral oil if added to edible oil and fats can cause cancers.

- Lead chromate when added to turmeric powder and spices can cause anaemia, paralysis, brain damage and abortions.
- Lead added to water, natural and processed food can lead to lead poisoning, foot drop, insomnia, constipation, anaemia, and mental retardation.
- Cobalt added to water and liquors and can cause cardiac damage also copper, tin, and zinc can cause colic, vomiting and diarrhoea.
- Mercury in mercury fungicide treated grains, or mercury-contaminated fish can cause brain damage, paralysis, and death.
- Non-permitted colour or permitted food colour like metal yellow, beyond the safe limit in coloured food can cause allergies, hyperactivity, liver damage, infertility, anaemia, cancer and birth defects.

(iv) Role of grades, brand and labels in the section of food

Ans. Grades: Food grading involves the inspection, assessment and sorting of various foods regarding quality, freshness, legal conformity and market value. Food grading often occurs by hand, in which foods are assessed and sorted. Machinery is also used to grade foods, and may involve sorting products by size, shape and quality. For example, machinery can be used to remove spoiled food from fresh product.A grade is a classification of grouping of units of a product having the same qualities and value. The qualities by which a grade is determined may not be the same for every product. By means of grades, many products have come to be classified and standardized according to size, maturity, color and other constituents that determine quality.In India, AGMARK and the stamp of the Indian Standards Institution (ISI) specifies quality and a certificate by them is a certification of an acceptable specific quality. The grading is only voluntary for domestic market. It is compulsory only for export. This is where the consumer can play a vital role by preferring to buy AGMARK or IS1 certified goods, and asking for it as an assurance of quality – you do not ask for honey but for AGMARK honey, you look for IS1 marking on coffee packets, and refuse to buy one that does not have either one of these. This will eventually make producers get the proper certification for their products and hopefully the quality will improve.

Brand: A brand is a name, term, design, symbol or any other feature that identifies one seller's good or service as distinct from those of other sellers. Brands are used in business, marketing, and advertising. Name brands are sometimes distinguished from generic or store brands. The effort of the producer is to establish his or her commodity as a standard and desirable quality product and to create demands specifically for his product to influence your choice to an extent that when you shop you will ask for the product by the brand name.

Labels: A label is a piece of paper, plastic film, cloth, metal, or other material affixed to a container or product, on which is written or printed information or symbols about the product or item. Information printed directly on a container or article can also be considered labeling.Labels should give you information you need about the product you are thinking of buying.A good label should have on it the grade of the product and the stamp or mark of the authority that has graded it.A good label should also give you a description of the product. They provide you with almost all the information you would want to be able to make up your mind about buying the product. You should make a special note of the net weight, price and the date of manufacturing given on labels.

(v) Functions of sodium and potassium in the body

Ans. Sodium: An adult body contains approximately 120 g of sodium. Most of this is present in the extracellular fluid. Extracellular fluid refers to the fluid outside the cell just as intracellular fluid refers to fluid inside the cell.

- **Function:** Needed for proper fluid balance, nerve transmission, and muscle contraction
- **Sources:** Table salt, soy sauce; large amounts in processed foods; small amounts in milk, breads, vegetables, and unprocessed meats

Potassium: Potassium is present in twice as much amount as sodium in the body. Approximately 250g of potassium is contained in the body and most of this is present in the cells.

- **Function**: for proper fluid balance, nerve transmission, and muscle contraction.
- **Source**; Meats, milk, fresh fruits and vegetables, whole grains, legumes.

(vi) Functions of food

Ans. The functions of food can be broadly classified into three main categories.

(1) Physiological functions of food: The physiological functions of food can be further sub-divided as follow:

- **Energy giving:** The body needs a constant supply of energy to carry out the involuntary processes of which we are not even aware, like, respiration, circulation of blood etc. which are essential for continuance of life. Energy is also required to carry out voluntary activities like professional, household and recreational activities, which every human being indulges in like, either jumping, walking, playing etc. Besides this some amount of energy is also required to convert the ingested food into usable nutrients in the body and the heat released during this process helps to keep the body warm. Energy is mainly provided to our body through carbohydrates and fats in the food. Rich sources of carbohydrates are cereals, sugar, jiggery, potatoes, honey etc. Good Sources of fats include ghee, oil, nuts etc. A major part of our daily diet is constituted by these energy-rich food materials.
- **Body Building:** The foods we eat become a part of us. Thus, one of the most important functions of food is that of building the body. A newborn body weighting 2.7-3.2 Kg. Can grow to its potential adult size of 55-70 Kg., if right kinds and amounts are eaten from birth to adulthood, in adult life, the food eaten each day helps to maintain the structure of the adult body, and to replace worn out cells of the body.

  Building of new tissues is very important particularly for the growing children and pregnant women. There is also a continuous breakdown of old tissues and building up of new tissues going on in our body at all ages irrespective of the apparent growth, thus maintaining a need for body building nutrients.

  For the body building purposes, the major nutrients utilized are proteins and minerals. Proteins are mainly provided through milk and milk products, meat, fish, poultry, nuts, soybean, and pulses etc.
- **Regulatory and Protective function:** The third physiological function of food is to regulate the activities of the body. It includes regulation of such varied activities as beating of the heart, maintenance of body temperature, muscle contraction, control of water balance, clotting of blood, removal of waste products from the body etc. For any of these processes, one or the other nutrients is responsible. For example, Vitamins of the B groups are an integral part of the enzymes and are responsible for metabolizing food and thus release energy. Vitamin K is an essential factor in clotting of blood.

  Apart from regulating our body processes, food also protects us from various infections, diseases, and injuries. For example, Consumption of Vitamin A and Vitamin C rich food help in building resistance in the body to fight against invading organism.

  The main nutrients which perform these functions include proteins, vitamins, minerals, water and roughage. Although these nutrients are required by the body in very small amounts, yet it is very important for them to be present in our daily diets. The major sources of these protective and regulatory nutrients are green leafy vegetable, milk, fresh fruits and vegetable, fish etc.

(2) The Psychological Functions of food: The second major function of food is the psychological function. Food must also satisfy certain emotional needs. These include sense of security, love and attention. Everyone grows in a particular culture with its own unique food habits of that culture and caste.

The person begins to associate the food habits and foods commonly consumed by him, as it gives him a sense of security and satiety. The foods daily eaten by us, give us more mental satisfaction, even a nutritional balanced meal may not be satisfying to the individual, if food include is unfamiliar or distasteful to him/her.

In a friendly gathering, one may try unfamiliar foods and thus enlarge our food experiences. During the course of time and repeated experience, strange foods become familiar and new tastes are formed. These new tastes are developed should again be satisfying to the mind. For example, a person accustomed to traditional Indian cuisine, takes time to adjust to Chinese or western dishes, but feels mentally satisfied at the site of familiar foods.

(3) Social function of Food: Food and eating has significant social meaning. Share food with any other person implies social acceptance. When you share a meal with anyone else, you are expressing your acceptance of friendship and respect for that person. Earlier only persons enjoying equal status in society eat together. A person would never share a meal with someone inferior to him in social terms. Food is also a symbol of our social life. Food is a medium through which we express our happiness. For example, feasts are given at specific states of life, such as birth, mundane ceremony, birthday, marriage etc. Sweets are also distributed and exchanged to mark certain auspicious occasion like festivals. Food is the common link in a meeting, party or get-together that attracts people to come to such social gatherings. Refreshment served even at officials meeting creates a relaxed atmosphere, where people can exchange their views. The menu for such get-together should bring the people together, rather than divide them. Foods help to strengthen mutual friendship.

For example, inviting friends and relatives over meals signify acquaintance and hospitality. Food also has a specific significance and meaning in the religious context. Certain food items such as fruits, sweets, and coconut are offered to the deity in temples. Often sweets are prepared at temples and gurudwaras and distributed to devote as a benediction or prasad.

Thus, it can be concluded that food performs various important functions from satisfying hunger to building mutual understanding and above all helps to maintain our health and adequate nutritional status.

DNHE-01: Nutrition for the Community
Guess Paper-II

Q. Define/Explain the following:

(i) Food

Ans. The term 'food' brings to our mind countless images. Food plays an important role in our lives and is closely associated with our existence. It is probably one of the most important needs of our lives.

