NAMAKKAL DT

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SECOND MID TERM TEST, NOVEMBER - 2019

STANDARD - X

Time : 1.15 hrs **SCIENCE** **Marks: 50**

I. Choose the correct answer:- **8×1=8**

1) Which of the following frequency is audible to human ear?
   a) 50 KHz b) 20 KHz c) 500 KHz d) 20,000 KHz
2) Which one of the following is used to track the satellite?
   a) Tyndai effect b) Magnetic effect c) Doppler effect d) Heating effect
3) The isotope used for the treatment of cancer is
   a) I^{131} b) Fe^{59} c) Na^{24} d) Co^{60}
4) The equilibrium attained during the melting of ice is known as
   a) Chemical equilibrium b) Physical equilibrium
   c) Both Physical and Chemical d) Mechanical equilibrium
5) Which one of the following is used as anaesthetics?
   a) Carboxylic acid b) Ether c) Ester d) Aldehyde
6) The term ethno Botany was introduced by
   a) Khorana b) J.W.Harshberger c) Ronald Ross d) Hugo-de-vries
7) We can cut the DNA with the help of
   a) Scissors b) Restriction endonucleases c) Knife d) RNA ase
8) Which one of the following present in "HANS" causes cancer?
   a) Sugar b) Tobacco c) Chillipowder d) Salt

II. Answer any six of the following questions.

Question No.10 is compulsory:- **6×2=12**

9) Why does sound travel faster on a rainy day than on a dry day?
10) Calculate the energy released when one Kg of Radioactive substance undergoes nuclear fusion reaction. (Given velocity of light $C=3\times10^8\ ms^{-1}$)
11) How is ethanoic acid prepared from ethanol? Give the chemical equation.
12) Assertion (A): If hydrogen peroxide is poured on a wound, It decomposes into water and oxygen.
    Reason (R): The gaseous oxygen bubbles away as it is formed and thus prevent the formation of H_2O_2.
    a) A and R are correct, R explains A b) A is correct, R is wrong
    c) A is wrong, R is correct d) A and R are correct, R does not explain A.
13) How can you determine the age of the fossils?

14) State Whether 'True' or 'False'. If false, Write the correct statement.
   a) Golden rice is a hybrid
   b) In vitro fertilization means the fertilization does inside the body.
15) Select PUFA - Poly Unsaturated fatty acid food from the given list.
   Skinned Chicken, beef, pork, sunflower oil, Egg, Nuts, fatty fish, butter.
16) Write correct or wrong. It wrong, correct it.
   Alcohol consumption increases the amount of fat in blood and leads to heart attack.

III. Answer any four of the following questions. Qn.No.19 is compulsory: 4×4=16

17) Define Doppler effect. Give their applications.
18) Compare the properties of alpha, beta and gamma radiations.
19) The hydroxide ion concentration of a solution is 1×10^{-11}m. What is the P^H of the solution?
20) What is called homologous series? Give any three of its characteristics?
21) Give the methods of plant breeding to develop high yielding varieties?
22) Why couldn't the drug addicts and alcohol addicts leave their habits easily.

IV. Answer all the questions:- 2×7=14

23) What is an echo? (a) State two conditions necessary for hearing an echo
   (b) What are the medical applications of echo. **[or]**
   a) In auto Ionization reaction of water. $H_2O_{(l)} + H_2O_{(l)} \rightleftarrows$ _____
   b) Ionic product of water is mathematically expressed as _____
   c) In agriculture, the paddy crop require _____ type of soil and sugarcane require _____ type of soil.
   d) Identify the fast and slow reaction from the following:-
      i) $2Na + 2HCl \rightarrow 2NaCl + H_2$
      ii) $2\ Na + 2\ CH_3COOH \rightarrow 2CH_3COONa + H_2$.
   e) Identify the type of reaction.
      $Pb(NO_3)_2 + 2KI \rightarrow PbI_2\downarrow + 2\ KNO_3$.
24) How does fossilization occur in plants? **[or]**
   How Natural selection is a propulsion force to Evolution?

