

Section – A

Fill in the blanks with answers. Each Question carries one mark.

1x10=10

1. **Prepathogenic** phase is the period before the onset of disease in man.
2. **Antidote** is substances which counteract or neutralize the effect of poisons.
3. Substances used as source of energy **carbohydrates & fats**.
4. Deficiency of phosphorus causes **softening of bone, caries of teeth**.
5. **Tuberculosis** is a communicable disease of respiratory tract.
6. Vitamin B₁₂ is used **in maturation of RBCs**.
7. The term Niacin is used collectively for **nicotinic acid and nicotinamide**.
8. Carbohydrates and fats provide **energy**.
9. Demography is used to describe **all aspect of human population**.
10. Coitus interruptus is **withdrawal method of family planning**.
11. Laproscopy is method used **for family planning**.
12. Chlorine is used to **disinfection of water**.
13. Water which produce leather with difficulty is **hard Water**.
14. Inspiration is **inhalation of air from external environment**.
15. Anopheles mosquitoes spread in **rainy season**.
16. Gram staining is method of **differential staining method**.
17. Tuberculosis **is a communicable disease of respiratory tract caused by Mycobacterium tuberculosis**.
18. Influenza **is communicable disease of respiratory tract caused by Influenza virus type A, B & C**.
19. Poliomyelitis **is an acute infectious viral disease of human alimentary tract but affect the CNS resulting in paralysis. It is caused by Polio virus type 1, 2 & 3**
20. The poisoning effect of a substance is neutralized by **antidote**.
21. The permanent method of sterilization in females is known as **tubectomy**.
22. The diseases caused by insects are called **arthropod born diseases**.
23. The word 'hygiene' is derived from the Greekword **hygeia**.
24. All aspect of human population is studied by **demography**.
25. Typhoid is caused by **Salmonella typhi**.
26. Malnutrition is mainly caused by **protein deficiency**.

27. Chloroxylenol is **chemical disinfectant in dettol**.
28. The popular Intrauterin copper device is **copper-T**.
29. **Citrus** fruit has highest vitamin C content.
30. **Glycogen** is the only carbohydrate of animal origin.
31. The contraceptive methods may be broadly grouped into (a)**Temporary** (b) **Permanent**.
32. **Shock** may be defined as a state of peripheral circulatory failure.
33. A **dressing** is a covering applied to a wound or to an injured part.
34. Cytoplasmic membrane of bacterial cell is a closed packed **proteneous** layer.
35. The term virus literally means **poison**.
36. Protozoa multiply **asexually** by binary fission or multiple fission.
37. **Crohn's disease** is a chronic granulomatous infection of humans.
38. When an epidemic spread widely is known as **pandemic**.
39. A **disinfectant** is a surface active agent.
40. Causative agent of diphtheria is *Corynebacterium diphtheria*.
41. Elisa test is used for screening **AIDS**.
42. Syphilis is caused by *Treponema pallidum*.
43. Sex ratio is defined as **no. of males per 1000 females in the population of a society**.
44. Chemical used for disinfecting water is **chlorine**.
45. Tubectomy is a sterilization operation in **female** to stop pregnancy.
46. Vitamin synthesized by the intestinal bacteria is **vitamin K**.
47. Most of the fluoride in the body is present in **bone and teeth**.
48. **Cellulose** is the indigestible component of carbohydrates.
49. The primary function of iron is to form **hemoglobin**.
50. **Contraceptive** formulations are slow release preparations.
51. Inert IUDs are usually made of **stainless steel or plastic**.
52. **Ischemia** means damage or death of a part of heart muscle.
53. The disinfecting action of chlorine is due to **hypochlorous acid (HOCl)**.
54. There are **four (egg, larva, pupa, adult)** stages in the life history of mosquito.
55. Virus can be seen only with **electron** microscope.
56. Algae are a group of **spores** bearing plants.
57. Acid fast staining method was first developed by **Paul Ehrlich**.
58. Poliomyelitis replicates mainly in the **alimentary** tract.
59. Rabies is also known as **hydrophobia**.

60. Ischemia refers to **lack** of oxygen due to inadequate perfusion.
61. **Epidemiology** is the basic science of preventive and social medicine.
62. There are **five** major classes of human immunoglobulin.
63. **Disinfectant** is a substance which destroys or inhibits the growth of micro-organisms.
64. Deficiency of vitamin D in adult women causes **osteoporosis**.
65. Diseases caused by droplet infection are **communicable diseases**.
66. Widal test is used for detection of **typhoid**.
67. Syphilis and gonorrhoea are examples of **sexually transmitted diseases**.
68. Roundworm infestation is caused by *Ascaris Lumbricoides*.
69. BCG is *Bacillus Calmette Gurein*.
70. G.F.R. means **glomerular filtration rate**.
71. Deficiency of iodine causes **goiter**.
72. Deficiency of iron causes **anemia**.
73. Diabetes mellitus is a disease characterized by **glycosuria**.
74. A fracture is a **deformity** in the normal continuity of bone.
75. MTP means **medical termination of pregnancy**.
76. The cardio-Pulmonary resuscitation consists of **restoration of breathing and circulation**.
77. Whooping cough is caused by *Bordetella Pertusis*.
78. **Syphilis** is an example of sexually transmitted disease.
79. The study of arthropods of medical importance is called **medical entomology**.
80. **Bleaching powder** is used for disinfections of wells.
81. Night blindness is caused by deficiency of **vitamin A**.
82. Rod shaped cells are **bacillus**.
83. Syphilis and Gonorrhoea are examples of **sexually transmitted** diseases.
84. Night blindness is caused by deficiency of **vitamin A**.
85. The permanent method of sterilization in males is **vasectomy**.
86. Mantoux test is used for diagnosis of **tuberculosis**.
87. Copper T is used as **female contraceptive**.
88. Influenza is caused by virus *Influenza virus type A, B & C*.
89. Sterilization of bandage is done by **ionizing radiation**.
90. Diabetes mellitus is disorder of **glucose metabolism**.
91. Well water is disinfected by **bleaching powder**.
92. Causative agent of plague is *Yersinia Pestis*.