The food that we eat is composed of small units that provide nourishment to the body. These are required in varying amounts in different parts of the body for performing specific functions. This means that good nutrition is essential for good health. However, if our diet provides the important units in incorrect amounts, either very less or in excess of what is required, it results in an imbalance of nutrients in your body. The condition is responsible for various deficiency diseases and slow or no growth of the body.

Food is any substance consumed to provide nutritional support for an organism. It is usually of plant or animal origin, and contains essential nutrients, such as carbohydrates, fats, vitamins, or minerals. The substance is ingested by an organism and assimilated by the organism's cells to provide energy, maintain life, or stimulate growth. Historically, humans secured food through two methods: hunting and gathering and agriculture.

(ii) Hormone

Ans. A chemical substance produced in the body that controls and regulates the activity of certain cells or organs. Many hormones are secreted by special glands, such as thyroid hormone produced by the thyroid gland. Hormones are essential for every activity of life, including the processes of digestion, metabolism, growth, reproduction, and mood control. Many hormones, such as neurotransmitters, are active in more than one physical process.

(iii) Extra Cellular Fluid

Ans. Extracellular fluid (ECF): It denotes all body fluid outside the cells of any multicellular organism. Total body water in healthy adults is about 60% (range 45 to 75%) of total body weight; women and the obese have a lower percentage than lean men.Extracellular fluid is the internal environment of all multicellular animals, and in those animals with a blood circulatory system a proportion of this fluid is blood plasma. Plasma and interstitial fluid are the two components that make up at least 97% of the ECF. Lymph makes up a small percentage of the interstitial fluid. The remaining small portion of the ECF includes the transcellular fluid (about 2.5%). The ECF can also be seen as having two components – plasma and lymph as a delivery system, and interstitial fluid for water and solute exchange with the cells.The extracellular fluid, in particular the interstitial fluid, constitutes the body's internal environment that bathes all of the cells in the body.

Intracellular fluid: The intracellular fluid, also known as cytosol, is all fluid contained inside the cells. It is the matrix in which cellular organelles are suspended. The cytosol and organelles together compose the cytoplasm. The cell membranes are the outer barrier. In humans, the intracellular compartment contains on average about 8 liters of fluid, and under ordinary circumstances remains in osmotic equilibrium. It contains moderate quantities of magnesium and sulphate ions.Intracellular fluid is the fluid present inside the cells.It is separated into compartments by membranes. For example, the mitochondrial matrix separates the mitochondrion into manycompartments.

Fluid balance: Fluid balance is an aspect of the homeostasis of organisms in which the amount of water in the organism needs to be controlled, via osmoregulation and behavior, such that the concentrations of electrolytes (salts in solution) in the various body fluids are kept within healthy ranges.The core principle of fluid balance is that the amount of water lost from the body must equal the amount of water taken in; for example, in humans, the output (via respiration, perspiration, urination, defecation, and expectoration) must equal the input (via eating and drinking, or by parenteral intake).

Q. Explain/Comment briefly on the following:

(a) Dimensions of health

Ans. As defined by World Health Organization (WHO), it is a "State of complete physical, mental, and social well-being, and not merely the absence of disease or infirmity." Health is a dynamic condition resulting from a body's constant adjustment and adaptation in response to stresses and changes in the environment for maintaining an inner equilibrium called homeostasis.

The four dimensions of health are:

- **Physical Health**- Physical health is the state of being free from illness or injury. It can cover a wide range of areas including healthy diet, healthy weight, dental health, personal hygiene and

sleep. Physical health is vital for overall well-being. A chronic physical illness is a long-term health problem that will not go away. For example, diabetes, asthma, arthritis or cancer. Chronic physical illnesses can be managed, but they cannot be cured. A person is physically healthy if he or she looks alert, energetic and vigorous.

- **Mental Health-** Mental health refers to our cognitive, behavioral, and emotional wellbeing. It is all about how we think, feel, and behave. The term 'mental health' is sometimes used to mean an absence of a mental disorder. Mental health can affect daily life, relationships, and even physical health. Mental health also includes a person's ability to enjoy life, to attain a balance between life activities and efforts to achieve psychological resilience. According to the WHO (World Health Organization), mental health is: A state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community. The most common types of mental illness are anxiety disorders, mood disorders, and schizophrenia disorder.
- **Social health-** Social health involves your ability to form satisfying interpersonal relationships with others. It also relates to your ability to adapt comfortably to different social situations and act appropriately in a variety of settings. Spouses, co-workers and acquaintances can all have healthy relationships with one another. Each of these relationships should include strong communication skills, empathy for others and a sense of accountability. In contrast, traits like being withdrawn, vindictive or selfish can have a negative impact on your social health. Overall, stress can be one of the most significant threats to a healthy relationship. Stress should be managed through proven techniques such as regular physical activity, deep breathing and positive self-talk.

Spiritual Health: Spiritual Wellness is a personal matter involving values and beliefs that provide a purpose in our lives. While different individuals may have different views of what spiritualism is, it is generally considered to be the search for meaning and purpose in human existence, leading one to strive for a state of harmony with oneself and others while working to balance inner needs with the rest of the world. Indians Probably understand spirituality more because in Indian society religious and moral codes of behavior are easily observable. A healthy individual obeys these moral codes most of the time. The concept of doing good and of not harming others; of believing in the basic forces of goodness and justice whether or not these are worshipped as God; of recognizing the needs of others and trying to fulfill them; of commitment. Duty and obligation, these are all characteristics of a spiritually well person. Spiritual health is certainly not easy to attain.

(b) Functions of carbohydrates in the body

A carbohydrate is a biomolecule consisting of carbon (C), hydrogen (H) and oxygen (O) atoms, usually with a hydrogen–oxygen atom ratio of 2:1 (as in water) and thus with the empirical formula $C_m(H_2O)_n$. The carbohydrates are technically hydrating of carbon. Carbohydrates are widely distributed in plant foods. They are mainly present in these foods in the form of three types of compounds called sugars, starches and fiber. All these carbohydrates are made up of some basic simple units. One prominent example of a basic unit is glucose. Other examples are fructose and galactose. Low-carbohydrate diets are associated with increased mortality, but they may miss the health advantages – such as increased intake of dietary fiber afforded by high-quality carbohydrates found in legumes and pulses, whole grains, fruits, and vegetables. Disadvantages of the diet might include halitosis, headache and constipation, and in general the potential adverse effects of carbohydrate-restricted diets are under-researched, particularly for possible risks of osteoporosis and cancer incidence. Table sugar (cane sugar) which we commonly use in our houses is a carbohydrate made up of two basic units one unit of glucose and one unit of fructose. On the other hand, a starch molecule is very large. It is made up of several basic units of glucose linked together. These chains of glucose can be straight or branched. Examples of foods rich in starch are rice, wheat, maize and tapioca. Fiber like starch, is made up of a number of basic units. The term fiber includes several substances. Cellulose is one example. It is a substance made up of several glucose units. Carbohydrates are classified as available and non-available carbohydrates. Carbohydrates like sugars and starches are digestible in the human digestive tract and hence can be made available to the body for its functioning. These carbohydrates are termed as available carbohydrates. Cellulose and certain other large carbohydrate molecules that cannot be digested in the human digestive tract are collectively referred to as fiber or non-available carbohydrates. So, in other words we can say that we can digest available carbohydrates and cannot digest non-available.

