



Subject Name: HEC

SUMMER- 18 EXAMINATION
Model Answer

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Important Instructions to examiners:

- 1) The answers should be examined by key words and not as word-to-word as given in the model answer scheme.
- 2) The model answer and the answer written by candidate may vary but the examiner may try to assess the understanding level of the candidate.
- 3) The language errors such as grammatical, spelling errors should not be given more Importance (Not applicable for subject English and Communication Skills).
- 4) While assessing figures, examiner may give credit for principal components indicated in the figure. The figures drawn by candidate and model answer may vary. The examiner may give credit for any equivalent figure drawn.
- 5) Credits may be given step wise for numerical problems. In some cases, the assumed constant values may vary and there may be some difference in the candidate's answers and model answer.
- 6) In case of some questions credit may be given by judgement on part of examiner of relevant answer based on candidate's understanding.
- 7) For programming language papers, credit may be given to any other program based on equivalent concept.

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Q. No.	Sub Q. N.	Answers	Marking Scheme
1		Answer any EIGHT of the following	8X2=16 M
	(a)	Define the terms (1 mark for each definition)	
	(i)	Health Education: (1 Mark) Health Education is educating public in general, individually or in masses communicating information given by experts on health aspects, diseases, drug abuse etc. so that people lead healthy life in all dimensions of human health as covered by WHO , in the interest of public welfare. OR Health Education is the process that informs motivates and helps the people to adopt and maintain healthy practices and life styles, advocates environmental changes if needed to facilitate this goal, conducts professional training and research towards the same end.	
	(ii)	Disease: (1 Mark) It is defined as a definite morbid process having a characteristic train or pattern of symptoms, where it may affect the whole body or any body part, where the cause, pathology and course of it may be known or unknown. OR “Disease is a condition of the body or some part or organ of the body in which its functions are disrupted or deranged.” OR Any deviation from normal functioning or state of complete physical or mental wellbeing.	
	(b)	Name the causative organism for the disease:	
	(i)	Chicken pox: (1 Mark) Causative agent- Varicella Zoster Virus	
	(ii)	Gonorrhea: (1 Mark) Causative agent – Niesseria gonorrhea	



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(c)	Give the long forms of following abbreviations: (1/2 mark for each acronym)	
(i)	AIDS: Acquired Immuno Deficiency Syndrome	
(ii)	TB: Tuberculosis	
(iii)	BCG: Bacillus (of) Calmett (and) Guerin OR Bacillus Calmett Guerin	
(iv)	TT: Tetanus Toxoid	
(d)	Name the sources of water: Sources of water: 1. Surface Water a) Reservoir: b) River: c) Tanks: 2. Rain Water 3. Ground Water a) Wells b) Springs:	
(e)	Define (1 mark for each definition)	
(i)	Incubation period: (1 Mark) It is the time period between an entry of the infectious agent and the appearance of the symptoms.	
(ii)	Antiseptics: (1 Mark) They are defined as substances which destroy or inhibit the growth of microorganisms and are used for living beings.	
(f)	Define hypertension. Write about prevention and control of hypertension. (1 mark each for definition, and prevention and control) Hypertension definition: (1 mark) Hypertension means consistent high blood pressure, more than 140/90 mm of Hg systolic/diastolic. OR Hypertension is defined as “a systolic pressure equal to or greater than 140 mm of Hg and/or a diastolic pressure equal to or greater than 90 mm of Hg.” Prevention and control: (1 mark for any 4 of the following points) 1. Reduction in consumption of salt, saturated fats in the diet (Balanced diet).	



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		<ol style="list-style-type: none">2. Reduction of weight and taking regular exercise.3. Avoid smoking and alcohol.4. Avoid stress and strain in life. Meditate and do yogas.5. Detected cases of hypertension can be treated with various antihypertensive drugs.	
(g)	Give modes of transmission of: (1 mark each for each mode of transmission)		
(i)	Malaria Modes of transmission: Malaria is transmitted by the bite of female anopheles mosquito (Arthropod borne).		
(ii)	Trachoma Modes of transmission: It occurs by direct or indirect contact with ocular discharges of infected person or fomites. Swimming pool where water can get contaminated is also a source of infection.		
(h)	Give ill effects of light : (2 mark for any 2 ill effects of the following) <ol style="list-style-type: none">1. Inadequate light puts strain on the visual apparatus which leads to general fatigue and loss of efficiency.2. Exposure to natural sunlight over a long period can cause skin cancer and in some individuals can cause sunburn or inflammation of skin.3. Dim light can create eye strain, which can lead to headache, tiredness, and loss of efficiency.		
(i)	Write the disinfection procedure for dead bodies (2 marks for any two points) Disinfection procedure for Dead bodies: <ol style="list-style-type: none">1. Bodies of the patient who have died with serious infectious diseases may be cleaned with a suitable disinfectant2. Stored in mortuary till the disposal.3. If the bodies are to be preserved for the purpose of dissection by medical student, they are preserved in formalin.		