93. To overcome constipation it is necessary to have sufficient amount of **water** in diet.
94. Filariasis is caused by *Wuchereria bancrofti and Brugia malayi*.
95. Deficiency of vitamin C causes **scurvy**.
96. Presence of protein (albumin) in the urine is called **albuminurea**.
97. Disease caused by droplet infection is **communicable disease**.
98. Antidote for arsenic poisoning is **dimercaprol**.
99. **Immunity** is the resistance of the body against the effects of invading pathogenic micro-organisms.
100. **Fat soluble** vitamins can be stored in the body.
101. The source rich in iodine are **sea food**.
102. Influenza is commonly known as **Flu**.
103. **Rain** is the prime source of all water.
104. A **disinfectant** is a surface cleaning agent.
105. **Desferrioxamine** is antidote in iron poisoning.
106. Scientific study of human population is known as **demography**.
107. Coma shaped bacteria is *Vibrio comma*.
108. **Moist heat sterilization** is used for disinfection of surgical instruments.
109. Instrument used to measure blood pressure is **sphygmomanometer**.
110. Leprosy is caused by *Mycobacterium Leprae*.
111. Major source of fluorine is **drinking water**.
112. Scabies spreads by **direct (skin to skin)** contact.
113. **Medical entomology** is branch of medicine which deals with arthropods of medicinal Importance.
114. Rabies is caused by *Lyssa virus type I*.
115. Beri-Beri is caused by deficiency of **vitamin B (thiamine)**.
116. Cholera is caused by two types of vibrio **Classical cholera vibrio** and **EI tor vibrio**.
117. AIDS stand for **acquired immuno deficiency syndrom**.
118. **Industrilisation and urbanisation** are major sources of air pollution.
119. Fat soluble vitamins are **vitamin B complex and C**.
120. Tetanus is caused by **Clostridium tetani**.

Definations-

- 1) **Toxoids** - When toxins are treated with chemicals such as formaldehyde, their toxic properties are destroyed without causing any loss of antigenic property. These are called as toxoid. **Example:** Tetanus Toxoid.
- 2) **Pandemic-** An epidemic that becomes very widespread and affects a whole region, a continent or the world due to a population.
- 3) **Personal hygiene-** Personal hygiene refers to maintaining cleanliness of one's body and clothing to preserve overall health and well-being.
- 4) **Prepathogenesis phase-** The disease agent has not yet entered man, but the factors which favor its interaction with the human host already exist in the environment.
- 5) **Health-** Health is a state of complete physical, mental, social, well being and not merely an absence of disease or infirmity.
- 6) **Disease-** Disease is a physiological or psychological dysfunction.
- 7) **Vasectomy-** In which both the vas are cut and tied, so that the sperm cannot enter the urethra. It is simple and easy surgical procedure.
- 8) **Epidemiology-** The detailed scientific study of the distribution of disease or disability in community and the application of this study to control health problem.

Section – B

Each question carries three marks.

3x5=15

Question No. 1) What are signs and symptoms of a fracture?

Question No. 2) Give the modes of transmission and prevention of Measles

Question No. 3) Give the modes of transmission and prevention of AIDS.

Question No. 4) Give the modes of transmission and prevention of Cholera

Question No. 5) What are the various sources and hazards of water pollution?

Question No. 6) What is the balance diet?

Question No. 7) Name the diseases caused by deficiency of proteins.

Question No. 8) What are the causes of cancer?

Question No. 9) What is septic tank?

Question No. 10) Differentiate between bacteria and virus.

Question No. 11) Classify vitamins and write the source of vitamin C and D.

Question No. 12) Write affects of air pollution.

Question No. 13) Give modes of transmission of typhoid and tuberculosis.

Question No. 14) What are nosocomial infections?

Question No. 15) What are consequences of population growth?

Question No. 16) What are hazards of smoking?

Question No. 17) Describe emergency treatment in burns & scalds.

Question No. 18) Write the differences between communicable and non-communicable diseases.

Question No. 01. What are signs and symptoms of a fracture?

Answer: Signs and symptoms of a fracture are:

- 1) Pain at or near the site of the fracture.
- 2) Tenderness and pain over the affected area, on applying pressure.
- 3) Swelling at the site of the fracture.
- 4) There may be deformity.
- 5) The patient is unable to move the affected part.
- 6) Unnatural movements may be felt or heard. When one end of the broken bone moves against another, a particular sound is heard it is known as crepitus.

Question No. 02. Give the modes of transmission and prevention of measles.

Answer: Measles: It is one of the commonest infectious diseases of children up to six years of age. One attack gives a high degree of immunity even for the whole life.

Mode of transmission: The mode of spread is direct from person to person, through droplet infection i.e. sneezing, talking and kissing etc. and direct contact with fomite such as spoons, cups and other articles.

Prevention: The children should be immunised against measles. For this purpose live attenuated, tissue cultured freeze dried vaccine is used. A single dose of 0.5 ml of vaccine administered at the age of 9-12 months appears to give 95% protection against measles for at least 15 years.

Question No. 03. Give the modes of transmission and prevention of AIDS

Answer- AIDS: AIDS stands for Acquired Immune Deficiency Syndrome which is a very fatal disease. This is caused by a virus known as *Human immunodeficiency virus* (HIV).

Modes of transmission: HIV virus is transmitted from one person to another person by following modes:

- a) Sexual contact i.e. vaginal, oral or anal sex can spread AIDS as the virus is excreted in the semen or vaginal fluid.
- b) Through transfusion of blood infected with AIDS virus.
- c) Through contaminated needles and syringes.
- d) It is transmitted from infected mother to foetus through placenta.

Prevention: 1) Have only one uninfected sexual partner.

- 2) Avoid going to prostitutes.
- 3) Do not indulge in oral/anal sex.
- 4) Use condom during sexual intercourse.
- 5) Properly sterilize the needles and syringes.
- 6) Women suffering from AIDS should avoid becoming pregnant.

- 7) Blood and blood products should be thoroughly investigated for the absence of HIV infection.
- 8) Avoid blood donation from strangers and professional donors.
- 9) Impart health education to the public.

Question No. 04. Give the modes of transmission and prevention of Cholera.

Answer- Cholera: Cholera is an acute infectious disease of the intestinal tract characterized by sudden onset of severe diarrhea and vomiting leading to rapid dehydration.

Modes of transmission: 1) It spreads by ingestion of contaminated water, food, milk, milk products or drinks with the discharge of the patient.

2) Flies act as mechanical carriers.

Prevention: 1) Isolate the patient in the hospital or at home.

2) Give immediate treatment to the patient.

3) During epidemics everybody should be immunized against cholera.

4) Patients clothes, stools, vomits and utensils should be thoroughly disinfected.