The functions of carbohydrates are:

1. **Energy-giving function**: The main function of carbohydrates is to provide energy for the working of the body. One gram of carbohydrate provides approximately 4 kilocalories (Kcal). Carbohydrate foods are widely distributed in nature and are the cheapest sources of energy. They usually provide 60-70 per cent of the total calories in our diets. The kilocalorie is the unit of measurement of energy. One kilocalorie is the amount of heat required to raise I the temperature of 1 kilogram of water by 1 degree centigrade. Carbohydrates provide energy, body cells convert carbohydrates into a fuel molecule ATP through a process called cellular respiration. Most of the carbohydrates in the foods you eat are digested and broken down into glucose before entering the bloodstream. Glucose in the blood is taken up into body's cells and used to produce a fuel molecule called adenosine triphosphate (ATP) through a series of complex processes known as cellular respiration. Cells can then use ATP to power a variety of metabolic tasks.
2. **Protein-sparing action:** If carbohydrate supplied in the diet in sufficient amount to meet caloric needs will spare protein, so that it can be used for protein metabolism. When inadequate protein is used as a source of calories amounts of carbohydrates in the food influences the rate of protein metabolism as indicated by the nitrogen excretion. The loss of protein which occurs on an insufficient diet may be diminished or even stopped by adding carbohydrates to the food; and if carbohydrate added to the diet of a man in nitrogen equilibrium, their results a temporary decrease in nitrogen output with a corresponding storage of protein in the body. The former observation could be interpreted as meaning simply that the body draws upon its stored protein for energy so long, and only so long, as the fuel value of the food is insufficient; but the fact that addition of carbohydrate or fat to a diet already sufficient may cause an actual storage of protein indicates that the "protein-sparing action" or "protein-protecting power" of carbohydrates.
3. **Utilization of fat:** Fat is one of the three general classes of energy sources ingested as food. As with the other sources, carbohydrates and proteins, fat is processed by the body in the manner that makes it most useful for energy production both immediately and in the longer term. The term "fat" encompasses a number of subcategories of fats, each of which is utilized by the body in different ways. The uses to which fats are directed within the body include: a source of stored energy fuel; a vehicle by which important nutrients, such as the fat-soluble vitamins A, D, and E are absorbed; and the production of certain cholesterols, known as high density lipoproteins (LDLs), or "good cholesterol," which assist in the reduction of artery-clogging compounds in the blood.

(c) Role of cholesterol in health and disease

Ans. Cholesterol helps your body build new cells, insulate nerves, and produce hormones. Normally, the liver makes all the cholesterol the body needs. But cholesterol also enters your body from food, such as animal-based foods like milk, eggs, and meat. Too much cholesterol in your body is a risk factor for heart disease.When there is too much cholesterol in your blood, it builds up in the walls of your arteries, causing a process called atherosclerosis, a form of heart disease. The arteries become narrowed and blood flow to the heart muscle is slowed down or blocked. The blood carries oxygen to the heart, and if not enough blood and oxygen reach your heart, you may suffer chest pain. If the blood supply to a portion of the heart is completely cut off by a blockage, the result is a heart attack. There are two forms of cholesterol that many people are familiar with: Low-density lipoprotein (LDL or "bad" cholesterol) and high-density lipoprotein (HDL or "good" cholesterol.) These are the form in which cholesterol travels in the blood.LDL is the main source of artery-clogging plaque. HDL actually works to clear cholesterol from the blood.The main goals in treating high cholesterol are to lower your LDL levels and lower your risk of cardiovascular disease. To lower cholesterol, eat a heart-healthy diet, exercise regularly, and maintain a healthy weight. Some may also need to take cholesterol-lowering drugs.

Q. "After the age of 10 years, boys absorb less iron as compared to girls."

Teen boys should get 11 milligrams of iron a day and teen girls should get 15 milligrams. (Adolescence is a time of rapid growth and teen girls need additional iron to replace what they lose monthly when they begin menstruating.)In prepubertal humans no major differences can be found between the sexes in red blood cell count or haemoglobin and serum ferritin concentrations. Only after the onset of menstruation does a difference emerge. Not until 10 years after the menopause does this situation revert in women, when the haemoglobin concentration becomes similar to that of aged matched men. This situation is compounded by the fact that modern women have a different reproductive history from those in the past. They reach sexual maturity at an earlier age, have fewer pregnancies, and breast feed for shorter periods;

as such they menstruate for more years than women in the past. Menstruation is the principal cause of iron loss in women.

Q. "Fast foods cannot be balanced nutritionally and hence must be restricted from the diet of adolescents."

Ans. Adolescence is the only time following infancy when the rate of physical growth actually increases. This sudden growth spurt is associated with hormonal, cognitive, and emotional changes that make adolescence an especially vulnerable period of life. First, there is a greater demand for calories and nutrients due to the dramatic increase in physical growth and development over a relatively short period of time. Second, adolescence is a time of changing lifestyles and food habit changes that affect both nutrient needs and intake.Third, adolescent drive for individuation means more opportunity to assert food choices and expand or narrow healthy options. Adolescence can be divided into three stages. Early adolescence (11-14 years of age) is characterized by the onset of puberty and increased cognitive development. Middle adolescence (15-17 years of age) is characterized by increased independence and experimentation. Late adolescence (18-21 years of age) is a time for making important personal and occupational decisions. Poor nutrition during any of these stages can have lasting consequences on an adolescent's cognitive development, resulting in decreased learning ability, poor concentration, and impaired school performance Eating junk food has become a trend. The children hate homemade healthy food. Junk food is injurious to health. Eating Burger and Pizza increases cholesterol in human body. The fat in human body increases. The increase fat is dangerous for heart. Drinking soft drinks adds dangerous toxins in human body. It affects the bone, skin and kidney.Good nutritious diet or balance diet is basic need of every child for their growth and development because of its delicious taste.1 Most of the children of this age during their meal time eat junk food and get addicted to the taste of the junk food. Though, junk foods are tasty but it has low nutritive value and high calories. Many people try to avoid or limit junk food in their diet. Out of that such food is not healthy, despite the fact that numerous food manufacturers manufacture various ranges of products which could be considered as junkfood.

Q. List the criteria of selection of the following foods:

(i) Roots and Tubers-ROOTS AND TUBERS are plants yielding starchy roots, tubers, rhizomes, corms and stems. They are used mainly for human food (as such or in processed form), for animal feed and for manufacturing starch, alcohol and fermented beverages including beer.The denomination "roots and tubers" excludes crops which are cultivated mainly for feed (mangolds, swedes) or for processing into sugar (sugar beets), and those classified as "roots, bulb and tuberous vegetables" (onions, garlic and beets). It does include starch and the starchy pith and flour obtained from the trunk of the sago palm and the stem of the Abyssinian banana (Musa ensete).The energy is about one third of that of an equivalent weight of grain such as rice or wheat because tubers have high water content. However, the high yields of most root crops ensure an energy output per hectare per day which is considerably higher than that of grains.As with all crops the nutritional composition of roots and tubers and tubers varies from place to place depending on the climate, soil the crop variety and other factors (Woolfe, 1987).Certain food preparation and processing method need to be promoted at the house-hold level to reduce the level of absorption inhibitors or increase the content of absorption enhancers and thus improving the bioavailability of Fe, Zn and provitamin, A eliminate the toxic component in roots and tubers. Food processing methods such as germination, malting and fermentation have been found to be very effective in enhancing Fe absorption by increasing vitamin C content or by lowering the tannin or phytic acid content.

(ii) Pulses –It should be WHOLE, it's presented by nature with all its edible parts (the bran, the starch, the germ everything). If any part is missing the body will know the difference. It should be FRESH and NATURAL.Pulsesshould be REAL, not fakes or imitations. Read the ingredients, if doesn't sound like food is not food. Make sure that it is Local, Seasonal, Not genetically modified so you are in balance with the Earth, the seasons and the environment. Itshould be BALANCED, APPROPRIATE and ENOUGH. Balanced: you need some proteins, some carbohydrates, some fats; some of each. Your diet should be appropriate to your lifestyle, it means that kids need different food from old people and it is just as important not eat too much as it is not to eat little.

(iii) Eggs- Eggs should be fresh and not stale, collected as early as possible after laying, at any rate within a week of laying. Very fresh eggs just laid on the day of setting may not be advisable to be set unless they attain the room temperature before setting. Eggs of 2- 4 days old are excellent.Soiled eggs should not be washed in water before setting, as washing with water opens up the pores and this interferes with the

hatching results. If the dirt is not excessive, it should be removed with a knife. Highly soiled eggs should not be used.

Understand how conventional eggs are produced. Conventional eggs often come from hens that have been kept in small cages in crowded facilities. Also, conventional eggs often come from hens that have eaten a diet of corn, soy and cottonseed meal, which is then filled with commercial additives. Conventional eggs are safe to eat and still make a good choice of protein. However, many researchers believe that eggs from chickens raised in these conditions are nutritionally inferior.

Know what organic means. Eggs labeled "organic" by the USDA come from chickens that are kept cage-free with outdoor access. These chickens have not had antibiotics and eat a diet free of animal by-products. In addition, the hens' diets cannot contain crops grown with chemical pesticides, fertilizers, irradiation, genetic engineering or sewage sludge.

