# Board Paper of Class 12 Science Term-II 2022
# Biology Delhi(Set 1)

**Total Time: 120**

**Total Marks: 35.0**

**Section A**

**Q.No.1:** Ringworm is one of the most common infectious fungal disease in humans. Name any **two** genera of fungi which cause ringworm and state any of its **two** symptoms. **Marks:[2.00]**

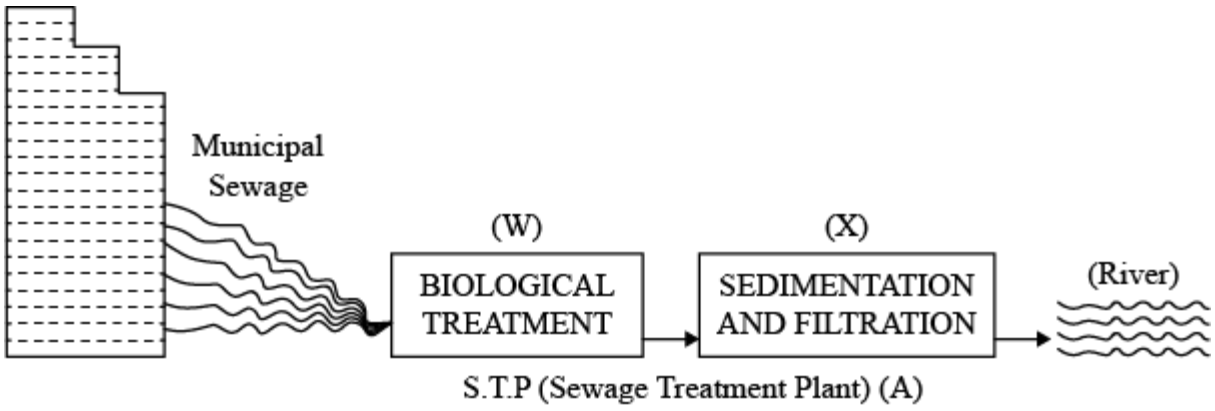
**Q.No.2:** Can we use slurry of human excreta instead of cowdung slurry to produce biogas in a typical biogas plant? Support your answer giving reasons. **Marks:[2.00]**

**Q.No.3:** State the mode of action of cocaine on human body. Write the scientific name of the source plant it is obtained from.

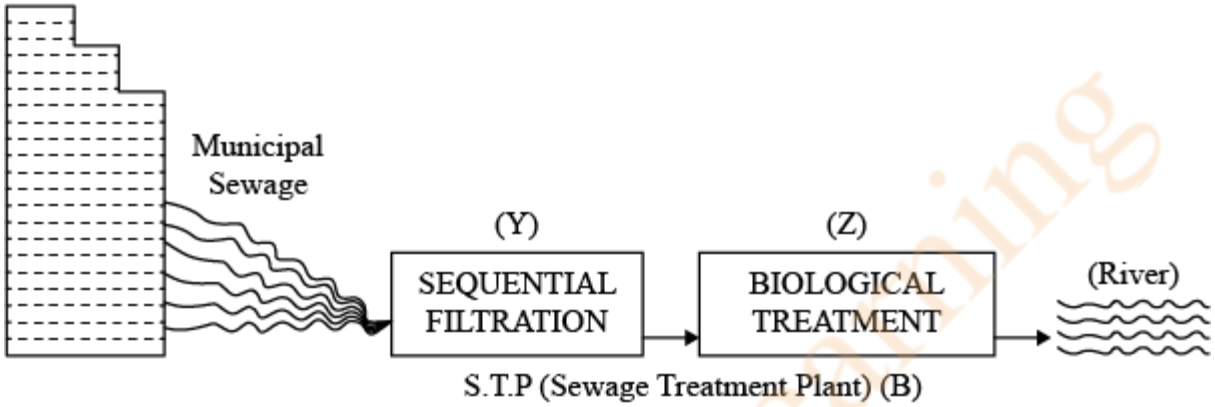
**OR**

Enumerate four most common warning signs of drug and alcohol abuse amongst the youth. **Marks:[2.00]**

**Q.No.4:** Study the given diagram of Sewage Treatment Plant (S.T.P.) and answer the questions that follow:




S.T.P (Sewage Treatment Plant) (A)




S.T.P (Sewage Treatment Plant) (B)