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	(j) Name the disease caused due to deficiency of (1 mark each for deficiency disease) (i) Iodine: Goiter, Hypothyroidism (ii) Thiamine: Beriberi	
	(k) Enlist types of diabetes. (2marks for any two types) 1. Insulin dependent diabetes mellitus(Type 1) IDDM 2. Non-Insulin dependent diabetes mellitus(Type 2) NIDDM 3. Gestational diabetes: Diabetes during pregnancy	
	(l) Classify microorganism Classification of Microorganisms: Depending on cellular organization and other features microorganisms are classified below 1. Kingdom Protista: (Having cellular organization) i. Prokaryotes (No organized nucleus) - Bacteria and Blue Green Algae ii. Eukaryotes (Organized nucleus) - Fungi, Algae, Slime molds and Protozoa 2. Having no cellular organization - Viruses, Viroid and Prions	
2	Answer any four of the following	4x3= 12M
	(a) Define the terms:(1Mark for each definition) i) Social health (1 mark) It implies harmony and integration within the individual, between each individual and other member of society and between individuals and the world in which they live. OR Quantity and quality of an individual's interpersonal ties and the extent of involvement with the community. ii) Mental health (1 mark) It is defined as a state of balance between the individual and surrounding with self	



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		<p>confidence, self-control and has respect for others.</p> <p>OR</p> <p>A state of harmony between one self and others, coexistence between the realities of the self and that of other people and that of the environment.</p> <p>ii) Physical health (1 mark)</p> <p>Physical health is the perfect functioning of the body i.e. a state in which every cell and every organ is functioning at optimum capacity and in perfect harmony with the rest of the body.</p>	
	(b)	<p>Write sources, functions, deficiency diseases of Vitamin A (1 mark each for sources, functions, deficiency diseases)</p> <p>Sources:</p> <p>Milk and milk products, eggs, fish, green and orange /yellow vegetables.</p> <p>Functions:</p> <p>Maintains healthy epithelial tissues, maintains normal vision</p> <p>Deficiency diseases:</p> <p>Night blindness, Keratinization, Xerophthalmia</p>	
	(c)	<p>What is disease agent? Classify them with examples. (1 mark for definition & 2 marks for 4 classes with examples)</p> <p>Disease agent (1 mark)</p> <p>The disease agent is defined as a substance living or nonliving, or a force tangible or nontangible, the excessive presence or lack of which may initiate or perpetuate a disease process.</p> <p>Classification with examples: (Any four classes with examples can be considered for 2 marks i.e.1/2 mark for each correct class with example)</p> <ol style="list-style-type: none">Biological Agents: The living agents like viruses, fungi, bacteria, protozoa, and rickettsia are the biological agents responsible for causation of disease.Nutrient Agents: These can be proteins, fats, carbohydrates, vitamins, minerals and water. Excess or deficient intake of these leads to nutritional disorders like anemia, obesity, night blindness, beriberi, scurvy, dehydration, and edema. Etc.Physical Agents: Exposure to excessive heat, cold, humidity, pressure, radiation, electricity, sound results in illness.Chemical Agents: Certain chemical substances produced in excess by the body	



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	<p>because of derangement of metabolic functions lead to diseases. These are the Endogenous agents causing the disease.</p> <p>Eg. Excess of bilirubin leads to Jaundice.</p> <p>a. Excess of uric acid leads to Gout.</p> <p>b. Excess of calcium carbonate forms kidney stones.</p> <p>Exogenous agents are acquired by the body from the environment by inhalation, ingestion or inoculation; cause various acute or chronic diseases. Various exogenous chemical agents are allergens, metals, fumes, dusts, insecticides etc.</p> <p>5. Mechanical Agents: Exposure to frequent or chronic friction and other mechanical forces result in tearing, sprains, dislocation etc.</p> <p>6. Social Agents: Poverty, smoking, drug abuse, unhealthy life styles, social isolation and maternal deprivation can act as causative factors for the development of disease.</p>	
(d)	<p>Give the first aid treatment for burns (Any 6 of the following points for 3 marks)</p> <p>First aid treatment of burns.</p> <ol style="list-style-type: none">1) Cool the burnt or scalded area immediately by putting plenty of cold water or by putting clean cloth soaked in cold water. Cooling of the part prevents further damage by removing residual heat from the affected area.2) Remove the clothing of the patient by cutting it around.3) Keep the patient in lie down position.4) Reassure the patient and do not disturb the blisters.5) Cover the burnt area by large dressings or by a clean cloth.6) No antiseptic lotion, oil, flour, butter, baking soda or ink should be applied on the burn. Burn area should not be touched unless it is necessary.7) Remove immediately from the body things like rings, bangles, belt, boots etc. because when the limbs swell due to edema, such articles may cause gangrene.8) If the patient is conscious, give sips of water to him.9) In case of chemical burns, wash the affected area with plenty of water until all chemical has been washed away.10) If burns affect eyes, wash them thoroughly and afterwards cover with sterile dressings.11) In case of extensive burn, wrap the victim in a clean cloth and shift him/her immediately to the hospital.	



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(e)	<p>What are proteins? State the functions of proteins. (1 mark for definition & 2 marks for functions)</p> <p>Definition: (1 marks)</p> <p>Proteins are the complex organic compounds with C, H, O, N and occasionally also contain iron, phosphorous, sulfur and other elements.</p> <p>Functions: (2 marks)</p> <ol style="list-style-type: none">1) Growth and repair of body cell and tissues.2) Synthesis of the hormones, plasma proteins and antibodies (immunoglobulins), haemoglobin, enzymes.3) Provision of energy: Spare amount of proteins can be used for the production of heat and energy.4) Body building.	
(f)	<p>Define immunity. Discuss its types. (1 mark for definition & 2 marks for any 2 types)</p> <p>Definition:</p> <p>Immunity is defined as “ability to produce and possess specific protective antibodies or the cellular mechanism, as a result of previous infection or immunization or body conditioned so by such previous experience as to respond sufficiently to prevent infection or clinical illness or both, after exposure to a specific infectious agent”.</p> <p>OR</p> <p>The power of the body to resist the effects of invasion of pathogens is known as immunity</p> <p>Types of Immunity:</p> <p>1.Active Immunity:</p> <ol style="list-style-type: none">ii) It is developed after clinical or subclinical infection or following immunization and it is humoral or cellular type.iii) Here antibodies i.e. immunoglobulin of 5 types are produced as IgG, IgM, IgE, IgD and IgA (Ig i.e. immunoglobulin). The antibodies work to destroy antigens. This is called humoral immunity.iv) The other type, cellular type active immunity works mainly against Mycobacteria, Salmonella, Candida and many viruses.v) It is long lasting, less expensive, with least side effects and characterized by memory	



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mechanism; as compared to passive immunity.