5) Clean and safe drinking water should be used.

6) Milk must be boiled before use.

7) Special care must be taken regarding the cleanliness of the surrounding as well as personal hygiene.

Question No. 05. What are the various sources and hazards of water pollution?

Answer: Contaminated water can adversely affect the health of man either directly or through the food and by its use for personal hygiene.

Sources of pollution: Water may be polluted by:

1. Sewage containing organic matter and pathogenic agents.
2. Industrial and trade waste (containing chemicals).
3. Agricultural pollutants (containing fertilizers and pesticides).
4. Physical pollutants (like heat and radioactive materials).

1) Biological hazards: These consist of water-borne diseases caused by the presence of an infective agent or an aquatic host in water e. g. hepatitis, poliomyelitis, cholera, typhoid, bacillary dysentery, amoebiasis, giardiasis and helminthic infection like round worm, thread worm and whipworm. On the other hand schistosomiasis and guinea worm infestations are due to the presence of an aquatic host.

2) Chemical hazards: These are caused by the chemical pollutants derived from industrial or agricultural wastes which find their way into public water supplies. These pollutants comprise of detergent solvents, heavy metals, cyanides, minerals, organic acids, nitrogenous substances, bleaching agents, pigments, dyes, sulphide, ammonia and other toxic and biocidal compounds.

Question No. 06. What is the balanced diet?

Answer: Balanced diet: A diet which contains adequate amount of all the essential nutrients like carbohydrates, proteins, fats, minerals, water, roughage material and vitamins sufficient for normal growth and development of the body, is called as balanced diet. The composition of a balance diet for an average adult human being is:

| | | | |
|--------------------------|--------------------|------------------------------------|-------------------------|
| Cereal - 400gm | Pulses – 50 - 80gm | Oil or ghee - 57gm | Leafy vegetables -114gm |
| Other vegetables - 85gm | Fruits - 85gm | Milk products - 284gm | Eggs - 1-2 eggs |
| Sugar and Jaggary - 57gm | Fish/Meat - 85gm | Water and salt - according to need | |

Question No. 7. Name the diseases caused by deficiency of proteins.

Answer: Protein deficiency diseases:

1) Kwashiorkor: It occurs mostly in the second year of life. It is due to weaning of the child from breast to a diet low in protein.

Symptoms:

1. The child is miserable and apathetic with a characteristic mewing cry.
2. The skin changes may vary from pigmentation, thickening and cracks to ulceration.
3. Hair are thin and sparse and colour is reddish or grey.

Treatment: Diet with adequate proteins and proper calorific value should be given to the infants.

2) Marasmus: It is a clinical condition of protein energy malnutrition resulting from deficiency of proteins and calories usually occurs in the age group of 1/2 - 5 years.

Symptoms: Severe muscle wasting, severe growth retardation, wasting of muscles, failure to gain weight, child feels good appetite but is irritated and marked wasting of skin & bones.

Treatment: Diet with adequate proteins and proper calorific value should be given to the infants.

Question No. 08. What are the causes of cancer?

Answer: Causes of cancer:

1. Smoking, chewing of tobacco is the common cause of cancer of mouth, tongue, larynx, pharynx, stomach, pancreas and kidney.
2. Consumption of alcohol leads to higher incidence of cancer of esophagus and stomach.
3. Hot spicy foods produce esophageal cancer.
4. Long term exposure to various chemical agents like asbestos, nickel, cadmium and chromium causes cancer of lung and skin.
5. Many viruses are responsible for causing cancer e.g. hepatitis B virus can cause cancer of liver.

Question No. 09. What is septic tank?

Answer: Septic tank: It is a tank in which household waste water and excreta can be disposed of. Waste water is allowed in the septic tank but water containing soap or detergent, bath room water etc. is not allowed. A septic tank should have a minimum capacity of 200000 litres and 1000 litres person space should be there. The septic tank is rectangular on the surface usually length is 1 to 2 times the breadth and depth is 1.5 to 2 meters. There is an inlet and outlet pipe above the water level and air space above the water level. A cover of cement concrete is provided at the top with man hole in the centre and the man hole is covered with another lid. The mechanism in the working of septic tank is anaerobic digestion of the contents. The heavy solid settles down and decomposed by anaerobic bacteria which cause reduction in its volume. This solid at the bottom is called as the sludge. The fatty and greasy substance rise to the water surface above and passed out through the out let.

Question No. 10. Differentiate between bacteria and virus.

Answer:

| S. No. | Bacteria | Virus |
|--------|---|--|
| 01. | Bacteria are unicellular microorganism. They are typically a few micrometers long and have many shapes including curved rods, spheres, rods, and spirals. | A virus is a sub-microscopic particle (ranging in size from 20–300 nm) that can infect the cells of a biological organism. |
| 02. | Cell wall is made up of Peptidoglycan/ Lipopolysaccharide enclosed DNA and RNA. | No cell wall. Protein coat present that enclosed DNA and RNA. |
| 03. | Ribosome is present. | Ribosome is absent. |
| 04. | Living organism because they replicate itself. | Viruses are a form of life or organic structures that interact with living organisms. |

Question No. 11. Classify vitamins and write the source of vitamin C and D.

Answer: Vitamins: Vitamins are complex organic compounds required for vital metabolic functions in the body and are needed by the body in small amount. They are grouped as:

a) **Fat soluble vitamins** - Vitamin A, D, E and vitamin K.

b) **Water soluble vitamins** – Vitamin B complex and vitamin C.

Sources of vitamin C: The main sources of vitamin C are fresh fruits and vegetables like orange, lemon, tomato, papaya, potato, cabbage, cauliflower, spinach, beans, pulses and germinating cereals. Amla and guava are very rich sources of vitamin C. Animal food like milk, meat, fish etc. are poor sources of vitamin C.

Sources of vitamin D: It is present in egg yolk, cod liver oil, halibut liver oil, butter and ghee. Cod liver oil is the richest source of vitamin D. The ultra violet rays present in sunlight convert ergosterol found in skin to vitamin D₂ and vitamin D₃.

Question No. 12. Write affects of air pollution.

Answer: Affects of air pollution:

- 1) Mortality and morbidity rates are increased.
- 2) It affects respiratory functions.
- 3) It leads to destruction of plant and animal life. The production of crops is greatly affected.
- 4) It leads to corrosion of metals.
- 5) Polluted air causes great damage to the buildings e.g. the Taj Mahal is affected by fumes of oil refinery.
- 6) Some time visibility is also affected.