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SECOND MID TERM TEST – NOVEMBER - 2019

X - SCIENCE

TIME: 1.15Hrs **TENTATIVE ANSWER KEY** **MARKS : 50**

Q.N	PARTICULARS	MARKS
I. Choose the correct answer:		**8x1=8**
1.	b)20KHz	1
2.	c)Doppler effect	1
3.	d)Co^{60}	1
4.	b)Physical equilibrium	1
5.	b)Ether	1
6.	b)J.W. Harshberger	1
7.	b)Restriction endonucleases	1
8.	b)Tobacco	1
II. Answer any six of the following questions: Question No. 10 is compulsory		**6x2=12**
9.	❖ During rainy days, the humidity increases. ❖ When humidity increases, the speed of sound increases. ❖ Hence, we can hear sound from long distances clearly during rainy seasons. ❖ This shows that, sound travels faster on a rainy day than on a dry day.	2
10.	Mass defect in the reaction (m) = 1kg Velocity of light (c) = $3x10^8 ms^{-1}$ By Einstein's equation, Energy released. So $E = mc^2$ $E = 1x(3x10^8)^2$ $E = 9 \times 10^{16} J$	1 1
11.	Ethanoic acid is prepared in large scale, by the oxidation of ethanol in the presence of alkaline potassium permanganate or acidified potassium dichromate. $CH_3CH_2OH \xrightarrow[2[O]]{KMnO_4/OH^-} CH_3COOH + H_2O$ Ethanol Ethanoic acid	2
12.	a) A and R are correct, R explain A	2
13.	❖ The age of fossils is determined by radioactive elements present in it. ❖ They may be carbon, uranium, lead or potassium. ❖ It is used in paleobotany and anthropology for determining the age of human fossils and manuscripts. ❖ Radioactive carbon(C^{14}) dating method ❖ Carbon consumption of animals and plants stops after death and since then, only the decaying process of C^{14} occurs continuously. ❖ The time passed since death of a plant or animal can be calculated by measuring the amount of C^{14}. present in their body.	2

14.	a)False **Correct statement:** Golden rice is a genetically modified plants b)False **Correct statement:** In vitro fertilization means the fertilization taking place outside the body	1 1
15.	**Unsaturated foods:** Sunflower oil, Nuts, fatty fish	 2
16.	Wrong. **Reason:** Alcohol consumption increases various nerves disorder and also degenerated and tissue it erected tissues the linking of intestine and liver.	1 1
III. Answer any four of the following questions: **Q.No. 19 is compulsory**		**4x4=16**
17.	**Doppler Effect:** Whenever there is a relative motion between a source and a listener, the frequency of the sound heard by the listener is different from the original frequency of sound emitted by the source. This is known as "Doppler effect". **Applications:** (a) **To measure the speed of an automobile** The frequency shift, the speed of the car can be determined. This helps to track the over speeding vehicles. (b) **Tracking a satellite** Measuring the change in the frequency of the radio waves, the location of the satellites is studied. (c) **RADAR (RAdio Detection And Ranging)** In RADAR, radio waves are sent, and the reflected waves are detected by the receiver of the RADAR station. From the frequency change, the speed and location of the aeroplanes and aircrafts are tracked. (d) **SONAR** In SONAR, by measuring the change in the frequency between the sent signal and received signal, the speed of marine animals and submarines can be determined.	2 2
18.	See table below	4

Properties	α rays	β rays	γ rays
What are they?	Helium nucleus ($_2He^4$) consisting of two protons and two neutrons.	They are electrons ($_{-1}e^0$), basic elementary particle in all atoms.	They are electromagnetic waves consisting of photons.
Charge	Positively charged particles. Charge of each alpha particle = +2e	Negatively charged particles. Charge of each beta particle = –e	Neutral particles. Charge of each gamma particle = zero
Ionising power	100 time greater than β rays and 10,000 times greater than γ rays	Comparatively low	Very less ionization power
Penetrating power	Low penetrating power (even stopped by a thick paper)	Penetrating power is greater than that of α rays. They can penetrate through a thin metal foil.	They have a very high penetrating power greater than that of β rays. They can penetrate through thick metal blocks.

	Effect of electric and magnetic field	Deflected by both the fields. (in accordance with Fleming's left hand rule)	Deflected by both the fields; but the direction of deflection is opposite to that for alpha rays. (in accordance with Fleming's left hand rule)	They are not deflected by both the fields.	
	Speed	Their speed ranges from 1/10 to 1/20 times the speed of light.	Their speed can go up to 9/10 times the speed of light.	They travel with the speed of light.	

19.

$[OH^-] = 1\times 10^{-11}$ M

$POH = -\log_{10}[OH^-]$

$= -\log_{10}[10^{-11}]$

$= -(-11 \times \log_{10}{}^{10})$

$= -(-11) = 11$

$pH + pOH = 14$

$pH = 14 - pOH = 14 - 11 = 3$

2

2

20.

Homologous series is a group or a class of organic compounds having same general formula and similar chemical properties in which the successive members differ by a - CH_2 group.

2

Characteristics of homologous series (Any 3)

2

- Each member of the series differs from the preceding or succeeding member by one methylene group ($-CH_2$) and hence by a molecular mass of 14 amu.
- All members of a homologous series contain the same elements and functional group.
- They are represented by a general molecular formula. e.g. Alkanes, C_nH_{2n+2}.
- The members in each homologous series show a regular gradation in their physical properties with respect to their increase in molecular mass.
- Chemical properties of the members of a homologous series are similar.
- All the members can be prepared by a common method.

