MT

2018 ___ ___ 1100

MT - SCIENCE & TECHNOLOGY - II (72) - SEMI PRELIM - I : PAPER - 6

Time : 2 Hours **(Model Answer Paper)** **Max. Marks : 40**

A.1. (A) Fill in the blanks :

(1) Bacteria used to clear oil spills are called **Hydrocarbonoclastic bacteria (HCB).** **1**

(2) Cells of the embryo undergo repeated **mitotic** division. **1**

(3) **Interferon** is used is the treatment of viral diseases. **1**

A.1. (B) Match the columns: **2**

Column 'A'	Column 'B'
(1) Tahsildar	(e) Taluka disaster management
(2) Prime Minister	(d) National disaster management
(3) Sarpanch	(b) Village level committee
(4) Collector	(a) District disaster management

A.1. (C) Choose the correct alternative and rewrite the statement :

(1) In 2014 there had been a huge **landslide** in the village Malin. **1**

(2) **Rhizobium** bacteria present in root nodules of leguminous plants help in nitrogen fixation. **1**

(3) Yeast reproduces by **budding** method of asexual reproduction. **1**

(4) Stem cell preserved in sterile vials are kept in liquid nitrogen at **–135°C to –190°C.** **1**

(5) The photovoltaic cells convert **solar** energy into electrical energy. **1**

A.2.	**Answer the following questions : (Any Five)**	
(1)	**Sewage management :** (i) In villages, domestic sewage is disposed off either in nearby soil or in biogas plant. (ii) In cities sewage is carried to processing unit for microbial action. (iii) Microbes are mixed with sewage to decompose compounds as well as pathogens. (iv) They release Methane and CO_2 by decomposition of carbon compounds present in sewage. (v) Phenol oxidising bacteria decompose the xenobiotic chemicals present in sewage. (vi) The sludge that settles down in this process can again be used as fertilizer. (vii) Water released after microbial treatment is environmentally safe. (viii) Microbes are used for bioremediation of environment polluted due to sewage.	**2**
(2)	(i) Microbe's rapid growth being non-toxic to humans, reduction in cultivation cost, production of additional enzymes, compounds to inhibit contaminant micro-organisms etc. has increased the use of mutant strains in industrial microbiology. (ii) Also, to prevent them from being attacked by viruses.	**2**
(3)	(i) Fruits are perishable agro - produce. (ii) Fruits contain vitamins, proteins, minerals and dietary fibres. (iii) There is a need to process fruits in order to increase their storage or shelf - life significantly. (iv) Various products are prepared from fruits like chocolates, jams, juices and jellies and are used daily. (v) Fruit processing is done in such a way that it can be used throughout the year. (vi) Fruit processing include various methods ranging from cold storage to drying, salting, air tight packing, pickling, evaporating etc.	**2**
(4)	(a) Tiredness, headache, insomnia, forgetfulness, tinnitus, joint pains and problems in vision. (b) Hacking of information, video piracy, sending derogatory messages, cyber bullying, introducing computer viruses, sending vulgar pictures, exchange of information and phone number, etc. are activities under the jurisdiction of cyber crime laws.	**2**

(5) Objectives of disaster managements are as follows: **2**

(i) Disposal of human life suffered by human being during the calamity and release of the people.

(ii) Supply of essential commodities to the people reduce the effect of disaster.

(iii) To restore human life in the region by creating reconciliation in disaster.

(iv) Rehabilitate disaster victims.

(v) Considering protective measures in disaster, such disaster will not repeat in future and to take care to reduce their intensity.

(6) 30 mA electric current can be obtained from 1cm^2 silicon solar cell and 0.5V potential difference is obtained. **2**

$\therefore$ Since cells i, ii are in series,

Potential difference = Sum of the individual potential differences.

$V_a = V_1 + V_2$

$\therefore \quad = 0.5 + 0.5$

$\therefore \quad V_a = 1V$

Electric current will be the same I_a = 30 mA

Since iii, and iv are in series,

$V_b = V_3 + V_4$

$= 0.5 + 0.5$

$\therefore \quad V_b = 1\ V$

Since i and ii, iii and iv are in parallel,

$\therefore$ Potential difference will remain the same.

$\therefore$ Total electric current (I) $= I_a + I_b$

$= 30 + 30$

$= 60$ mA

$\therefore$ Potential difference is 1V and electric current of 60 mA can be obtained.

A.3. Answer the following questions : (Any Five)

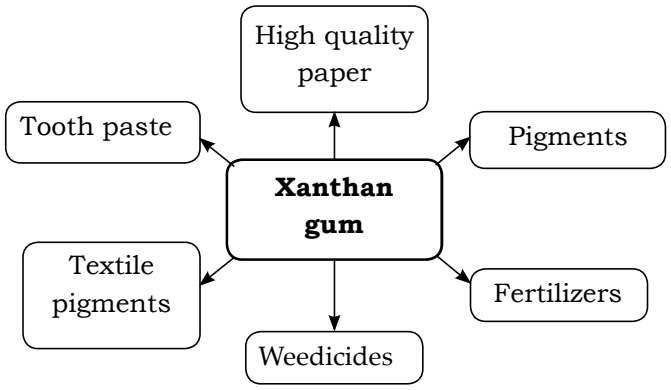
(1) (i) Taking into consideration the scope of disaster, some of the important facts must be thought over. They are (a) Pre-disaster phase (b) Warning phase (c) Emergency phase (d) Rehabilitation phase (e) Recovery phase (f) Reconstruction phase. **3**

(ii) Taking into consideration the nature and scope of disaster, three aspects of disaster are important for common citizens.