Question No. 13. Give mode of transmission of typhoid and tuberculosis.

Answer: Typhoid: It is a communicable disease caused by *Salmonella typhi*. Enteric fever includes both typhoid fever and paratyphoid fever. The symptoms of typhoid fever are:

1. Increase in body temperature to the extent of 1° every day.
2. Severe headache, back pain with dry and coated tongue.

Transmission: It is transmitted by contaminated water and food. It is also transmitted by direct contact and through flies.

Tuberculosis: Human tuberculosis is a chronic disease caused by *Mycobacterium tuberculosis*, a non-motile slow growing, acid fast, non spore forming aerobic bacillus.

Modes of transmission:

- 1) Mainly by droplet infection.
- 2) By direct contact with patient.
- 3) Inhalation of dust particles containing tubercle bacilli.
- 4) By using contaminated food articles or other articles of the patient.

Question No. 14. What are nosocomial infections?

Answer: Hospital acquired infections (HAIs): They are also known as nosocomial infections and defined as the infections acquired by the patient after they have been admitted to the hospital or other health care centre. Prior to admission in the hospital the patient do not have any such disease. They can get the disease from different sources like patients, unsterilized instruments, infected hands of surgeons, nurses, ward boys and other hospital staff who come in contact with the patients, contaminated food, water, other drinks may also be a source of infection. Articles like linen, bed clothes, furniture, sinks, basins, pots, door handles etc.

are also a source of infection. Hospital dust, air and discharge of the patient which are highly contaminated with micro-organisms, are the most important source of infection.

Types of hospital infection-

1. Wound infection- These include (i) post operative wound infections and non surgical wound infections.
2. Infections of alimentary tract- These occur more commonly in infants in maternity wards and children in paediatric ward.
3. Infections of respiratory tract- The commonly observed infections are tuberculosis, pneumonia.

Question No. 15. What are consequences of population growth?

Answer: Consequences of population growth: Population growth has created lot of problems for the public as well as for the government. Some of the serious problems include:

- 1) **Food problems:** Daily a large number of new mouths are added to our existing population they require food for their existence.
- 2) **Falling economic status:** In India per capita income is very low and more than 40 percent of India's population lives below poverty line. The benefits of planned development are mostly consumed by new population, making it more and more difficult to raise the existing standard of living.
- 3) **Social problems:** The population explosion has led to various social problems which include poverty, unemployment, and illiteracy due to inadequate schooling facilities, psychological disturbance, inadequate or substandard housing facilities, overcrowding at all places.

Question No. 16. What are hazards of smoking?

Answer: Hazards of smoking: 1. Smoking is associated with significant morbidity and mortality.

2. Smoking still remains as one of the leading cause of preventable death in patient suffering from respiratory disorders.
3. Cigarette smoking causes many types of cancer.
4. It also increases the risk of cardiovascular diseases.
5. Exposure to tobacco smoke during pregnancy can lead to delivery complications and increase the risk of health problems in the newborn.

Question No- 17 Describe emergency treatment in burns & scalds.

Answer- Burns & scalds: Burns are the injuries which are caused by dry heat like fire, flame and hot metals etc. Scalds are the injuries which are caused by moist heat like boiling water, steam, hot oil, hot wax
Following measures are taken:

- 1) Put off the fire by throwing water, covering the flames with blanket and coat.
- 2) Without wasting time put plenty of cold water or any other non-inflammable liquid.

- 3) Do not try to remove the clothing's from the burnt area rather cut them around.
- 4) Keep the patient calm and in lie down position to avoid shock.
- 5) Do not disturb the blisters in anyway.
- 6) Do not use absorbent cotton, oily substances, antiseptics, flour, butter, baking soda or ink on burn.
- 7) Do not touch the burnt area more than necessary.
- 8) If eyes are affected with burns, wash them thoroughly and afterward cover with sterile dressings.

Question No-18 Write the differences between communicable and non-communicable diseases.

Ans. Differences between communicable and non-communicable diseases

| Communicable diseases | Non-communicable diseases |
|--|--|
| 1. Diseases which spread from one person to another directly or indirectly through an infectious agent or its product. | 1. Diseases which are not transmitted from one person to another directly or indirectly but it is caused due to multiple causes. |
| 2. Example tuberculosis, cholera, influenza etc. | 2. Example cancer, diabetes, blindness etc. |

SECTION -C

Each Question carries five marks.

5x15=25

Question No. 01. What are principle nutrients?

Question No. 02. Elaborate various stages of demographic cycle.

Question No. 03. Write a short note on snake bite poisoning.

Question No. 04. What is the important role of proteins?

Question No. 05. How can we remove hardness of water?

Question No. 06. Name any five diseases caused by virus.

Question No. 07. Give the first aid treatment of shock.

Question No. 08. Name various arthropods born diseases.

Question No. 09. Give short note on cardio pulmonary resuscitation.

Question No. 10. Discuss natural methods of contraception.

Question No. 11. Define immunity and give its classification.

Question No. 12. Draw a well labeled diagram of bacterial cell and classify various types of bacteria.

Question No. 01. What are principle nutrients?

Answer: Principle nutrients: A good nutrition is essential for normal growth, development and maintenance of health. The constituents of food which provide required amount of energy are called principle nutrients which include carbohydrates, proteins, fats, vitamins, minerals and water.

Carbohydrates: Carbohydrates consist of carbon, hydrogen and oxygen. Carbohydrates are the cheapest and main source of energy as 1gm of carbohydrate; upon oxidation produce 4 calories of energy.

Fats: Fats consist of carbon, hydrogen and oxygen. Fats or lipids are composed of glycerol and fatty acids.

Proteins: These are complex organic nitrogenous compounds consisting of carbon, hydrogen, oxygen, nitrogen, sulphur and phosphorus. They are made up of number of smaller units of amino acids. These amino acids are classified as:

a) Essential amino acid: These amino acids cannot be synthesized in the body and must be included in the diet for example: leucine and isoleucine.

b) Non-essential amino acid: These amino acids can be synthesized in the body for example, arginine and glycine.

Vitamins: Vitamins are complex organic compounds required for vital metabolic functions in the body and are needed by the body in small amounts.

Question No. 02. Elaborate various stages of demographic cycle.