2. Passive Immunity:

i) When antibodies produced in one body (human or animal) are transferred to another to induce protection against disease, it is called as passive immunity.

ii) Passive immunity is effective immediately as ready-made antibodies are given to human.

iii) It is rapidly established, it is of very short duration.

3. Herd Immunity:

i) It is level of immunity or resistance of a community or a group of people to a particular disease on background of past experience of a disease.

ii) Herd immunity develops in the community because of immunizations, infections and subclinical infections.

3

Answer any Four of following:

4X3=12M

(a) **Define the term Demography and explain demographic cycle. (1 mark for definition & 2 marks for demographic cycle)**

Definition: (1 Mark)

Demography is the scientific study of human population.

Demographic Cycle : (2 Marks)

It comprises of following 5 stages –

i) First Stage:

It is “High Stationary Stage “. The feature of this phase is both natality i.e. birth rate and mortality i.e. death rate are very high. Both cancel each other keeping population steady. India was in this phase till 1920.

ii) Second Stage:

It is “Early Expanding Stage “. Here mortality starts falling down but birth rate remains same i.e. higher. As a result population starts increasing. At present African and South Asian countries are in this phase.

iii) Third Stage:

It is “Late Expanding Stage “. Her mortality continues to fall but birth rate also started decreasing. But yet birth rate remains higher than death rate. So population continues to increase. China, India, Singapore are at this stage.

iv) Fourth Stage:



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It is "Low Stationary Stage ". It is also called Zero Growth stage as birth rate equals death rate and both are lowered. So net population growth is zero.

Many developed countries have reached this stage in last 20 years.

v) Fifth Stage:

It is "Negative Growth Stage ". Here death rate is higher than birth rate. So there is decline in population size. Reasons behind are advancement in medical science and facing problems of population increase. Germany and Hungary are presently at this stage.

(b) Write a note on fungal infections. (3 marks for any three of the following points)

Fungal Infections are called as Mycoses.

1. Superficial Fungal Infections: these are common infections on skin, nails hair etc eg: Ringworm and tinea infections. Causative agents are dermatophytes, candida albicans etc

2. Deep seated fungal infections: (Systemic mycoses) these infections vary in severity ranging from asymptomatic infections to fatal diseases. Causative agents are actinomycetes, Histoplasma etc

3. Opportunistic fungal infections: These infections occur in patients suffering from diseases such as Cancer, AIDS etc.

4. Cleanliness and hygienic habits are important to avoid fungal infections

5. Antifungal agents used commonly are griseofulvin, clotrimazole etc

(c) Name various techniques for staining of bacteria. Give procedure for acid fast staining.(1 mark for various staining techniques & 2 marks for acid fast staining)

Techniques of staining (1 Mark)

1. Simple Staining

2. Differential staining :Gram Staining, Acid Fast staining

Acid fast staining: Ziehl Neelsen Method (2 Marks):

The Ziehl-Neelsen stain is a type of differential bacteriological staining method used to identify acid-fast organisms, mainly Mycobacteria tuberculosis and M. Leprae .It is a modification of acid fast staining and is performed in the following steps.

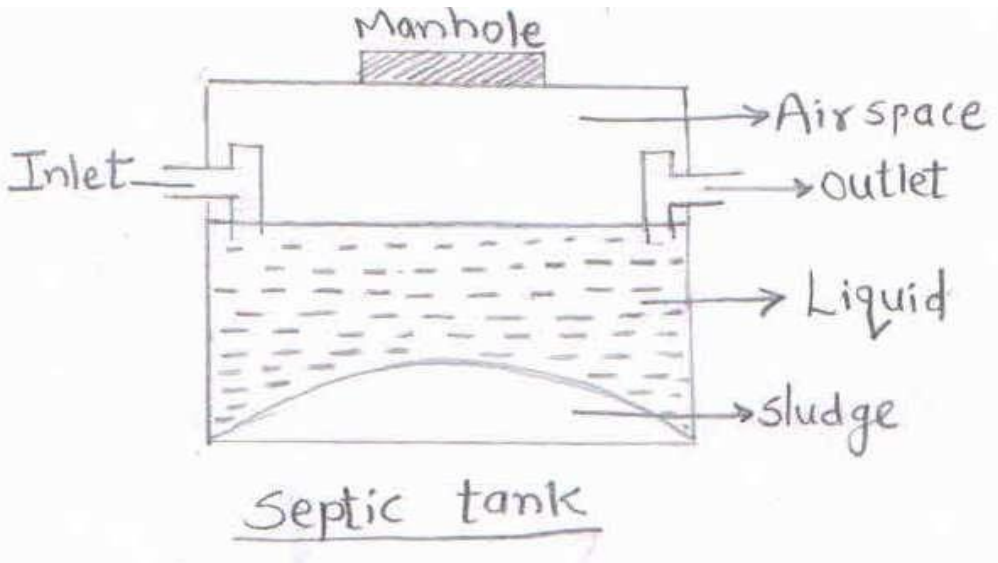
1.Prepare a smear and add carbol fuchsin

2.Wash and add 20% sulfuric acid,

3. Wash and add methylene blue as counter stain.

4.Wash,dry and observe under microscope.