Consider purchasing free-range eggs. Hens that are "free-range" are not only cage-free but are also given access to the outdoors. However, free-range does not necessarily mean that the hens were pastured; it simply means that the hens had the option to go outside. To ensure that you eat truly free-range eggs, purchase eggs from pastured hens. Pastured hens often eat diets that include greens, seeds, worms and bugs, which are more akin to a natural chicken's diet.

(iv) Lady fingers-

Lady's finger is a common vegetable, especially in India. You can get in all vegetable markets locally as well as in food malls or supermarkets. Its price is almost similar to other vegetables. Choose the fresh looking long, dark green colored ones. Avoid buying those, which have blemishes, bruises and cuts or leeked internal skickiness, which might happen during transportation. Always go for medium diameter ones, not too long, because bulgy lady's finger have very big seeds within, which spoil the delicacy of this vegetable. Avoid the shrinked okra, which happens due to moisture loss on storage. Check for any worm or insect infestation.

(v) Banana- Bananasshould not have black spots on the skin and be free from bruises and slightly hard when purchased. They should be then allowed to ripen at room temperature, as fully ripe fruit is easily bruised even as you carry it home from the market. Shelf-life of green bananas is very short after ripening. Ripe fruit does not store well in the refrigerator, as the sugar to starch conversion is favored at low temperature. Best eating quality of bananas has been reached when the solid yellow color is specked with brown.

DNHE-01: Nutrition for the Community
Guess Paper-III

Q. What is food? List the functions of food.

Ans. The term 'food' brings to our mind countless images. Food plays an important role in our lives and is closely associated with our existence. It is probably one of the most important needs of our lives.

The food that we eat is composed of small units that provide nourishment to the body. These are required in varying amounts in different parts of the body for performing specific functions. This means that good nutrition is essential for good health. However, if our diet provides the important units in incorrect amounts, either very less or in excess of what is required, it results in an imbalance of nutrients in your body. The condition is responsible for various deficiency diseases and slow or no growth of the body.

Food is any substance consumed to provide nutritional support for an organism. It is usually of plant or animal origin, and contains essential nutrients, such as carbohydrates, fats, vitamins, or minerals. The substance is ingested by an organism and assimilated by the organism's cells to provide energy, maintain life, or stimulate growth. Historically, humans secured food through two methods: hunting and gathering and agriculture.

FUNCTIONS OF FOOD

The functions of food can be broadly classified into three main categories.

1) Physiological functions of food: The physiological functions of food can be further sub-divided as follow:

- **Energy giving:** The body needs a constant supply of energy to carry out the involuntary processes of which we are not even aware, like, respiration, circulation of blood etc. which are essential for continuance of life. Energy is also required to carry out voluntary activities like professional, household and recreational activities, which every human being indulges in like, either jumping, walking, playing etc. Besides this some amount of energy is also required to convert the ingested food into usable nutrients in the body and the heat released during this process helps to keep the body warm. Energy is mainly provided to our body through carbohydrates and fats in the food. Rich sources of carbohydrates are cereals, sugar, jiggery, potatoes, honey etc. Good Sources of fats include ghee, oil, nuts etc. A major part of our daily diet is constituted by these energy-rich food materials.
- **Body Building:** The foods we eat become a part of us. Thus, one of the most important functions of food is that of building the body. A newborn body weighting 2.7-3.2 Kg. Can grow to its potential adult size of 55-70 Kg., if right kinds and amounts are eaten from birth to adulthood, in adult life, the food eaten each day helps to maintain the structure of the adult body, and to replace worn out cells of the body.

Building of new tissues is very important particularly for the growing children and pregnant women. There is also a continuous breakdown of old tissues and building up of new tissues going on in our body at all ages irrespective of the apparent growth, thus maintaining a need for body building nutrients.

For the body building purposes, the major nutrients utilized are proteins and minerals. Proteins are mainly provided through milk and milk products, meat, fish, poultry, nuts, soybean, and pulses etc.

- **Regulatory and Protective function:** The third physiological function of food is to regulate the activities of the body. It includes regulation of such varied activities as beating of the heart, maintenance of body temperature, muscle contraction, control of water balance, clotting of blood, removal of waste products from the body etc. For any of these processes, one or the other nutrients is responsible. For example, Vitamins of the B groups are an integral part of the enzymes and are responsible for metabolizing food and thus release energy. Vitamin K is an essential factor in clotting of blood.

Apart from regulating our body processes, food also protects us from various infections, diseases, and injuries. For example, Consumption of Vitamin A and Vitamin C rich food help in building resistance in the body to fight against invading organism.

The main nutrients which perform these functions include proteins, vitamins, minerals, water and roughage. Although these nutrients are required by the body in very small amounts, yet it is very important for them to be present in our daily diets. The major sources of these protective and regulatory nutrients are green leafy vegetable, milk, fresh fruits and vegetable, fish etc.

2) The Psychological Functions of food: The second major function of food is the psychological function. Food must also satisfy certain emotional needs. These include sense of security, love and attention. Everyone grows in a particular culture with its own unique food habits of that culture and caste.

The person begins to associate the food habits and foods commonly consumed by him, as it gives him a sense of security and satiety. The foods daily eaten by us, give us more mental satisfaction, even a nutritional balanced meal may not be satisfying to the individual, if food include is unfamiliar or distasteful to him/her.

In a friendly gathering, one may try unfamiliar foods and thus enlarge our food experiences. During the course of time and repeated experience, strange foods become familiar and new tastes are formed. These new tastes are developed should again be satisfying to the mind. For example, a person accustomed to traditional Indian cuisine, takes time to adjust to Chinese or western dishes, but feels mentally satisfied at the site of familiar foods.

3) Social function of Food: Food and eating has significant social meaning. Share food with any other person implies social acceptance. When you share a meal with anyone else, you are expressing your acceptance of friendship and respect for that person. Earlier only persons enjoying equal status in society eat together. A person would never share a meal with someone inferior to him in social terms. Food is also a symbol of our social life. Food is a medium through which we express our happiness. For example, feasts are given at specific states of life, such as birth, mundane ceremony, birthday, marriage etc. Sweets are also distributed and exchanged to mark certain auspicious occasion like festivals. Food is the common link in a meeting, party or get-together that attracts people to come to such social gatherings. Refreshment served even at officials meeting creates a relaxed atmosphere, where people can exchange their views. The menu for such get-together should bring the people together, rather than divide them. Foods help to strengthen mutual friendship.

For example, inviting friends and relatives over meals signify acquaintance and hospitality. Food also has a specific significance and meaning in the religious context. Certain food items such as fruits, sweets, and coconut are offered to the deity in temples. Often sweets are prepared at temples and gurudwaras and distributed to devote as a benediction or prasad.

Thus, it can be concluded that food performs various important functions from satisfying hunger to building mutual understanding and above all helps to maintain our health and adequate nutritional status.

Q. Elucidate the meaning of nutrition along with its different aspects.

Ans. Nutrition is the science that interprets the interaction of nutrients and other substances in food in relation to maintenance, growth, reproduction, health and disease of an organism. It includes food intake, absorption, assimilation, biosynthesis, catabolism, and excretion. The diet of an organism is what it eats, which is largely determined by the availability and palatability of foods. For humans, a healthy diet includes preparation of food and storage methods that preserve nutrients from oxidation, heat or leaching, and that reduces risk of foodborne illnesses. In humans, an unhealthy diet can cause deficiency-related diseases such as blindness, anemia, scurvy, preterm birth, stillbirth and cretinism, or nutrient excess health-threatening conditions such as obesity and metabolic syndrome; and such common chronic systemic diseases as cardiovascular disease, diabetes, and osteoporosis. Under nutrition can lead to wasting in acute cases, and the stunting of marasmus in chronic cases of malnutrition.

Nutrients: Action, Interaction and Balance

Food, contains nutrients as well as substances which are non-nutrients. The body needs each nutrient in specific amounts. Some are needed in relatively larger amounts (the macronutrients) and some in smaller amounts (the micronutrients). But they are all equally essential for our health. Each nutrient plays a significant role in the body. The mineral, calcium, for example, helps build strong bones and teeth. This is the actionof calcium. Similarly, other nutrients have their own specific functions. To return to the earlier example, bones and teeth also contain another mineral, phosphorus. Both calcium and phosphorus must be supplied to the body in the required amounts and proportions to ensure the normal growth of bones and teeth. This means that normal growth of bones and teeth and maintenance of their normal structure and function requires an interactionbetween these two nutrients.