Answer: Demographic cycle: According to history of population the population growth takes place according to a cycle known as demographic cycle. This cycle is divided into following stages:

1) High stationary stage: It is the first stage during which the population remains stationary because there is a high birth rate as well as a high death rate.

2) Early expanding stage: It is the second stage during which the death rate begins to fall but the birth rate remains unchanged so there is a increase in the population.

3) Late expanding stage: It is the third stage during which the birth rate decreases but still the population continues to increase because the birth rate is still higher than the death rate.

4) Low stationary stage: It is the fourth stage during which the population remains almost stationary because there is low birth rate as well as low death rate.

5) Declining stage: It is the fifth stage during which the population begins to decrease because the birth rate is lower than the death rate.

Question No. 03. Write a short note on snake bite poisoning.

Answer: Snake bite: Poisoning due to snake-bite is very dangerous that even leads to death. Some of the poisonous species are cobra, viper and some sea-snakes. Symptoms of poisoning are depending upon the type of snake. Common clinical feature of snake bite are puncture wound, pain, swelling, weakness, dizziness, excessive salivation and vomiting etc.

Treatment:

1. Lay the patient down, try to cool and calm him. Give him assurance as he is very frightened.
2. Do not allow him to move the bitten part because the movement may favor faster absorption of poison into systemic circulation.
3. Apply a band, cloth above the fang mark to prevent the spread of poison to the other parts of the body.
4. Wash the wound with soap and water.
5. Make a sharp cut over the bitten area and allow bleeding by squeezing the area.
6. Suck out the poison with a suction pump or by mouth and spit it out.
7. If breathing stops give artificial respiration.
8. Immediately shift the patient to a hospital.

Question No. 04. What are the important role of proteins?

Answer- Proteins are complex organic nitrogenous compounds consisting of carbon, hydrogen, oxygen, nitrogen, sulphur and phosphorus. They are made up of number of smaller units of amino acids. These amino acids are classified as:

- a) Essential amino acid: These amino acids cannot be synthesized in the body and must be included in the diet for example: Leucine and Isoleucine.
- b) Non- essential amino acid: These amino acids can be synthesized in the body for example, Arginine and Glycine.

Sources of protein: The different sources of proteins are milk, eggs, meat, fish, pulses, cereals and fruits.

- a) First class proteins: Protein foods, which contain all essential amino acids in correct proportions such as meat, egg, fish, soya bean and milk
- b) Second class proteins: They do not contain all the essential amino acids in the correct proportions such as peas, beans and pulses.

Role / Functions of proteins:

- 1) Required for body building, repair and maintenance of body tissues.
- 2) Biosynthesis of plasma proteins and hemoglobin.
- 3) Biosynthesis of antibodies, enzymes and hormones.
- 4) Play an important role in the constitution of all tissues including body fluids, for example blood.

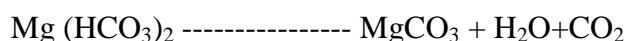
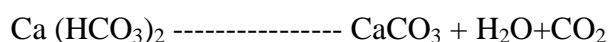
- 5) Provide energy and heat.
- 6) Responsible for the cell-mediated immune response.

Question No. 05. How can we remove hardness of water?

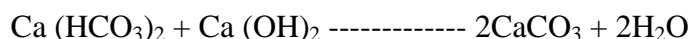
Answer: Hard water: Water which produce lather with difficulty is known as hard water. Hardness of water is defined as soap destroying power of water. Hardness of water is due to presence of soluble salts i.e. bicarbonates, chlorides and sulphates of magnesium and calcium. Hardness of water is of two types:

1) Temporary hardness: This hardness of water is due to presence of bicarbonates of magnesium and calcium.

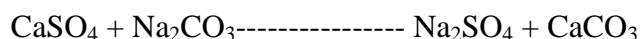
a) It can be removed by boiling. On boiling the carbon dioxide is expelled out of water and precipitates of calcium and magnesium is deposited at bottom



b) It can also removed by adding lime or calcium hydroxide to water. Lime absorbs carbon dioxide and precipitates of calcium carbonate are formed.



2) Permanent hardness: This hardness of water is due to presence of chlorides and sulphates of magnesium and calcium. It is not removed by boiling. When sodium carbonate or soda ash is added to water, the sulphates or calcium and magnesium is converted into sodium sulphate.



Question No. 06. Name any five diseases caused by virus.

Answer: 1. AIDS (Acquired Immuno Deficiency Syndrome): It is caused by the infection due to *Human immuno deficiency virus* (HIV) – Retrovirus. The virus affects adversely the immune system of the body mainly T-lymphocytes. As a result individual is exposed to numerous life threatening infections, neurological disorders and malignancies.

2. Small pox: Small pox is a viral disease caused by *Variola virus*. Small pox starts initially as a sudden onset of fever and on the third day, it leads to the formation of skin eruptions, macule, papule, pustule and scab.

3. Influenza: It is a communicable disease which is produced by a number of viruses. Influenza occurs in the form of fibrile respiratory infections. Influenza occurs in all the ages.

4. Chicken pox: It is a communicable disease; the causative agent for chicken pox is called *Varicella zoster virus* (V-Z Virus) or *Human (alpha) herpes virus 3*. It is commonly transmitted by droplet infection,

contamination from the discharge from ruptured lesion of skin and placental transfer of virus can occur and results in infection in the foetus.

5. Measles: Measles is caused by a specific virus (*Measles virus*) and it is a disease which occurs in children. Measles is characterised by fever which is followed by typical rashes.

Question No. 07. Give the first aid treatment of shock.

Answer: Shock: Shock is defined as a condition of severe depression of vital functions of body due to poor circulation of the blood.

Treatment:

1. Provide well-ventilated area to the patient and remove the crowd tactfully.
2. Raise the legs by keeping a pillow under the legs to improve the circulation.
3. If there is difficulty in breathing, raise the head and chest of the patient.
4. Loosen the clothes to make him easy and keep the patient warm with a blanket.
5. Don't give anything to eat because sometimes an emergency operation is required.
6. Immediately shift the patient to a hospital.

Question No. 08. Name various arthropods born diseases.

Answer: 1) Plague: This is highly fatal infectious disease transmitted from vertebrate animals to men under natural conditions.

Causative agent: It is caused by *Yersinia pestis*. It is primarily a disease of rodents and vertebrate animals. However human beings are affected incidentally. Vector of plague is rat flea.

Occurrence: Plague occurs in human beings in three forms i.e., Bubonic, Pneumonic and Septicaemic.