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	<p>5. Acid fast bacteria- appear pink or red</p> <p>7. Non acid fast bacteria appears- blue, green</p>	
(d)	<p>Discuss the design and mechanism of septic tank. (1 mark each for design, mechanism & Diagram)</p> <p>Design: (1 Mark)</p> <p>It's a tank in which household waste water and excreta can be disposed off. It is a suitable method for small communities. It is usually rectangular on the surface usually length is 1.5 to 2 times the breadth and depth is 1.5 to 2 meters. Water is filled in the septic tank; height of the water column is 1 to 1.5 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 of man hole in the center and man hole is covered with another lid.</p> <p>Mechanism (1 Mark)</p> <p>The working is anaerobic digestion. The heavy solids settle down and decomposed by anaerobic bacteria which cause reduction in volume and is rendered harmless. This solid at the bottom is called as sludge. Fatty substance rise to the top. Supernatant liquid contains microorganisms, and is allowed to be collected in trenches. It spreads in soil and organic matter gets oxidized.</p> <p>Diagram: (1 Mark)</p> 	
(e)	<p>With the help of a neat labelled diagram describe the structure of virus (1 mark for neat labelled diagram and 2 marks for description of structure)</p>	

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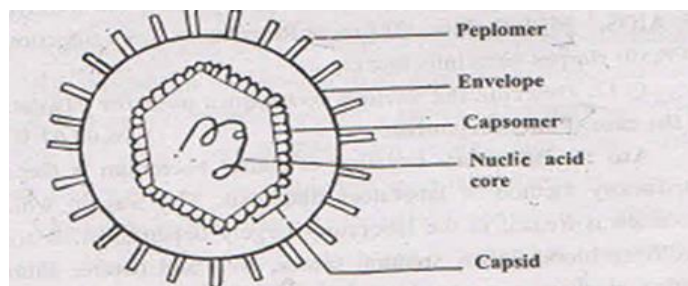
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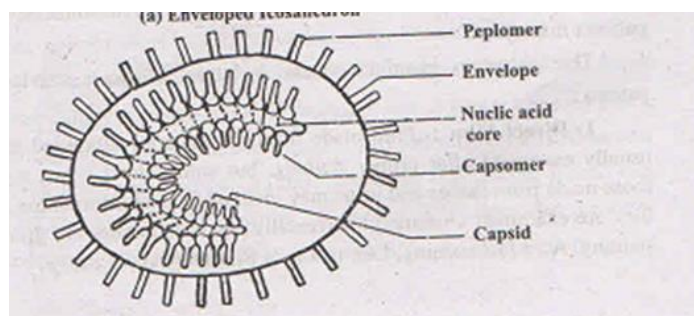
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Diagram:



OR



Description: (any 4 points for 2 marks)

- 1) Virus is ultramicroscopic entity on boundary of living and nonliving.
- 2) It does not possess the cellular organization.
- 3) Structurally it possesses a protein coat called 'capsid', enclosing nucleic acid at central core.
- 4) Capsid is made up of structural units called capsomers, where each capsomer is made up of 7 to 8 monomers.
- 5) Virus carries centrally located nucleic acid, either DNA or RNA but never the both. It is unusually ssDNA or dsRNA can be present as nucleic acid or the usual dsDNA or ssRNA.
- 6) Virus particle may be 'enveloped' or naked i.e. without envelop. Envelop may show projections called spikes.
- 7) Virus may show icosahedral (cubical) form or helical (rod like) form of structure. There may be combination of these two forms as seen in 'bacteriophage', with additional parts as neck, collar, base plate and tail fibres.
- 8) Pathogenicity of virus is because of nucleic acid, while antigenicity is because of capsid and envelop (when present)

(f) Explain in detail Cardio-Pulmonary Resuscitation (CPR) (1 mark each for each step)



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CPR is most important lifesaving first aid procedure in patients whose spontaneous respiration has stopped and/or pulse is absent.

CPR can be done by ABC Formula – where –

A – stands for Airway Clearance

B - stands for Breathing

C – stands for Circulation or Cardiac Massage

1) Airway Clearance: (1 mark)

i) Victims' mouth is opened and cleaned by clean cloth by first aider to remove debris, impurities or secretions so as to prevent blocking airway.

ii) Now head position of victim is changed so that airway is not blocked by tongue fall-back.

iii) Crowd surrounded victim should be given by placing mouth on victims' nose.

2) Breathing –(1 mark)

i) If breathing is stopped, mouth to mouth respiration i.e. artificial respiration is given, after cleaning mouth.

ii) First aider should pinch nose of patient tightly by one hand, breath in lungful of air and breath out entire air forcefully in patients' airway by tightly sealing mouth on patients' mouth.

iii) Expansion of chest of patient by 2-5cm should be observed that confirms air entering in to victim's lungs.

iv) For adult patient such 12 mouth to mouth breathing are given per minute.

v) In case if victims' mouth cannot be open due to any reason, mouth to nose artificial respirations should be given by placing mouth on victims' nose.

3) Circulation or Cardiac Massage (1 mark)

i) If patients' pulse is missing, to revive heart working chest massage is given.

ii) It is performed by pressing hard with both hands on victims' chest, two fingers above the lower end of sternum.

iii) First aider should exert pressure by heel of hands keeping hands exactly perpendicular to patients' chest i.e. area of compression.

iv) Pressure applied should be sufficient so that chest gets pressed by 1.5 to 4 cm.

v) Such chest massage is given 60-80 sufficient so that chest gets pressed by 1.5 to 4 cm.

v) Such chest massage is given 60-80 times per minute continuously.