The concept of balance can also be explained by taking the example of calcium and phosphorus. If the diet contains too much phosphorus, it prevents the body from taking in enough of calcium. This creates an imbalance between calcium and phosphorus and affects the bones and teeth. This imbalance can be corrected by consuming foods that supply the two nutrients in the correct proportions. In the larger

context, the term balance means that the nutrients needed by the body should be provided in the right amount and proportions.

Handling of Food and Nutrients by the Body

The food you eat every day provides the nutrients you need to survive. These food components include the macronutrients like protein, carbohydrate and fat that offer calories as well as play specific roles in maintaining your health. Micronutrients, such as vitamins and minerals, don't act as an energy source but do serve a variety of critical functions to ensure your body operates as optimally as possible.

Once digestion is completed several nutrients are available to the body in a form in which the body can use them further. The process by which nutrient move from the intestine into the blood is referred to as absorption. The blood then transports them to all the cells of the body where they are utilized for different functions.

All the substances in the food which the body cannot absorb are thrown out in faces. The processing and handling by the body of absorbed nutrients results in the formation of certain other substances or by-products. Some of these are harmful and need to be thrown out of the body. This is achieved by transferring them from the blood to the urine. The latter is then thrown out of the body.

Social, psychological and economic aspects of nutrition.

1. **Social and psychological**: Social influences on food intake refer to the impact that one or more persons has on the eating behaviour of others, either direct or indirect, either conscious or subconscious. Even when eating alone, food choice is influenced by social factors because attitudes and habits develop through the interaction with others. Research has shown that we eat more with our friends and family than when we eat alone and the quantity of food increases as the number of fellow diners grows.
2. **Social-cultural aspect**: Our ancient Vedic tradition emphasizes food as the life-giver. Its further attributes specific qualities to specific foods. It is said that sattvic foods, for example, increase intellectual capacity and creativity, energy aid cheerfulness. Milk and milk products are regarded as the prominent sattvic foods. The rajasic food (foods that stimulate passion) are stated to include fish, eggs and meat while pork and beef are put in the category of tamasic foods (stale, reheated, tasteless and impure foods). Contrast this view of food and eating with our modern views, we no longer believe that certain foods or categories of foods (when part of a usual diet) can influence our behaviour to any significant extent. At restaurants and hotels, customers frequently eat reheated food which in the Vedic tradition has the lowest status. Many people, even though they may be vegetarian, do not mind sharing food with non-vegetarian friends. The former, of course, would not consume meat and meat products but may still accept vegetarian foods prepared in kitchens where meat is also cooked. This is a desirable trend. Tolerance and adaptability to varied eating habits is a healthy sign of progress.
3. **Psychological aspect:** People engage in eating behavior as a matter of survival, normally every day. That is, one has to make choices about what to eat, when, and how much. In contrast to our ancestors. However, whose primary task was to seek out any food that would provide energy and nutrients, those choices have become more difficult nowadays. In western or westernized societies in particular, food is abundant, cheap, and available in a great variety. Moreover, eating is a fundamentally rewarding behavior, and is thus intrinsically linked to mood and emotions.Many factors influence our choice of foods such as advertisements and the attitudes of other people around us. Our reactions to these influences often determine both what we eat and how much we eat. One example is the child who seeks to overcome a feeling of insecurity or inferiority by eating more. Another child may seek to overcome the same feelings by eating less. Thus, our individual reactions to food and to the people around us can have a significant psychological influence on our eating pattern.
4. **The economics of food:** Food must be within the reach of people and it must be equitably distributed to all sections of the population. The availability of food and its proper distribution are of great importance. You may have heard of people dying of starvation even when plenty of food was available. In India, for example, agricultural production has consistently increased. However, the problem of distributing our food surplus still remains. As a result, large sections of our population do not get enough food. These are only some of the larger economic issues of interest to everyone. Our ultimate aim should be to ensure the good health of all individuals.

Q. Define Vitamins. Write different types of vitamins and evaluatetheirfunctions.

Ans. A **vitamin** is an organic molecule (or related set of molecules) that is an essential micronutrient that an organism needs in small quantities for the proper functioning of its metabolism. Essential nutrients cannot be synthesized in the organism, either at all or not in sufficient quantities, and therefore must be obtained through the diet. The "vita" part of the word "vitamin" means "life". Vitamins are in fact vital and essential for life and health. They regulate metabolism, help in the growth and maintenance of our body and protect against disease. Some of the vitamins are soluble in water while others are soluble in fat. They are hence classified into two categories: water-soluble vitamins and fat-solublevitamins. Vitamin C can be synthesized by some species but not byothers.

The vitamins are of two types:

1. Fat Soluble Vitamins: Vitamins A, D, E and K are known as the fat-soluble vitamins. A vitamin that can dissolve in fats and oils. Fat-soluble vitamins are absorbed along with fats in the diet and can be stored in the body's fatty tissue. They come from plant and animal foods or dietary supplements. Once absorbed into the body, fat-soluble vitamins are stored in fatty tissues and liver. The body can use these stores for future use. Each type of fat-soluble vitamin promotes different functions in the body. People deficient in the fat-soluble vitamins may require supplements to boost their supply. It is possible to take in too much of a fat-soluble vitamin, which could lead to toxicity and adverse reactions.

(a) Vitamin A(RETINOL): Vitamin A plays an important role in maintaining healthy vision. Without vitamin A, a person would suffer from severe vision issues. Vitamin A or retinol is found only in the foods of animal origin. Animal foods like milk, butter, ghee, egg, fish and liver are rich sources of vitamin A plant food do not contain retinol. They contain certain orange or yellow colored pigments called carotenoids which can be converted to retinol in the body. Beta carotene is the most widely distributed carotenoid in plant foods. Most of the yellow and orange color of vegetables and fruits is due to these carotenoid pigments. Ripe fruits such as mango, papaya and yellow/orange vegetables like carrot and pumpkin are rich in beta carotene. Green leafy vegetables also contain carotenoid pigments. Here the yellow and the orange color of the carotenoid pigments is masked due to the presence of another pigment called chlorophyll.

Functions of vitamin A are:

(a) It helps form and maintains healthy teeth, skeletal and soft tissue, mucus membranes, and skin. It is also known as retinol because it produces the pigments in retina of theeye.

(b) It promotes good vision, especially in low light.

(c) It may also be needed for reproduction andbreastfeeding.

(d) Retinol is an active form of vitamin A. It is found in animal liver, whole milk, and some fortified foods.

(b) Vitamin D: Vitamin D is produced naturally in the human body when the skin is exposed to the sun. Vitamin D aids in bone health and development. Vitamin D is also called the "sunshine vitamin". This is because it is manufactured from a substance present in our skin on exposure to sunlight. As a result of this, we do not necessarily have to depend on dietary sources of vitamin D. The easiest way of obtaining the vitamin is, in fact, enough exposure to sunlight foods like egg, liver, and butter contains vitamin D.

Functions of vitamin B are: -

Your body must have vitamin D to absorb calcium and promote bone growth. Too little vitamin D results in soft bones in children (rickets) and fragile, miss happen bones in adults (osteomalacia). You also need vitamin D for other important body functions.

(c) Vitamin E: Vitamin E is antioxidants that can help the body destroy free radicals. Free radicals are unstable atoms that may cause the formation of cancer cells. As such, vitamin E could play an important part in preventing cancer. Vitamin E is present in almost all foodstuffs Vegetable oils like groundnut, soya, cottonseed and safflower are rich sources of vitamin E.

Functions of vitamin E: Vitamin E in our body is for the protection it gives to other substances like unsaturated fatty acids, vitamins A and C. It prevents their destruction in the body as well as in foods.

(d) Vitamin k: Vitamin K helps the body form blood clots. This necessary function prevents a person from bleeding out from small scratches. Among plant foods, green leafy vegetables like spinach, cabbage and lettuce are rich sources of vitamin K. After absorption from the upper part of the small intestine the vitamin is distributed to various body tissues. Vitamin K is stored in very small amounts.