2) Malaria: Malaria is caused by parasites of the genus *Plasmodium* i.e., *Plasmodium falciparum*, *Plasmodium vivax*, *Plasmodium ovale* and *Plasmodium malariae*. It is transmitted to human beings by the bite of infected female anopheles mosquitos. It may also be transmitted by blood transfusion. It is a disease of hot wet climates.

Symptoms: Fever along with chill, profuse perspiration (sweating), enlarged liver and spleen, headache and anemia.

Prevention and control:

1. Early detection and notification to health authorities.
2. Chemotherapy using chloroquine, quinine or other suitable drug.
3. Breeding of mosquitoes must be checked and destruction of mosquito's larvae by spraying DDT or other chemical substances.
4. Protection against mosquito's bites by using mosquitoes nets, windows in the houses should be fitted

with wire gauge and by the use of mosquitoes repellent creams etc.

3) Filariasis: Filariasis is caused due to the infection with the filarial worms *Brugia malayi* and *Wuchereria bancrofti*. The parasite completes their life cycle in wucheresia.

Symptoms: Fever accompanied by pain, tenderness, reddening of skin along the course of inflamed lymphatic vessels, inflammation of spermatic cord, temporary edema.

Prevention and control: 1. Protection from mosquitoes bites by using mosquitoes nets and repellent creams etc.

2. Prevention of mosquitoes breeding by spraying insecticides and by proper sanitary disposal of wastes.

3. Early detection/diagnosis and treatment with diethyl carbamazine.

4. Periodic blood examination.

5. Health education to the public.

Question No. 09. Give short note on cardio pulmonary resuscitation.

Answer: Resuscitation method: Resuscitation is the process of maintaining the exchange of gases in the lungs through artificial respiration and revival of heart activities through resuscitation method.

Principles of resuscitation: Resuscitation is required when there is no breathing or inadequate circulation.

The aims of resuscitation are:

1. To clear the airway. This is achieved by removing obstruction if any.

2. To restore breathing. This is achieved by artificial respiration.

3. To restore circulation. This can be attempted by cardiac massage.

Clearing the airway: Obstruction of airway may occur due to

1. Tongue falling back

2. Inhaled foreign body

3. Vomit

The obstructed airway is opened as follows:

1. The jaw is lifted forward and the head is tilted on the neck. The foreign body is now removed by fingers.

2. Back blow can also expel the foreign body.

Mouth to mouth artificial respiration: After making sure that the airway is clear, the patient turned onto his back. After kneeling by his side, the nose is pinched with one hand and the chin bent forward with the other. After taking a long breath, the mouth is kept over that of the patient. His lungs are inflated and this is noted by expansion of his chest. Now, the mouth is taken away and it is carefully watched whether the patient exhales the breath. After doing this five or six times the patient starts breathing again.

Restoration of circulation: This is done by chest compression (closed chest cardiac massage, (CCCM). Before doing this, artificial respiration is done as above. One hand is placed over the lower third of the

sternum and the other hand is placed over the first. By this position, the hands lie over the heart. With the arms straight, the hands are rocked backwards and forwards alternately. This releases and compresses the heart. Ultimately it forces blood to circulate.

Question No. 10. Discuss natural methods of contraception.

Answer: Natural Methods: (i) **Abstinence:** Sexual abstinence literally means complete stoppage of sexual contacts. Though it is a completely effective method of birth control but is not practicable.

(ii) **Coitus interruptus:** It is also known as withdrawal method. It is the oldest method of birth control practiced by a man. In this method the penis is withdrawn from the vagina just before ejaculation of semen.

(iii) **Safe period:** Rhythm method or safe period method is based on the fact that a woman normally produces one egg-cell every month which is shed during the fertile period which is roughly 10th to 20th day after the onset of menstrual period.

(iv) **Basal body temperature method:** During a woman's menstrual cycle, her basal body temperature rises at least 0.4 F because of release of hormone (progesterone) after ovulation. This rise in temperature forms the basis of basal body temperature method.

(v) **Prolonged lactation method:** Breast feeding to infants for 6 months in 50% female can prevent conception.

Question No.11. Define immunity and give its classification.

Answer: Immunity is defined as the resistance against an infecting organism. The immune mechanism of the body is capable of recognizing, destroying and eliminating infectious micro organism. The immune mechanism is due to antibodies produced in the body.

Classification of Immunity

Immunity can be classified into 1. Natural Immunity 2. Artificial Immunity

1. Natural Immunity- This type of immunity is inherited from birth itself. This type of immunity provides natural resistant against disease. For example, Man is naturally resistant to a virus which produces a disease called rinderpest in cattle.

2. Artificial Immunity- It produced by the administration of vaccines or suitable substances. Artificial Immunity is classified into 1. Active immunity 2. Passive immunity

1. Active immunity- It involves the stimulation of the body to produce its own antibodies. The stimulation of antibody production is achieved by the administration of vaccines, toxoids etc. Active immunity takes some time to develop, but it is of long duration.

2. Passive Immunity- It involves the administration of an antibody produced in one body to other i.e. readymade antibodies are administered. Passive immunity develops rapidly, but it is of short duration.

Question No 12. Draw a well labeled diagram of bacterial cell and classify various types of bacteria.

Answer: Classification of bacteria-

Based on Gram staining-

Gram positive bacteria – Some bacteria take up Gram stain, resist decolourisation and appear violet with stain. E.g- Streptococcus.

Gram negative bacteria- Some bacteria Gram stain is not taken up since it is decolourised by organic solvents. They take the counter stain and appear red. e.g- Salmonella.