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4		Answer any Four of the following	4x3=12M
	(a)	<p>Define First Aid. Mention major principles of First Aid. List the contents of first aid box. (1mark each for definition, principal & content of first aid box)</p> <p>First Aid Definition: (1Mark)</p> <p>First aid is defined as essential and emergency treatment given to an accident victim and victim of sudden illness before the medical help arrives.</p> <p>Major principles of First Aid are: (1Mark for any 4 points)</p> <ol style="list-style-type: none">1. To control hemorrhage if any2. To maintain respiration3. Prevention of shock4. Splinting or immobilization of fractures5. Careful observation of any other symptoms. <p>Contents of First Aid box: (1 Mark)</p> <p>The " First Aid Kit " ideally contains at least –</p> <ol style="list-style-type: none">i) Sterile gauze piecesii) Bandages of different sizes.iii) Adhesive plasters of different sizes.iv) Scissors and forcepsv) Antisepticsvi) Some medicines as Analgesics, and Packets of O.R.S	
	(b)	<p>Explain elements of minor surgery and dressing in short. (1 mark for enlisting of elements & 2 marks explanation)</p> <p>The ‘Elements of Minor Surgery and Dressings’ include mainly: (1 mark for any 4 points of the following)</p> <ol style="list-style-type: none">1) Common surgical instruments2) Glass and plastic instruments3) Rubber instruments4) Sutures and ligatures with suturing needles5) Dressings <p>(Any 4 of the following points for 2 marks)</p> <ol style="list-style-type: none">1) Common surgical instruments: These include towel clips, forceps, scissors, scalpels, needles and needle holder etc.2) Glass and plastic instruments- These include mainly different types of syringes	



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3) Rubber / PVC - These include Surgical gloves, urinary catheters, Ryle's tube, etc.
4) Sutures and ligatures- Sutures are any material used to sew or stitch together tissues until healing occurs. These can be Absorbable or Non absorbable.
5) Dressings- It is term applied to wide range of materials used for dressing of wound and includes different types of bandages, adhesive tapes.
6) There are different "antiseptics" commonly used as- AF Lotion, Eusol, Magsulf solution, Tincture benzoin, Tincture iodine

(c) Define fertility (1 Mark) and give the factors affecting fertility (1 Mark for definition & 2 Marks for factors affecting)

Fertility Definition (1 mark)

Fertility means the ability to produce off springs or children.

Factors affecting fertility : (2 marks-any 4 of the following points may be considered, each point carries ½ mark)

1. Age at marriage- The fertility data on national scale reveals that females who marry before the age of 18 gave birth to larger number of children than those who married later. Early marriage is a common and long established custom in India. But according to the child Marriage Restraint Act — 1978, the legal age at the time of marriage should be, 18 years for girls and 21 years for boys

2. Duration of married life-

It has been observed that 10-25 percent of all births occur within 1-5 years of married life,

50-55 percent of all births within 5-15 years of married life, but after 25 years of married life it is very low. This data suggests that family planning efforts should be concentrated in the first few years of married life.

3. Spacing of children-

Postponement of births or spacing of children significantly declines the fertility rate.

4. Education-

Literacy helps to decline the fertility rate. It has been observed that the total fertility rate is more among illiterate than among the literate.

5. Economic status-

There is inverse relationship between economic status and fertility rate. More the per capita income of the family less is the birthrate. The world population conference in fact stressed that "Economic development is the best contraceptive."

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6. Religion and caste-

Muslims have higher fertility rate than Hindus and Hindus have higher fertility rate than Christians. Amongst Hindus, lower castes seem to have a higher fertility rate than higher castes.

7. Nutrition-

The economic status and nutrition are directly related to each other. But there is indirect effect of nutrition on fertility rate. All well fed societies have low fertility and poorly fed societies high fertility rate.

8. Family planning-

Family planning is an important and key factor in reducing the fertility

(d) **Name the methods for small scale purification of water. Draw a well labelled diagram for slow sand filter. (1 ½ marks each for Small scale purification of water and diagram of slow sand filter)**

Methods for small scale purification of water: (1½ marks for any three of the following methods)

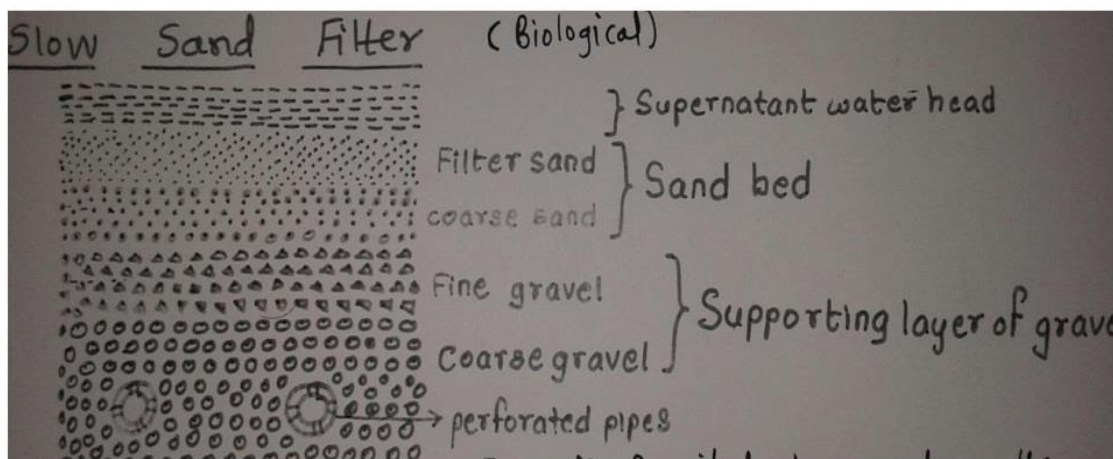
a) Boiling:

b) Chemical Disinfection: By use of Bleaching powder or Chlorinated lime, potassium permanganate, iodine

c) Filtration: - by use of ceramic filters like Pasteur Chamber land filter, Berkefeld filter and Katadyn filter.