21.

1. Introduction of new varieties of plants
2. Selection
3. Polyploidy breeding
4. Mutation breeding
5. Hybridization

Introduction of New Varieties of Plants

- It is a process of introducing high yielding varieties of plants from one place to another.
  Such plants are called as **exotic species**.
- These imported plant materials may carry pathogens and pests, hence they are thoroughly tested in a plant quarantine before being introduced to the fields.
- e.g *Phaseolus mungo* was introduced from China.

Selection

- Selection is one of the oldest methods of plant breeding in which individual plants or groups of plants are sorted out from a mixed population based on the morphological characters.

Methods of selection There are three methods of selection. They are

1. Mass selection 2. Pureline selection 3. Clonal selection

1. Mass selection

- Seeds of best plants showing desired characters are collected from a mixed population.
- The collected seeds are allowed to raise the second generation. This process is carried out for seven or eight generations.
- At the end, they will be multiplied and distributed to the farmers for cultivation. Some common examples for mass selection are groundnut varieties like TMV–2 and AK–10. Its schematic representation is given below. 4

Pureline selection

- Pureline is "the progeny of a single individual obtained by self breeding". This is also called as individual plant selection.
- In pureline selection large numbers of plants are selected from a self-pollinated crop and harvested individually.
- Individual plant progenies from them are evaluated separately. Th e best one is released as a pureline variety.

Clonal selection:

- A group of plants produced from a single plant through vegetative or asexual reproduction are called **clones**. All the plants of a clone are similar both in genotype and phenotype.

Polyploidy Breeding:

- Sexually reproducing organisms have two complete set of chromosomes in their somatic cells. This is called **diploid** (2n).
- The gametic cells have only one set of chromosome. This is called **haploid.**
- An organism having more than two sets of chromosomes is called **polyploidy**

Mutation Breeding:

- Mutation is defined as the sudden **heritable change** in the nucleotide sequence of DNA in an organism.
- It is a process by which **genetic variations** are created which in turn brings about changes in the organism.
- The organism which undergoes mutation is called a mutant.

i) Physical mutagens :

Radiations like X-rays, α, β and γ-rays, UV rays, temperature etc. which induce mutations are called physical mutagens

ii Chemical mutagens :

Chemical substances that induce mutations are called chemical mutagens. e.g. Mustard gas and nitrous acid.

The utilisation of induced mutation in crop improvement is called **mutation breeding**.

Hybridization

- Hybridization may be defined as the process of crossing two or more types of plants for bringing their desired characters together into one progeny called **hybrid**.
- Hybrid is superior in one or more characters to both parents.
- *Triticale* is the first man- made cereal hybrid. It is obtained by crossing wheat (*Triticum durum*, 2n = 28) and rye (*Secale cereal*, 2n = 14). The F_1 hybrid is sterile (2n = 21). Then the chromosome number is doubled using colchicine and it becomes a hexaploid *Triticale* (2n = 42).

22.	❖ People use drugs and alcohol for many reasons. They may experiment or use just for fun, to relax, or to cope with emotions such as stress, depression, or anxiety. ❖ When drug or alcohol use turns from an occasional recreational activity into a habit that causes problems in a person's day-to-day life, it may become a substance use disorder or an addiction. ❖ The following reasons the drugs and alcohol addicts are not ready to leave their habits easily. ▪ The continuous use of turns into habit. So we cannot easily leave from the long term behavior. ▪ People think addiction is about a lack of willpower. ▪ They are not ready to face the real situation. ▪ They want to hide their stress, depression, etc with the help of alcohol and drugs.	4
IV. Answer all the questions:		**2x7=14**
23.	**Echo:** An echo is the sound reproduced due to the reflection of the original sound from various rigid surfaces such as walls, ceilings, surfaces of mountains, etc. **a) Conditions necessary for hearing echo:** The persistence of hearing for human ears is 0.1 second (i) Thus, the minimum time gap between the original sound and an echo must be 0.1 s. (ii) the minimum distance required to hear an echo is 17.2 m. The above criterion can be satisfied only when the distance between the source of sound and the reflecting surface would satisfy the following equation: $\text{Velocity} = \frac{\text{distance travelled by sound}}{\text{time taken}}$ $v = \frac{2d}{t}$ $d = \frac{vt}{2}$ Since, $t = 0.1$ second, then $d = \frac{v \times 0.1}{2} = \frac{v}{20}$ If you consider the velocity of sound as 344 ms^{-1}, the minimum distance required to hear an echo is 17.2 m. **b) Medical Applications of echo:** The principle of echo is used in obstetric ultra sonography, which is used to create real-time visual images of the developing embryo or fetus in the mother's uterus. This is a safe testing tool, as it does not use any harmful radiations.	2 2½ 2½
	(OR) a) $H_3O_{(aq)}^+ + OH^-_{(aq)}$ b) $Kw = [H_3O^+]\,[OH^-]$ c) acidic, Neutral d) i) Fast ii) Slow e) double displacement reaction (or) Precipitation reaction	1 1 2 2 1
24.	**1.Petrifaction** ❖ Minerals like silica slowly penetrate in and replace the original organic tissue and forms a rock like fossil. ❖ This method of fossilization can **preserve hard and soft parts**. ❖ Most bones and wood fossils are petrified.	