(a) Phase of emergency : Important character of this phase is that

	maximum lives can be saved by quick actions during this phase only. Various actions like search and rescue operations, medical assistance, first aid, restoring communication services, removing the people from affected area are expected in this phase. Gravity of disaster can be estimated in this phase only. (b) Transitional phase : Rehabilitation work starts in this phase, after subsidence of any type of disaster. It includes clearing of debris, restoring water supply, repairing roads etc. so that it helps to bring normalcy in public life. (c) Reconstruction phase: This is a highly complicated phase. People reconstruct their buildings and facilities like roads and water supply are restored. Farming practices are restarted. However, it takes a long time for reconstruction.	
(2)	(i) The first-aid training is extremely necessary for every citizen. (ii) Use of this knowledge is useful for offering help to the people around facing any disaster and injury. (iii) The first-aid measures differ from person to person according to the type and intensity of disaster. (iv) Victims of disaster need to be offered some primary help before actual medical treatment. First aid is useful in such circumstances. (v) First aid training can help in saving life in actual disaster time. (vi) First aid training helps people to face disaster with courage, maintain their moral and give psychological support, which can be provided to them by the people trained in first aid. (vii) Hence, it is necessary to take training of first aid.	**3**
(3)	(i) Crops developed with desired characters by integrating foreign gene with their genome are called as genetically modified crops. (ii) High yielding varieties with resistance to disease, alkalinity, weeds other stresses like extreme cold and drought are produced. (iii) A gene had been isolated from the bacterium Bacillus thuringiensis and integrated with the gene of cotton and brinjal. (iv) This improved variety - BT cotton, BT Brinjal kills the pests and yield is maintained. (iv) A gene synthesizing the vitamin A (beta carotene) has been introduced in the variety of rice. This variety contains 23 times more amount of beta carotene than the original variety. (v) Herbicide tolerant plant varieties are being developed. Due to this, it has become possible to selectively destroy the weeds.	**3**

(4) Complete the following conceptual picture with respect to uses. **3**



(5) Vinegar produced : **3**

(i) Vinegar is used in each country of the world to impart sour taste to food materials.

(ii) It is also used for preservation of pickles, sauce, ketch-up, chutneys. etc.

(iii) Chemically vinegar is 4% acetic acid (CH_3COOH).

(iv) Ethanol is obtained by the fermentation of carbon compounds like fruit juices, maple syrup, sugar molasses, starch of roots by yeast *Saccharomyces cerevisiae*.

(v) Microbial degradation of ethanol by mixture of bacterial strains - *Acetobacter* and *Glucanobacter* takes place.

(vi) Acetic acid and other by-products are obtained through it.

(vii) Acetic acid is separated from mixture by rarefaction.

(viii) Acetic acid is bleached with the help of potassium ferrocynide, and is then pasteurized.

(ix) A very small quantity of SO_2 gas is mixed to produce vinegar.

(6) **3**

(i) A - condenser, B - control Rods

(ii) The splitting of a heavy nucleus of Uranium to Barium, Krypton and three neutrons with release of energy is called nuclear fission.

(iii) (1) Products of nuclear fission called nuclear waste are all radioactive. The disposal of nuclear waste is a big challenge.

(2) Sometimes accident can occur which can leak harmful radiations.

(3) Radiation pollution can be most dangerous.

Q.4. Answer the following questions : (Any One)

(1) Usefulness of biotechnology: **5**

(i) Biotechnology has worked for human welfare.
(ii) There is considerable progress in the field of agriculture, pharmacy, plant as well as animal life.
(iii) Scientist have modified plants, animals, human beings using various techniques of biotechnology.
(iv) Biotechnology has modified shape, size, taste, seed/seedless fruits and vegetables.
(v) Reliable, rapid and consistent enzymes have been created which play a mojor role in food processing.
(vi) A number of dairy products are made available to us.
(vii) A number of human and animal diseases have found cure and prevention.
(viii) Biotechnology has modified plants to have their own pest resistant traits.
(ix) Diagnostic kits are available for various diseases.

Harmful effects of Biotechnology are as follows.

(i) High cost of genetic engineering apparatus.
(ii) Crosses between different species gives rise to hazardous organisms.
(iii) During experimentation when more Transgenic potatoes are grown, it can be life threatening
(iv) Thus biotechnology should be balanced.

(2) **5**

(i) Planet Earth has experienced many natural disasters.
(ii) Most of the disasters are unpredictable situations that have occurred in the Asian continent and the regions of Pacific ocean.
(iii) Huge loss of life and to the planet Earth have occurred due to such disasters.
(iv) Generally, such conditions of natural imbalance have been arisen due to greed and economic progress of human being.
(v) In reality, previous problems of several years have been fierce.
(vi) Due to population explosion, the basic needs is increased after the World War -II.
(vii) Condition of instability arises in the country due to various reasons like economic inequality, racial and religious differences etc.
(viii) Incidences like terrorism, abduction, social differences have been a routine now.
(ix) Production and use of harmful chemicals is under ban in developed countries. However, production of chemicals which can wipe out the human race is common in developing and poor countries.

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