Functions of vitamin k: -

Phylloquinone, also known as vitamin K1, is found in plants. When people eat it, bacteria in the large intestine convert it to its storage form, vitamin K2. It is absorbed in the small intestine and stored in fatty tissue and the liver. Without vitamin K, the body cannot produce prothrombin, a clotting factor that is necessary for blood clotting and bone metabolism.

2. Water soluble vitamins: Water-soluble vitamins dissolve in water, which means these vitamins and nutrients dissolve quickly in the body. Unlike fat-soluble vitamins, water-soluble vitamins are carried to the body's tissues, but the body cannot store them. Any excess amounts of water-soluble vitamins simply pass through the body. Because these vitamins are needed by our bodies, we need to make sure we intake these vitamins on a regular basis. Water soluble vitamins include Vitamin C and the vitamin B complex.

(a) Vitamin C: The benefits of vitamin C may include protection against immune system deficiencies, cardiovascular disease prenatal health problems, eye disease, and even skin wrinkling. Vitamin C, also known as ascorbic acid is necessary for the growth, development and repair of all body tissues. Fruits like Amla, guava, green leafy vegetables and green chilies are examples, of some of the cheap sources of vitamin C. Amla is the cheapest source and provides 20 times or more ascorbic acid as compared to the expensive citrus.

Functions of vitamin c are: Vitamin C plays an important role in many physiological processes in humans. It is needed for the repair of tissues in all parts of the body. The important functions of vitamin C include the formation of protein used to make skin, tendons, ligaments, and blood vessels for healing wounds and forming scar tissue, for repairing and maintaining cartilage, bones, and teeth and aid in the absorption of iron. It can also act as a reducing and capping agent for metal nano particles.

(b) Vitamin B complex: This is a group of vitamins with similar functions. Vitamins of the B complex group include: thiamine (B I), riboflavin (B2), folic acid, niacin and vitamin B_{12}. They usually occur together in foods. The B vitamins act as coenzymes and help in the metabolism of carbohydrates, proteins and fats.

- **Thiamine or B_1:** Thiamine is a vitamin, also called vitamin B1. Vitamin B1 is found in many foods including yeast, cereal grains, beans, nuts, and meat. It is often used in combination with other B vitamins, and found in many vitamin B complex products.People take thiamine for conditions related to low levels of thiamine (thiamine deficiency syndromes), including beriberi and inflammation of the nerves (neuritis) associated with pellagra or pregnancy.Thiamine is also used for digestive problems including poor appetite, ulcerative colitis, and ongoing diarrhea.Thiamine is also used for AIDS and boosting the immune system, diabetic pain, heart disease, alcoholism, aging, a type of brain damage called cerebellar syndrome, canker sores, vision problems such as cataracts and glaucoma, motion sickness, and improving athletic performance. Other uses include preventing cervical cancer and progression of kidney disease in patients with type 2 diabetes.
- **Riboflavin or B_2:** Riboflavin or B2 is widely distributed in plant and animal foods. Milk, liver, kidney, eggs and green leafy vegetables are good sources of riboflavin. Whole grain cereals and pulses contain fair amounts. On refining there is some loss of the vitamin. However, sprouting and fermentation of whole grain cereals and pulses can markedly increase their content of riboflavin and other B vitamins.The riboflavin which we ingest is absorbed from the upper part of the small intestine into the bloodstream and is taken to various body tissues to perform specific functions. Like other water-soluble vitamins, excess riboflavin is excreted in the urine.Riboflavin plays an important role in the metabolism of carbohydrates, fats and proteins.
- **Niacin:** Having enough niacin, or vitamin B3, in the body is important for general good health. As a treatment, higher amounts of niacin can improve cholesterol levels and lower cardiovascular risks.niacin can boost levels of good HDL cholesterol and lower triglycerides. Niacin also modestly lowers bad LDL cholesterol. It's often prescribed in combination with statins for cholesterol control, such as Crestor, Lescol, or Lipitor.The good sources of niacin include meat,

fish, poultry, cereals, pulses, nuts and oilseeds. One interesting point about niacin is that it can also be formed in the body from an amino acid called tryptophan.

- **Folic acid:** Folic acid is forms of a water-soluble B vitamin.Folic acid is the synthetic form of this vitamin.Folic acid is used for preventing and treating low blood levels of folate (folate deficiency), as well as its complications, including "tired blood" (anemia) and the inability of the bowel to absorb nutrients properly. Folic acid is also used for other conditions commonly associated with folate deficiency, including ulcerative colitis, liver disease, alcoholism, and kidney dialysis.
- **Vitamin B_{12} or Cobalamin:** Vitamin B12, also known as cobalamin, is a water-soluble vitamin that is involved in the metabolism of every cell of the human body: it is a cofactor in DNA synthesis, and in both fatty acid and amino acid metabolism.Vitamin B_{12} can only be absorbed in the 'presence of a specific chemical substance called intrinsic factor. This is substance is secreted by the cell of the stomach. Vitamin B12 ingested combines with intrinsic factor and is absorbed from the small intestine.

Q.Write a short note on the following:
(a) Carotenoids,
Ans. Carotenoids also called tetraterpenoids, are yellow, orange, and red organic pigments that are produced by plants and algae, as well as several bacteria and fungi. Carotenoids give the characteristic color to pumpkins, carrots, corn, tomatoes, canaries, flamingos, and daffodils. Carotenoids can be produced from fats and other basic organic metabolic building blocks by all these organisms. The only animals known to produce carotenoids are aphids and spider mites, which acquired the ability and genes from fungi.Carotenoids from the diet are stored in the fatty tissues of animals, and exclusively carnivorous animals obtain the compounds from animal fat. In the human diet, absorption of carotenoids is improved when consumed with fat in a meal. Cooking carotenoid containing vegetables in oil increases carotenoid bioavailability.There are over 1,100 known carotenoids which can be further categorized into two classes, xanthophylls (which contain oxygen) and carotenes (which are purely hydrocarbons, and contain no oxygen).his causes the compounds to be deeply colored yellow, orange, or red. Carotenoids are the dominant pigment in autumn leaf coloration of about 15-30% of tree species, but many plant colors, especially reds and purples, are due to polyphenols.
Foods highest in beta carotene include:
1. Carrots
2. Sweet potatoes
3. Dark leafy greens, such as kale and spinach
4. Romaine lettuce
5. Squash
6. Cantaloupe
7. Red and yellow peppers
8. Apricots
9. Peas
10. Broccoli

(b) Coenzymes.
Ans. Coenzymes: Coenzymes are substances which are needed by enzymes to do their job effectively. It is a substance that enhances the action of an enzyme. Hence they can be considered as the helpers of 'specific enzymes. These enzymes cannot function in the absence of their specific coenzymes.Thiamine forms a part of a specific coenzyme involved mainly in carbohydrate metabolism. The main function of this coenzyme is its role in the burning or oxidation of glucose to produce energy.Niacin (like riboflavin) is also part of coenzymes which help to release energy from the end products of the digestion of carbohydrates, fats and proteins. It thus helps in their metabolism.Coenzymes are small molecules. They cannot by themselves catalyze a reaction but they can help enzymes to do so.

(c) Food processing.
Ans. Food processing is the transformation of agricultural products into food, or of one form of food into other forms. Food processing includes many forms of processing foods, from grinding grain to make raw flour to home cooking to complex industrial methods used to make convenience foods. Primary food processing is necessary to make most foods edible, and secondary food processing turns the ingredients into familiar foods, such as bread. Tertiary food processing has been criticized for promoting

overnutrition and obesity, containing too much sugar and salt, too little fiber, and otherwise being unhealthful. By using method processing we can alter the content of Thiamine and some Vitamin in cereals or pulses.

Processing of wheat: Wheat is usually not consumed in the form of wheat grains as such but in the processed form e.g. whole wheat flour (Atta), refined wheat flour (Maida and Suji/Rawa). Most of the thiamine and other B vitamins are present in the outer covering or bran and the germ layer of the wheat grain.Atta or whole wheat flour has most of the bran and part of the germ layer in it and is a good source of thiamine. Maida and Suji have very little bran and germ and hence are poor sources of thiamine and other B-complex vitamins in general.