2. Based on shape of bacteria- .

Cocci: Spherical or oval shape

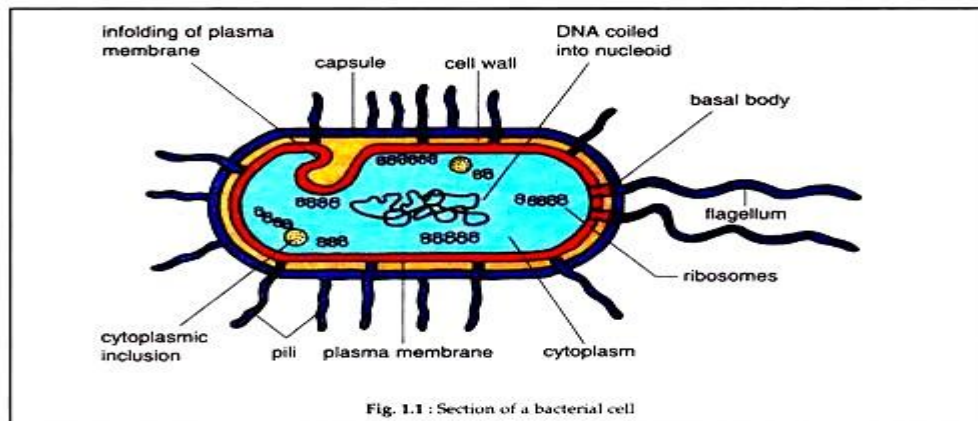
Bacilli: Rod shaped cells

Vibrios: Comma shaped curved cells

Spirilla: Rigid spiral forms

Spirochaetes: Flexible spiral forms

Actinomycetes: Branching filamentous forms



SECTION D

Each Question carries ten marks.

1x10=10

Question No. 01. What is the important role of vitamins? Describe the disease caused by deficiency of vitamin B and fat soluble vitamins. Write down their prevention and treatment.

Question No. 02. What are the various determinants of health? Explain in detail

Question No. 03. What are the indicators of health? Explain it.

Question No. 04. Define microbiology. Discuss various type of staining technique for microorganisms. Discuss Gram staining and acid fast staining in detail.

Question No. 05. Write a short note on diabetes mellitus.

ANSWERS

Question No. 01. What is the important role of vitamins? Describe the disease caused by deficiency of vitamins. Write down their prevention and treatment.

Ans. Vitamins: Vitamins are complex organic compounds required for vital metabolic functions in the body and are needed by the body in small amounts. They are grouped as:

- a) Fat soluble vitamins - Vitamin A, D, E, K.
- b) Water soluble vitamins – Vitamin B complex and vitamin C.

Role of Vitamins:

- 1) Vitamin A helps in proper functioning of retina and vision.
- 2) Vitamin A helps in maintaining functioning and integrity of glandular and epithelial tissues.
- 3) It helps in skeletal growth and has an anti-infective action.
- 4) Vitamin D facilitates the absorption and utilization of calcium and phosphorus for healthy bones and teeth.
- 5) Vitamin E maintains healthy muscular system and act as antioxidant.
- 6) Involved in the metabolism of carbohydrates, fats and proteins.

Vitamin A deficiency diseases:

a) Xerophthalmia (Dry eyes) – It is caused by the deficiency of vitamin-A. It is an eye disease due to lack of secretion of lachrymal or tear glands. It may result in bacterial growth, thickening, keratinization and ulceration of cornea and even blindness. It is the main cause of blindness among children in India.

b) Night Blindness (Nyctolopia) – It is also caused by deficiency of vitamin-A. It is the inability of a person to see in dim light. Dryness of skin, respiratory infections like common cold also occurs due to deficiency of vitamin-A.

Vitamin B₁ deficiency diseases:

a) **Beri-Beri** – Beri - beri is caused by deficiency of vitamin B₁ or thiamine. It is characterized by loss of appetite, decrease in weight, retarded growth, degeneration of nerves, muscle atrophy, heart failure and oedema of hands and legs.

Vitamin B₂ deficiency diseases:

a) **Cheilosis** – Cheilosis is caused by deficiency of vitamin B₂ or riboflavin. In this disease inflammation and cracking at corners of the mouth takes place.

b) Photophobia, corneal ulcers, dryness of skin and hair loss also occurs due to vitamin B₂ deficiency

Vitamin B₃ or Pantothenic acid deficiency diseases:

Burning feet syndrome in which itching and burning of feet takes place is caused by deficiency of vitamin B₃.

Vitamin B₁₂ deficiency diseases–

a) **Pernicious anemia** – It is caused by deficiency of vitamin B₁₂ or cyanocobalamin. It is characterized by malformed RBC's without hemoglobin. It may prove fatal.

b) **Megaloblastic anemia** – It is caused by deficiency of folic acid and vitamin B₁₂. It is characterized by the presence of large immature nucleated RBC's in the blood.

Prevention and treatment – All the diseases which are caused by deficiency of vitamins are prevented by taking diet with adequate amount of vitamin rich items. If necessary then vitamin supplements are also taken.

Vitamin E: Vitamin E (tocopherol) is an anti-sterility vitamin. Vitamin E is present in wheat, cereal, embryos, green leaves, and some vegetable oil. Therapeutically vitamin E is used in prevention of abortion, in certain menstrual disorders and in the improvement of lactation. Deficiency of vitamin E leads to death of foetus in uterus and sterility in males and females.

Vitamin K: Vitamin K is fat soluble vitamin. It is essential for normal coagulation of blood and necessary for the formation of prothrombin and other blood clotting factors in liver. It is occur in green leaves, alfalfa, spinach, cauliflower, carrot etc. Bacteria present in small intestine also produce vitamin K. Deficiency of vitamin K leads to increased prothrombin time, and a tendency for haemorrhage from skin.

Question No. 2. What are the various determinants of health? Explain in detail

Answer- Health and determinants of health: Health is not only absence of disease but a state of complete physical, mental and social well being.

1) **Physical health:** It refers to the perfect functioning of the body state in which every cell and every organ is functioning at optimum capacity.

2) **Mental health:** It is defined as the ability of the individual to make personal and social adjustments. These adjustments are concerned with one's daily life in relation to others, at home and at work and he adjusts in a way acceptable to the society.

3) **Social health:** The health of the people depends on the social and environmental conditions, poverty, illiteracy, unemployment and adverse social relation greatly affect the health of an individual.

Determinants of health: There are many factors, which may be internal within the individual and external in the environment, society, which governs the health of an individual. Important determinants of health are:

a) Heredity: The state of health of an individual to some extent depends on the genetic constitution of the body. Certain common diseases are of genetic origin. For example, Hemophilia, mental retardation, diabetes and epilepsy.

b) Environment: Environment is divided into internal environment and external environment. The internal environment of an individual includes each and every component, part, tissue, organ and organ system and their functioning. Where as external environment consists of those things to which human being is exposed. So environment also affects the health of a person.

c) Life-style: Life style denotes the way people live. Many health problems are associated with life - style changes or personal habits (e.g. smoking, alcoholism). Certain life styles factors also promote health. For example- adequate nutrition, enough sleep and sufficient physical activity.

d) Socio-economic conditions: Economic status, education, occupation, political system, housing employment, nutrition etc. influence human health. The economic status determines standard of living, quality of life, size of the family and purchasing power. However, sometimes a good economic condition may be a reason for illness, for example, coronary heart disease in economically sound individual. Education is second major factor influencing health status. Further, suitable employment in productive work promotes health as it gives job satisfaction and raises economic status of an individual.

e) Health and family welfare services: The main aim of these services is to provide primary health care and to improve health status of population for example treatment of diseases, prevention of illness, provision of safe drinking water, healthy environment.