2.Mold and Cast

- A replica of a plant or animal is **preserved in sedimentary rocks**.
- When the organism gets buried in sediment it is dissolved by underground water leaving a hollow depression called a mold.
- It shows the **original shape but does not reveal the internal structure**.
- Minerals or sediment fill the hollow depression and forms a cast.

3.Preservation

- Original remains can be preserved in **ice** or **amber** (tree sap).
- They protect the organisms from decay.
- The entire plant or animal is preserved.

4. Compression

- When an organism dies, the hard parts of their bodies settle at the **bottom of the sea bed** and are **covered by sediment**.
- The process of sedimentation goes on continuously and fossils are formed.

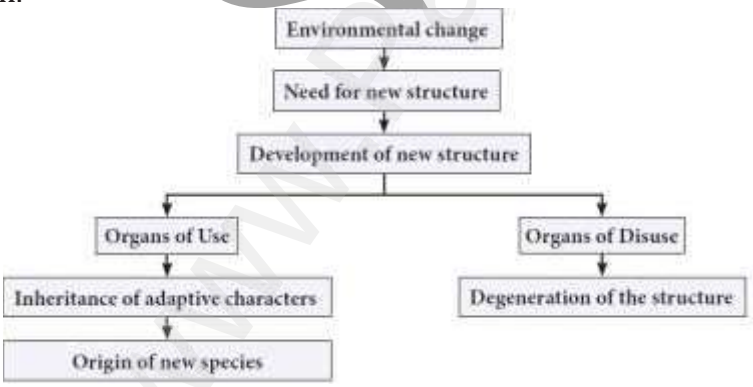
5.Infiltration or Replacement

- The **precipitation of minerals** takes place which later on infiltrate the cell wall.
- The process is brought about by several mineral elements such as silica, calcium carbonate and magnesium carbonate.
- Hard parts are dissolved and replaced by these minerals.

7

(OR)

Charles Darwin (1809-1882) was one of the great naturalist and philosopher of 18th century. He was born in England in 1809. While studying in college through his friendship with Professor J.S.Henslow he was fascinated towards nature. At that time the British Admiralty planned a **voyage of exploration** for 5 years on a ship named **H.M.S. Beagle** around **South America**. Dr Henslow was asked to nominate a young naturalist for the voyage. Darwin was given the opportunity. During his five years (1831–1835) voyage he visited many parts of **Galapagos island** and **Pacific island**. Darwin made elaborate observations on nature of the land, plants and animals of the regions he visited. He further worked for a period of 20 years to develop the theory of natural selection.



7

Darwin published his observations and conclusions under the name '**Origin of species**' in **1859**. The book of Darwin demonstrates the fact of evolution. It elaborates on the **theory of Natural selection** for evolutionary transformation,

Principles of Darwinism

i. Overproduction

Living beings have the ability to reproduce more individuals and form their own progeny. They have the capacity to multiply in a geometrical manner. This will increase reproductive potential leading to overproduction.

ii. Struggle for existence

Due to over production, a geometric ratio of increase in population occurs. The space to live and food available for the organisms remain the same. This creates an intense competition among the organisms for food and space leading to struggle. The struggle for existence are of three types:

a. **Intraspecific struggle:**

Competition among the individuals of same species.

b. **Interspecific struggle:**

Competition between the organisms of different species living together.

c. **Environmental struggle:**

Natural conditions like extreme heat or cold, drought and floods can affect the existence of organisms

iii. Variations

The occurrence of variation is a characteristic feature of all plants and animals. **Small variations** are important for evolution. According to Darwin **favourable variations** are useful to the organism and **unfavourable variations** are harmful or useless to the organism.

iv. Survival of the fittest or Natural selection

During the struggle for existence, the organisms which can overcome the challenging situation, **survive** and **adapt** to the surrounding environment. Organisms which are unable to face the challenges, are unfit to survive and disappear. The process of selection of organisms with favourable variation is called as natural selection.

v. Origin of species

According to Darwin, **new species originates by the gradual accumulation of favourable variations** for a number of generations.