Sprouting and fermentation: Sprouting and fermentation of whole grain cereals or pulses increases their content of B-complex vitamins and vitamin C Sprouting. Itis the process of growing or germination of seeds or grains by first soaking them in water and then leaving the grains moist for about 24 hours by wrapping them in moist cloth. **Fermentation is** the chemical changes taking place in certain foods when mixed in a ground form with added fluid and kept overnight at a suitable temperature. During this time certain beneficial bacteria multiply and grow in the fad mixture and bring about some desirable changes in it.

Q. Define the term mineral.

Ans. A mineral is a chemical element required as an essential nutrient by organisms to perform functions necessary for life. However, the four major structural elements in the human body by weight (oxygen, hydrogen, carbon, and nitrogen), are usually not included in lists of major nutrient minerals (nitrogen is considered a "mineral" for plants, as it often is included in fertilizers). These four elements compose about 96% of the weight of the human body, and major minerals (macro minerals) and minor minerals (also called trace elements).Minerals, as elements, cannot be synthesized biochemically by living organisms. Plants get minerals from soil. Most of the minerals in a human diet come from eating plants and animals or from drinking water.Minerals are one of the four groups of essential nutrients,The five major minerals in the human body are calcium, phosphorus, potassium, sodium, and magnesium. All of the remaining elements in a human body are called "trace elements". The trace elements that have a specific biochemical function in the human body are sulfur, iron, chlorine, cobalt, copper, zinc, manganese, molybdenum, iodine and selenium.

Q. Explain the concept of meal planning along with its aims.

Ans. A meal is an eating occasion that takes place at a certain time and includes prepared food. The names used for specific meals in English vary, depending on the speaker's culture, the time of day, or the size of the meal. Meals occur primarily at homes, restaurants, and cafeterias, but may occur anywhere. Regular meals occur on a daily basis, typically several times a day. Special meals are usually held in conjunction with such occasions as birthdays, weddings, anniversaries, and holidays. A meal is different from a snack in that meals are generally larger, more varied, and more filling than snacks. The type of meal served or eaten at any given time varies by custom and location. In most modern cultures, three main meals are eaten: in the morning, early afternoon, and evening. Further, the names of meals are often interchangeable by custom as well. Some serve dinner as the main meal at midday, with supper as the late afternoon/early evening meal; while others may call their midday meal lunch and their early evening meal supper. Except for "breakfast", these names can vary from region to region or even from family to family. Meal planning is the simple act of taking some time to plan any number of your meals for the week. Plan for yourself or plan for your family. Plan to eat healthy, and plan a night out. Plan every snack and meal, or simply plan your lunches so you don't spend money on restaurant food during the week. You can use the three group classifications to plan for any meal. Remember to include a cereal and a source of fat - it could be ghee, Vanaspati or a vegetable oil from the energy-giving group in each meal. If you are including a sweet item, sugar would also be part of the energy-giving group. It is not necessary to include three items in a menu because there are three food groups. In fact, a single dish can also be a balanced meal. Time is also an important factor in meal planning. The meals should be planned according to the time for meal i.e. whether it is breakfast, lunch or dinner. Normally while planning the meal for whole day, it is seen that 1/3rd of day's requirement are met by lunch 1/3rd by dinner and 1/3rd by breakfast and evening tea. But this is not a rigid schedule and can be changed according to individual requirement. But as long as the total nutritional requirements are being met. For daily meals the first importance is given to nutritive value. However, for special occasion, special importance has to be given to color, appearance,

number of dishes to be included, but at the same time nutritive value cannot be ignored. Similarly, each festival has its specific food item which should always be given importance e.g. preparing sweets for Deepawali, cake for X'mas, Sewian for Eid etc. Variety is very important, because nobody likes to eat even his favorite food stuff over and over again. Therefore, to introduce variety, do not repeat same food items during day meal. Also, variety in meal planning is the sum total of many kinds and classes of food served in pleasing color combinations, with judicious mixture of soft and crisp foods, blunt and sharp flavors, hot and cold dishes. It ensures better nutrition and also results in more interesting meals with an attractive variety of texture, colour, taste and appearance which in turn stimulates appetite and pleases the palate. Various methods of working can also introduce a variety – a meal consisting of tandoori roti, dal and seasonal green vegetable also with a crisp salad.

The aims in planning meals are to:

- fulfil the nutritional needs of the family members, taking into account the family size and composition ',
- plan meals within the family income, i.e. make maximum use of the money available, in the best possible way
- aid, in the proper purchase, preparation and service offood
- economize on time, labour and fuel
- provide variety in the diet by making proper selection of foods from within each of the three food groups
- make meals appealing and, palatable by proper selection of food in terms of colour, texture and flavor.

Q. What is pregnancy? Describe the various physiological changes that take place in the woman's body during pregnancy.

Ans. The period from conception to birth. After the egg is fertilized by a sperm and then implanted in the lining of the uterus, it develops into the placenta and embryo, and later into a fetus. Pregnancy usually lasts 40 weeks, beginning from the first day of the woman's last menstrual period, and is divided into three trimesters, each lasting three months.

Following are some physiological changes that take place in the woman's body during pregnancy:

(1) Changes in body weight during pregnancy: Continuing weight increase in pregnancy is considered to be one favorable indication of maternal adaptation and fetal growth. However, routine weighing of the mother during pregnancy is not now thought to be necessary, because it does not correlate well with pregnancy outcomes. For example, there can be a slight loss of weight during early pregnancy if the woman experiences much nausea and vomiting (often called 'morning sickness').A woman who is pregnant with more than one baby will have a higher weight gain than a woman with only one fetus. She will also require a higher calorie diet.A lack of significant weight gain may not be a cause for concern in some women, but it could be an indication that the fetus is not growing properly.The entire period of pregnancy is actually divided into three trimesters:

- 1st trimester - 0-3 months
- 2nd trimester - 3-6 months
- 3rd trimester - 6-9 months

(2) Changes in the cardiovascular system: The cardiovascular system consists of the heart, the blood vessels (veins and arteries), and the blood that circulates around the body. It is the transport system that supplies oxygen and nutritive substances absorbed from the gastrointestinal tract to all the cells, tissues and organs of the body, enabling them to generate the energy they need to perform their functions. It also returns carbon dioxide, the waste product of respiration, to the lungs, where it is breathed out. The chemical processes that go on in the body generate many waste products, which the blood transports to the kidneys and liver, where they are removed. Other functions of the cardiovascular system include the regulation of body temperature, and the circulation and delivery of hormones and other agents that regulate body functions. There are several significant changes in this complex system during pregnancy.

(3) Changes in the urinary system during pregnancy: The urinary system consists of the kidneys (a pair of organs on either side of the abdomen near the back), the tubes connecting the kidneys to the bladder where urine is stored, and a tube called the urethra that passes urine out of the body.The kidneys extract waste from the blood and turn it into urine. They must work extra hard to filter the mother's own waste products from her blood, plus those of the fetus, and get rid of them in her urine. Therefore, there is also an increase in the amount of urine produced during pregnancy.

(4) Changes in body metabolism: The basal metabolic rate (BMR) increases during pregnancy. Pregnancy is characterized by rapid growth and development of the foetus and the mother tissues. Due to this rapid growth and development the basal metabolism increases.

(5) Changes in the uterus, cervix and vagina: After conception, the uterus provides a nutritive and protective environment in which the fetus will grow and develop. It increases from the size of a small pear in its non-pregnant state to accommodate a full-term baby at 40 weeks of gestation. The tissues from which the uterus is made continue to grow for the first 20 weeks, and it increases in weight from about 50 to 1,000 gm (grams). After this time, it doesn't get any heavier, but it stretches to accommodate the growing baby, placenta and amniotic fluid. By the time the pregnancy has reached full term, the uterus will have increased to about five times its normal size.

(6) Changes in digestive functioning: One important adaptation of the body during pregnancy is the increased rate of absorption of certain important nutrients like calcium and iron. The absorption increases so as to meet the increased demands of the body.

Q. Define budget. Write the steps for making budget.

Ans. A budget is an estimation of revenue and expenses over a specified future period of time and is usually compiled and re-evaluated on a periodic basis. Budgets can be made for a person, a family, a group of people, a business, a government, a country, a multinational organization or just about anything else that makes and spends money. At companies and organizations, a budget is an internal tool used by management and is often not required for reporting by external parties. The process of preparing a budget is called budgeting.