d) Disinfection of wells

Diagram of slow sand filter (1 ½ Marks)



Schematic representation of the slow sand filter bed

OR

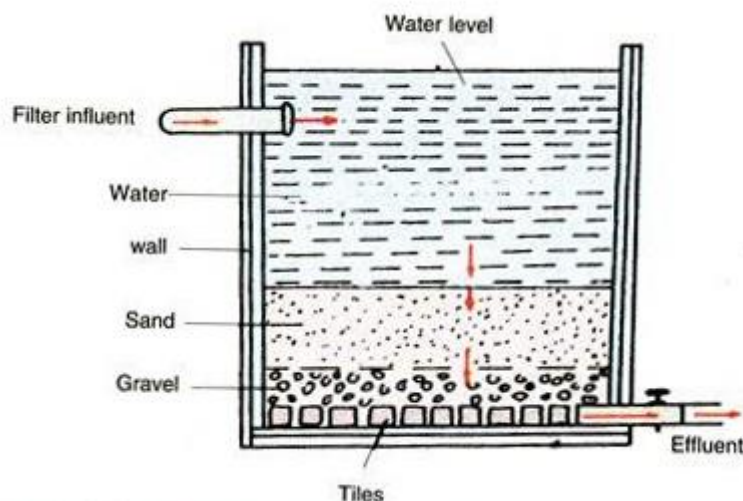
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(e) **Define Epidemiology. Differentiate between case control study and cohort study (1 mark for definition & 2 marks for differentiation)**

Definition: (1 mark)

Epidemiology is the study of the distribution and determinants of health related events and diseases in the population and also the application of this knowledge to control health problems.

Differentiation between Case control study and Cohort study: (2 marks)

Case Control Study

- Retrospective study
- From effect to the cause
- Studying the disease and see if you can associate risk *factors* to it.

Cohort Study

- Prospective study
- From cause to the effect
- Studying the risk factor to see if disease is associated with it

(f) **Give causes, prevention and control of blindness. (Causes 1 mark i.e. ½ mark for any two points, prevention and control of blindness 2 marks)**

Blindness is defined as ' visual acuity of less than 3/60 (Snellen) or its equivalent.

'Causes: (1 Mark for any 2 points)

- i) Vitamin A deficiency due to malnutrition and disease like measles can extremely weaken the vision.
- ii) Cataract, glaucoma, trachoma and other eye infections are common causes.



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- iii) Congenital disease, tumour of eye, retinal detachment, diabetes, hypertension, and diseases of nervous system.
- iv) Persons working in industries and mines as occupation gets eye injuries often.
- v) Use of infected kajal and treatment by quacks can also lead to blindness.
- Prevention and control: (2 Marks)**
- Improving nutrition particularly related to Vitamin A intake.
 - Proper and timely treatment of infectious diseases of eye.
 - Improving safety measures and working conditions at occupation places.
 - Regular eye checkup of children in schools followed by health education helps to prevent blindness

Q.5

Answer any FOUR of the following :

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(a)

Discuss in brief about Nosocomial infections. How it can be prevented?

Description: (2 marks)

Nosocomial Infections:

These are also called Hospital Acquired Infections and defined as infection that appears in patient because he/she visited hospital and which is not related with disease or cause for which patient is not admitted to the hospital. Eg. Surgical wound infections, tetanus, Serum Hepatitis, HIV infection, UTI, certain RTI, etc.

Prevention of Nosocomial Infections: (1 mark)

1. Strict sterilization measures during surgery.
2. Frequent checkup of hospital staff attending patient for any communicable infection.
3. Proper and immediate disinfection of urine, stools and sputum of patient.
4. Sanitation actions promptly and regularly taken.
5. Disinfection of operation theatre as regular required.
6. Disinfecting room after patient is discharged or after death of patient.
7. Supply of safe water and food to the patients.

(b)

Explain various indicators of health in short. Indicators of Health:

These are all those changing factors which indicate health status of individual and community.

Indicators are : (Any six indicators of the following indicators, $\frac{1}{2}$ mark each)

1. Mortality Indicator: It is number deaths per 1000 population per year, in given particular area.
2. Infant Mortality Rate: It is number of deaths of infants per 1000 live births per



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	<p>year for given particular area.</p> <ol style="list-style-type: none">3. Expectancy of Life: It is estimating average number of years likely to be lived by a person, if current age specific mortality rates are applied.4. Morbidity Indicators: It is status between health and death that actually tells about disease situation in the community. It is more sensitive than mortality indicator.5. Disability Rate Indicators: This tells about health status between disease and death, where it can be event type or person type indicator.6. Nutritional status indicators: It is positive health indicator that mainly considers anthropometric measurements of pre-school children, children at school entrance age, and prevalence low birth weight (less than 2.5 Kg).7. Utilization Rates : These indicates the extent to which health care facilities and services are used by population in particular area for given time. It is influenced by individual additives, services availability and services accessibility.8. Indicators of Social and Mental Health: These are indirect indicators of which few examples are suicide, murder, other violent act, crimes, road accidents, drug abuse, alcoholism, neglected youth, battered wife and battered children etc.9. Environmental Indicators: These mainly tell about quality of physical and biological environment; mainly concern with different pollutions, refuse, disposal, toxic food and drinks etc. It covers supply of safe and potable water and proper sanitation facilities to population.	
(c)	<p>Mention and give functions of any six minerals present in the body. (Functions of any 6 minerals of the following. $\frac{1}{2}$ Mark for each mineral)</p> <ol style="list-style-type: none">1. Calcium: Functions for growth and healthy maintenance of bones and teeth. Also functions for one important blood clotting factor.2. Phosphorus: Required for proper development of bones and teeth and to prevent dental caries and stunted growth.3. Iron: Most important element needed for synthesis of respiratory pigment the Haemoglobin.4. Iodine: The micronutrient needed for formation of thyroxin hormones as T_3 and T_4, and to prevent simple goiter.5. Zinc: It is important constituent of vary important enzyme, the carbonic anhydrase. It is also needed for actions of dehydrogenases and	