Question No. 3. What are the indicators of health. Explain it.

Answer- Health Indicator: Indicators are defined as the factors which give information and are required to assess the health of a community and they are also required for the comparison of health status between the people of one community with other community over certain period.

Various health indicators are as follows:

a) Mortality indicators (Death rate): Frequency of death is an important indicator of health in a community. Of the various mortality rates, crude death rate is the frequently used index.

$$\text{Crude death rate} = \frac{\text{No. of deaths in a year}}{\text{Mid-year population}} \times 1000$$

The other death rates used are infant mortality rate, child mortality rate, maternal mortality rate, proportional mortality rate and disease specific mortality rate.

b) Morbidity indicators: The occurrence of disease is also an indicator of health. The various morbidity indicators are incidence rate, hospital attendance, admission and discharge rate.

c) Disability rates: These include days of restricted activity, bed disability days and work loss days

d) Nutritional status indicators: They are measurements of height, weight and mid-arm circumference.

e) Health care delivery indicators: They are doctor population ratio, doctor – nurse ratio, population – bed ratio etc.

f) Environmental indicators: They include proportion of the population who get safe water, and also indicators relating to pollution of air, light and water.

g) Social and mental health indicators: Suicides, homicides, smoking, alcoholism and drug abuse.

Question No- 4. Define microbiology. Discuss various type of staining technique for microorganisms. Discuss Gram staining and acid fast staining in detail.

Ans. 4. Microbiology: Microbiology is the study of the propagation, isolation, identification and biology of micro-organism.

Staining technique of microbes: Staining techniques are of importance for the identification of micro-organisms. After isolation of the causative microorganisms staining them properly does morphological study. Preparation of a smear is the first step in staining procedure. A loopful of liquid culture or fluid specimen or a section of bacterial colony is taken and spread as thin film over the required area on a slide. Smear is then heat fixed by moving the slide on the flame for 2-3 times. Various techniques of staining are:

- a) Simple staining.
- b) Gram's staining.
- c) Acid fast staining/Ziehl- Neelson staining.
- d) Endospore staining.
- e) Volutin granule staining.
- f) Capsule staining.

a) Gram – Staining Method: By this method morphological details of the bacteria can be made visible and microorganism can be grouped as gram positive and gram negative bacteria. The procedure of the staining is as follow:

- 1) A thin film of bacterium is fixed on a slide using nichrome wire loop.
- 2) Smear is heat fixed by moving the slides on the flame for 2-3 times or it is fixed with alcohol.
- 3) Cover the smear with methyl violet stain for one minute and excess of stain is removed by washing with water.
- 4) Immerse the slide in dilute solution of iodine for two minutes to fix the colour.
- 5) The smear is then decolorized with alcohol or acetone.
- 6) Wash the smear quickly by running tap water.
- 7) Cover the smear with dilute carbol fuschin for 30 seconds.
- 8) Wash with tap water and dry it in air.
- 9) Examine the slide under oil immersion lens.

Gram positive bacteria will retain the violet colour of methyl violet, for example, Streptococci, Pneumococci.

Gram negative bacteria are decolourized by spirit, alcohol and are stained with counter stain like carbol fuschin, safranin which gives pink colour to them, for example, *E. coli*, gonococci, *S. typhi*.

b) Acid - fast staining: Certain organisms are not easily stained by usual dyes due to high lipid content but when stained with acid fast stain retain the colour even after washing with acid and are called acid fast microbes. Ziehl – Neelson method is used which involves staining with hot concentrated carbol fuschin solution, washing with water and then with 20% sulphuric acid alternatively until the film has only a faint pink colour. The film is then washed with water. Acid fast organisms retain the colour, for example, *Mycobacterium tuberculosis*, *Mycobacterium leprae*. The procedure of the staining is as follow:

- 1) Prepare and fix a smear of mucoid part of the sputum.
- 2) Cover the smear with carbol fuschin for 5 minutes.
- 3) Wash the smear with water.
- 4) Put slide in 20% H₂SO₄ for one minute and then through it.
- 5) Wash the slide with water.
- 6) Put methylene blue for 30 seconds and wash with water.
- 7) Dry the slide and observe it under oil immersion lens.
- 8) Tubercle bacilli are stained red or pink where as the background is blue.

Question No. 5. Write a short note on diabetes mellitus.

Answer- Diabetes Mellitus:

Types of Diabetes Mellitus:

- 1) Insulin Dependent Diabetes Mellitus (IDDM or Type I) and
- 2) Non-Insulin Dependent Diabetes Mellitus (NIDDM or Type II)

1) Type I diabetes is seen in young individuals of less than 30 years of age. It is the juvenile onset type diabetes.

2) Type II diabetes is more commonly type of diabetes and occurs in the middle aged and elderly people and can be controlled by treatment or dietary control. It is adult or maturity onset type diabetes.

Symptoms: Hyperglycemia (increased blood sugar level), glycosuria (sugar in urine), loss in weight, ketosis, acidosis, dry skin and mouth, dry tongue, increased appetite, increased thirst, increased rate of breathing and coma.

Causes of Diabetes:

1) Decreased production or action of insulin hormone secreted by the beta cells of islet of langerhans in the pancreas. Insulin deficiency may be due to pancreatic disease, defective formation of insulin, destruction of beta cells in the pancreas.

2) Heredity.

3) Diet rich in carbohydrates and fats.

4) Obesity.

5) Viral infections.

6) Certain chemical agents like alloxan.

7) Lacks of exercise, stress, trauma, surgery and pregnancy etc.

Prevention and control:

1) Dietary control: Calorie and sugar restricted diet and it should be rich in proteins and fibres.

2) Maintaining ideal body weight.

3) By use of drugs – The use of insulin along with diet is crucial to the survival of type – I (IDDM).

4) For the management of type – II diabetes diet, insulin, oral hypoglycemic agents (Tolbutamide) play a major role.