The steps for making budget are: -

- Make a list of the items on which you need to spend money.
- Arrange these items in the order of preference. The essential ones like food, clothing, shelter, health and education get top priority.
- Estimate the probable expenditure on each of these items.
- Estimate the total money that will be available.
- Make an estimate of the maximum essential expenditure that you can incur on each of the items of expenditure with the assured income.
- Now balance the budget to bring your expenditure into line with the income.

Q. What are the factors influencing food budget?

Ans. The factors influencing food budget are: -

a) The income of the family: In the lower income group money is spent on cheaper foods like cereals and among cereals. cheaper cereals like bajra and jowar. These are the foods that provide most of the calories in this income group. In the higher income group superior quality of cereals are used which are more costly, like basmati rice and sharhati wheat. The people belonging to the high-income group do not always exclude cheaper foods from the diet. we have mentioned that green gram dal may be selected by the low-income group. This does not mean that rich people would not consume it. Foods such as milk and milk products egg, meat, fish and poultry rarely figure in the diets of low-income group individuals. Expensive fruits and vegetables are also excluded.

b) The size of the family: With a greater number of people in a family, you spend more money on food. The expenditure per person declines as the number of people increases. This is the principle on which costing of meals for large groups is done - the larger the group you are cooking for, the lower are the charges per person and the smaller the group you are cooking for, the high the charges per person, the menu being the same.

c) Current food prices: If food prices are low, you spend less money on food. When food prices rise your expenditure on food also increases. Being a necessity, food can very easily push the other items of expenditure out of the family budget thereby influencing the quality of life.

d) Nearness of the family to the source of food supply: Our country is still largely rural with the exception of a few large cities, most towns and cities are close to rural areas which produce most of our food particularly fresh fruits, vegetables, cereals, milk and eggs. The cost of food in areas of its production is very much lower than the cost of it in the city or town market because of the following reasons: -

- you are paying for the transport of food from the place where it is produced to the market.
- you are paying for the damage to the food in transport - some eggs might break; some fruits and vegetables would get spoilt.

- you are paying for the rent of the market area.
- you are providing income to the people who make a living by selling foods in the city markets.

e) Opportunity for home production and processing of foods: Producing and processing certain items of food at home helps to reduce expenditure on food besides improving the quality of meals consumed. It depends upon the facilities and the expertise the family has for doing this. Growing vegetables, particularly the green leafy ones like spinach, amaranth, mint and coriander in your garden.

f) The relative interest of the family in food and in other commodities: To some people what they eat matters a lot. They are particular about the quality of food as well as its nutritional adequacy and are prepared to make an effort to prepare good meals. Some, on the other hand would not bother beyond the point of getting enough of the right kind of foods. Yet others might spend essential food-money on non-food items such as clothing. People with this kind of an attitude towards food need to be extra careful if they do not want to be undernourished.

Q. What are the three important factors that can help us economize on our food expenditure?

Ans. Following are the three important factors that can help us economize on our food expenditure:

a) Knowledge of nutrition: Enough information is available in India regarding nutritional requirements of individuals, the nutritive value of foods, as well as planning nutritionally adequate diets. we should avoid food Items with little or no nutritional value. when we do buy such food Items it should be for a specific purpose, and only after the basic nutritional needs have been taken care of. Take the example of grapes they contain approximately 80% water and 20% solids. The solid matter consists of 16.5 per cent carbohydrate in the form of sugar, and approximately 3 per cent cellulose and only 0.5 per cent of minerals. Eating grapes is almost as good as drinking a glass of water with a little flavor and sugar in it. Besides carbohydrate and some electrolytes (minerals like sodium. potassium. chloride) they do not provide any other nutrient to the body and cost quite a lot in most places. As fruits papayas and guavas are nutritionally superior to grapes as well as to apples and pomegranates and they are much cheaper too. In such a situation it is very important to make sure that reducing your expenditure on food do not reduce the Food Resources nutritional adequacy of that meals This is where the basic food groups help.

b) Intelligent Buying: Getting the best product for your money involves a constant battle of wits between the seller and the buyer.

- **Plan Ahead:** Create a detailed shopping list based on your needs and weekly menu plan, and take into account how you plan on using leftovers.Have a light snack before you go shopping, and stick to your grocery list to help avoid impulse purchases or costly mistakes like falling for the displays at the end of the aisles.
- **Make Healthy Choices -- They're Cheaper:** The savings came from reducing portion sizes and from buying fewer of the high-calorie foods that tend to increase the amount spent at the grocery store. People tend to spend a lot on those "extras" foods that add calories but little nutritional value, like sodas, bakery items, and chips.
- **Buy Produce in Season:** Food in season is usually priced to sell. During the summer months, corn on the cob can cost as little as 10 cents an ear; at other times of the year, it may cost 10 times as much. Also, shop your local farmers' market for great deals on local produce; the prices won't include shipping costs.
- **Brown-Bag It**: Making lunch and taking it with you is a great money-saver and an excellent use of leftovers for meals at work, school, or wherever your destination. "Packing your lunch not only saves you money, but you can control all the ingredients so they are healthy and low in calories.
- **Think Frozen, Canned, or Dried:** Next time you're gathering ingredients for a recipe, try using frozen, canned, or dried foods. They may be less expensive than fresh, yet they are equally nutritious. Produce is typically frozen, canned, or dried at the peak of ripeness when nutrients are plentiful. Fish and poultry are often flash-frozen to minimize freezer damage and retain freshness. With frozen foods, you can use only the amount you need, reseal the package, and return it to the freezer. If it's properly stored, there's no waste. Canned foods are often sitting in a bath of juice, syrup, or salty water and usually require rinsing. Dried fruits are concentrated in flavor and a great substitute for fresh fruit. Also consider using powdered or evaporated versions of milk in soups, casseroles, mashed potatoes, or desserts. Buy the form that gives you the best price for your needs.

- **Save on Protein Foods:**When possible, substitute inexpensive vegetarian sources such as beans, eggs, tofu, and legumes for more expensive meat, fish, or poultry. Eat vegetarian once a week or more to increase your consumption of healthy plant foods while saving money. Eggs are an excellent, inexpensive source of protein that can be eaten for breakfast, lunch, or dinner. You could also try using a smaller portion of meat, fish, or poultry and extending the dish with whole grains, beans, eggs, or vegetables. When you do buy meat, choose smaller portions of lean cuts. For example, lean cuts of beef are those that include the terms "loin" or "round." (You can tenderize lean cuts of meat mechanically or by marinating them.) You can also buy a whole chicken and cut it up instead of paying the butcher to do it for you or buy the cheaper "family pack" and portion it into airtight freezer bags.
- **Waste Not, Want No:** Before you toss perishable food into your grocery cart, think about exactly how you'll use it. The Environmental Protection Agency estimates that Americans generate roughly 30 million tons of food waste each year. Using leftover vegetables, poultry, or meat in soups, stews, salads, and casseroles minimizes cost and demonstrates your creativity in the kitchen. For example, have a roasted chicken for dinner one night and use the leftovers for dinner the next night. Try topping a bed of fresh greens with vegetables, fruits, and slices of leftover chicken. Add a loaf of whole-grain bread, and presto! You've got a nutritious meal in minutes. You can also eat leftovers for breakfast or take them with you for lunch.
- **Buy and Cook In Bulk:** Cooking in bulk can save both money and time.Prepare food in bulk and freeze it in family-sized portions, which saves time in the kitchen.For example, making a big batch of tomato sauce will be less expensive (and probably tastier) than buying it.

C) Home production and processing: Product on means growing the food item while processing means further preparation of the food item to make it ready to eat. Very few of us produce the food we consume but most of us process nearly all of it, and in some cases from stage one. Let us take wheat for example we buy the wheat, clean it, perhaps wash and dry it in the sun and get it ground for use as flour. However, with the advancement of science and technology and the boost to large scale, as well as small-scale business enterprise. Our markets are fast getting crowded with completely or partially processed food. Examples are noodles, tomato ketchup, packaged soups, soup cubes, jams and jellies, pickles, instant dosa, idli and Gulab jamun mix, breads, biscuits, and other baker goods, cleaned chicken cleaned and cut chicken, cleaned and packed meats and fish, besides ready-made foods from catering establishments. The cost of partially processed or completely processed foods is naturally higher.