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		<p>carboxypeptidases. It is also needed in polymerization of insulin.</p> <p>6. Copper: It is trace element present in some enzymes and it plays important role in incorporating iron in Hb.</p> <p>7. Sodium: It plays important role in muscle contraction physiology.</p> <p>8. Magnesium: It is essential for normal metabolism of calcium and potassium. Also it is cofactor for some enzymes to work.</p> <p>9. Chlorine: It plays important role in regulation of osmotic pressure and in body water balance maintenance. Also needed for production of HCl in gastric juice.</p> <p>10. Cobalt: It forms integral structural part of vitamin B₁₂ And it is required for activation of enzymes as oxidoreductase, methyl transferase etc.</p> <p>11. Manganese: It is essential for normal bone structure and it functions as cofactor or activator for many enzymes as pyruvate carboxylase , phosphoglucosmutase and hexokinase.</p> <p>12. Sulphur: Sulfur containing amino acids are important constituents of body proteins as keratin and chondroprotein also it forms -SH group that acts as active center of enzymes and involved in tissue respiration physiology.</p> <p>13. Potassium: It helps for various intracellular activities, for contraction of muscles, for transmission of impulses and to maintain electrolyte balance in the body.</p>	
	(d)	<p>What are intrauterine devices? Give their advantages.</p> <p>Intrauterine devices: (1 mark)</p> <p>Intrauterine devices are the contraceptive devices used by women, being fitted in uterus, which prevent conception either by affecting sperm survival or conditions unfavorable for gametes or making conditions unsuitable for embryo implantation.</p> <p>Advantages: (2 marks for any 4 of the following points)</p> <ol style="list-style-type: none">1. Once inserted, IUD is effective for a longer period.2. It is reversible, safe and effective method.3. It is cheap method of contraception.4. There are no systemic side effects.5. No need of continuous motivation or daily administration.6. IUD insertion procedure is simple and takes only few minutes.	
	(e)	<p>Name the methods for solid waste disposal and explain any one. (List of methods 1 Mark. Explanation of any one of the following method 2 Marks)</p>	



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Methods of solid waste disposal :

- i) Dumping
 - ii) Sanitary landfill or Controlled tipping
 - iii) Burning or Incineration
 - iv) Composting
 - v) Burial
- i) **Dumping:** Dry refuse is mainly dumped in low lying areas which help not only in disposal but also in reclamation of land. By action of bacteria, the volume of the refuse decreases considerably in volume and is converted gradually into humus. It is not an ideal method. It causes public nuisance, attracts insects and animals. It causes air and water pollution.
- ii) **Controlled tipping or sanitary landfill:** This is the most satisfactory method of refuse disposal. In this method a trench is dug. The refuse is compactly dumped in these pits and at the end of each working day is covered with earth, when trench is full, again it is covered with earth and compacted. In this method the chemical and bacteriological processes decompose the refuse into simple substances with generation of heat. The refuse is fully decomposed at the end of 6 months and can be used as manure.
- iii) **Incineration or Burning:** Refuse can be disposed of hygienically by burning. It requires special equipment called as incinerator. It is a hollow cylinder made of metal, the refuse is put on the land and covered with the incinerator. Hospital refuse which is particularly dangerous e.g. infectious material is best disposed off by burning.
- iv) **Composting:** It is a method of combined disposal of refuse and night soil. The basic principle is, when the refuse and night soil (excreta) are dumped in pit and covered with earth there is anaerobic decomposition. The heat produced during decomposition kills the organisms and ultimately compost is obtained, which is used as manure. In a big trench, layers of 15 cm refuse alternating with 5cm layer of excreta are placed on one another till it is full.
- v) **Burial:** It is useful for small scale disposal like camps. In a small trench or pit the refuse is collected and at the end of each day it is covered with 20 - 30 cm of earth. The contents of the pit may be taken out after 4-6 months and used on the fields.



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	(f)	<p>Define fracture. Name types of fracture and give first aid treatment for fracture. (Fracture definition 1Mark, Types of fracture 1Mark & First aid treatment 1 Mark)</p> <p>Definition:</p> <p>Fracture is defined as a break in a bone or a crack in a bone, which may be caused by accident or violent act.</p> <p>Types of fractures:</p> <ol style="list-style-type: none">1. Simple or close fracture2. Compound fracture3. Complicated fracture4. Comminuted fracture <p>First aid treatment for fracture:</p> <ol style="list-style-type: none">1. Control bleeding if any by applying pressure bandage.2. Cover all wounds with sterile dressings.3. Immobilize the fracture parts immediately by using bandages or splints. (It is a support for a broken bone like wooden plank, Cardboard, Metal etc.)4. Analgesics may be given, if there is pain.5. Shift the patient to the hospital as early as possible.	
6		<p>Write causative agent, mode of transmission symptoms and control of following : (any four) (Causative agent 1 Mark, Mode of transmission 1 Mark, Symptoms 1 Mark, Control Measures 1 Mark.)</p>	4X4=16M
	(a)	<p>Plague</p> <p>Causative Agent: Yersinia pestis</p> <p>Mode of Transmission :</p> <p>The fleas feed on rats and infect them. The infected rats die. After the death of the rat the fleas leave the rats in search of food. These fleas may bite human beings. While biting, the fleas regurgitate the plague bacteria from stomach and thus infect the man during next blood meal. In later stages of human plague Y.Pestis may be expectorated and man to man spread may occur by droplets.</p> <p>Symptoms:</p> <ol style="list-style-type: none">1. Plague organisms in body reach lymph nodes and produce severe inflammatory response.	



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2. Patient develops sudden fever, chills, headache and inflammation of lymph glands.
3. In few days enlarged and tender (bubos) develop in groin, often in axilla or neck.
4. Rapid toxemia develops along with rapid pulse rate, hypotension and mental confusion.
5. Bubonic plague develops into septicaemic plague, where blood stained sputum with plague bacilli is expectorated.
6. Finally develops pneumonic plague, where patient expectorates large amount of blood stained, frothy, highly infective sputum; which is followed by cyanoses and death.
- Control:**
1. Early diagnosis and immediate isolation of detected case of patient.
 2. Immediate notification of even single case identified.
 3. Proper disinfection and disposal of sputum of patient.
 4. Use of tetracycline 500 mg to 2 g depending upon disease severity.
 5. Control of rats by different methods and control of rat fleas by use of DDT and BHC.
 6. Vaccination

(b)

Syphilis :

Causative agent: Treponema palladium

Mode of Transmission:

1. Sexual contact with infected person.
2. Affected mother to child.

Symptoms: Headache, sore throat, irregular fever, cutaneous rash, lesions on skin, bone, tongue, testes, liver, aorta etc.

Control:

1. Avoid unsafe sexual contact
2. Penicillin injection.

(c)

Rabies

Causative Agent : Lyssa virus type 1(Family Rhabdoviridae)

Modes of Transmission :

1. Bite of rabied dog or cat, as saliva of such animals carry the virus.
2. Transmission by droplet of patient or carrier, saliva of affected animal or human carries virus in large number. Licks on abraded skin or mucosa can transmit disease.



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	<p>Symptoms : These include headache,malaise,sore throat,slight fever,,pain and tingling at the bite site,hydrophobia,intolerance to bright light,noise,aerophobia.</p> <p>Control :</p> <ol style="list-style-type: none">1. Pre-exposure or post-exposure Antirabies vaccine is given2. There is no specific treatment to treat rabies patient but symptomatic treatment is given, as patient is isolated in dark room.3. To control stray dog population is also important as most prominent rabies transmission is by rabid dog bite.	
(d)	<p>Poliomyelitis</p> <p>Causative agent: Poliomyelitis virus serotype I or II or III.</p> <p>Modes of Transmission:</p> <ol style="list-style-type: none">1. Main transmission is through Faeco-oral route.2. Another route is the droplet infection, this occurs in the acute phase of disease when the virus occurs in the throat. Close personal contact with an infected person facilitates droplet infection. <p>Symptoms :</p> <p>In 90% of cases there are no symptoms. About 8% show mild illness and 1-2% suffer from major illness when the virus attacks CNS and produces varying degrees of paralysis.</p> <p>Control :</p> <ol style="list-style-type: none">1. Most important and only effective way to prevent polio is vaccination, commonly OPV2. Other prevention way is to improve and keep personal hygiene by proper cleanliness and sanitation.3. Community health education is also important way to prevent this disease.4. In India PPIP (Pulse Polio Immunisation Programme) as mass immunization programme is under operation for national polio eradication.	
(e)	<p>Diphtheria</p> <p>Causative Agent : Corynebacterium diphthriae</p> <p>Modes of Transmission</p> <ol style="list-style-type: none">1. Most common spread by droplets released by patient or carrier.2. Transmission also takes place through bacilli contaminated droplet nuclei.	



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3. Spread by direct contact with infectious cutaneous lesions.
4. Cups, handkerchiefs, toys, thermometers, etc. contaminated by nasopharyngeal secretion of patient or carrier can also spread this infection.

Symptoms :

There is difficulty in swallowing and patches of greyish yellow membrane appear over tonsils, throat. Swabs from this membrane show the presence of organisms.

Control :

1. Most effective way is to give DPT vaccine
2. Early detection of disease, followed by complete treatment.
3. Treatment with antibiotics such as Erythromycin
4. The isolation of detected cases prevents effectively the disease spread.

(f)

Tetanus

Causative Agent : Clostridium tetani

Modes of Transmission :

1. Main transmission is through contamination of wounds by tetanus spores.
2. The injuries that can cause tetanus are pin prick, abrasion, puncture wound, burn, human bite, animal bite, stings, unsterile injections or surgical instruments, compound fractures, etc.

Symptoms :

1. Muscular rigidity that remains throughout illness.
2. Spasmodic pains of voluntary muscles , particularly facial muscles, muscles of back and neck and of lower limbs & abdomen.
3. Often characterized by “ lock-jaw “.

Control :

1. Immunizing children by DPT and DT vaccines.
2. Immunization with TT
3. It is preferred to immunize patient actively as well as passively after an injury by ATS.
4. Complete sterility measures undertaken during child birth and any surgery.
6. Benzathine penicillin can be given by IM route.