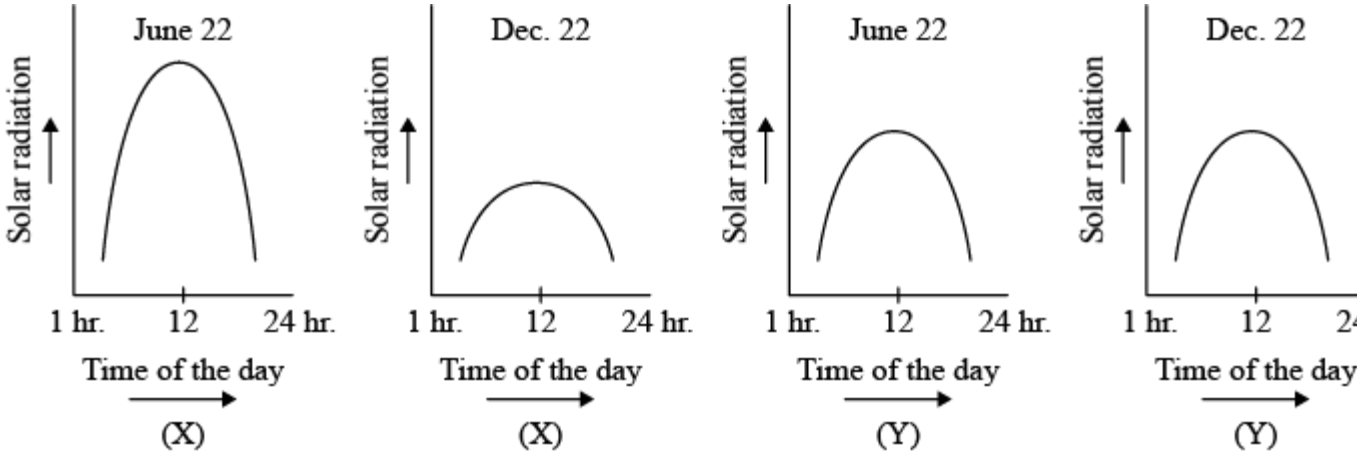
(a) Which one of the two 'S.T.P' (A) or (B) will be more effective in treating the human excreta in the municipal waste?
(b) Write the steps followed in carrying the treatment of the sewage in step (Z), once the BOD of sewage is reduced significantly till it is passed on to the "anaerobic sludge digesters". **Marks:[2.00]**

**Q.No.5:** Write the best method to measure the population density of a single Banyan tree in comparison to 20 ***Parthenium*** weeds in a forest by an ecologist. Explain and justify your answer. **Marks:[2.00]**

**Q.No.6:** (i) Write the observations made at the end of Connell's field experiment on barnacles on the rocky sea coasts of Scotland.
(ii) Name any two categories of organisms that in general are adversely affected by competition.

**OR**

The graphs (X) and (Y) given below depict the diurnal variations in the solar radiations in the month of June (Summer) and in December (Winters):




(i) Which of the two graphs depicts tropical region and temperate regions respectively?
(ii) Which of the two regions (X) or (Y) will show high biological diversity and why? **Marks:[2.00]**

## Section B

**Q.No.7:** 'An HIV patient normally doesn't die of 'AIDS', but death is caused due to many other infections.' Do you agree with the statement? Give explanatory reasons in support of your answer. **Marks:[3.00]**

**Q.No.8:** (a) Why do doctors have to carry many tests for selecting a person to be a suitable donor for someone who is going for an organ transplant and not take the organ from just anybody? Explain giving reason.
(b) Name the drug a patient who has undergone a successful organ transplant, has to take all his/her life. **Marks:[3.00]**

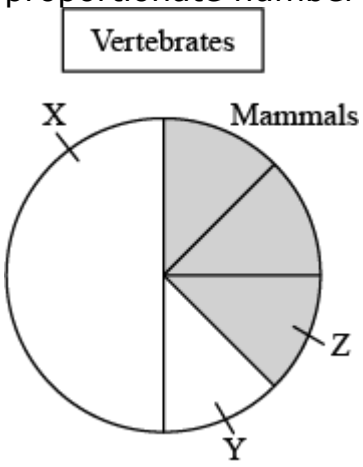
**Q.No.9:** A cell free method of amplifying DNA first developed in the mid 1980's revolutionized the field of biotechnology. Name the method and explain the basic steps of the technique involved. **Marks:[3.00]**

**Q.No.10:** Given below is an equation describing the Species-Area relationship between species richness and area for a wide variety of taxa as angiosperm plants, birds, bats etc.
$S = CA^Z$
(i) Give a graphical representation of the given equation showing Species-Area relationship.
(ii) What does 'S' represent in the given equation?
(iii) What is the value of Z' (regression coefficient) for frugivorous birds and

mammals in the tropical forests of difierent continents?

**OR**

Given below is a 'pie chart' representing the global biodiversity : proportionate number of species of major taxa.




(i) Identify (X) and (Y) in the given 'pie chart".
(ii) "Extinction of species across taxa are not random." Which group amongst the vertebrates is more vulnerable to extinction.
(iii) Give one example each of recent extinctions of species in Russia, Mauritius and Australia. **Marks:[3.00]**

**Q.No.11:** (a) How does a gene therapy involving direct modification of the cells, in order to achieve a therapeutic goal is used in the treatment of ADA deficiency? Explain.
(b) A host cell must be made competent, before it is able to receive an rDNA. Justify.

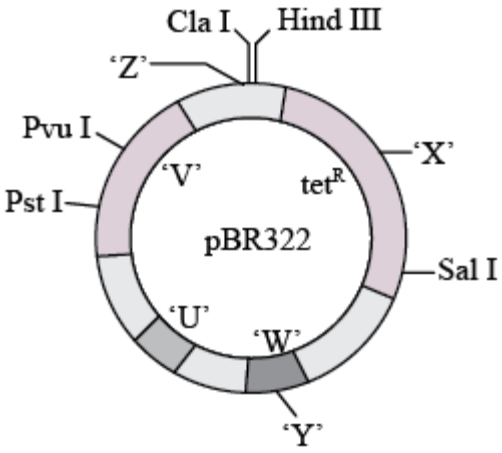
**Marks:[3.00]**

**Q.No.12:** (a) Enlist two criteria that are used to identify a region for maximum protection as 'Biodiversity hotspots'
(b) Name any two "hotspot" regions in our country.

**Marks:[3.00]**

## Section C

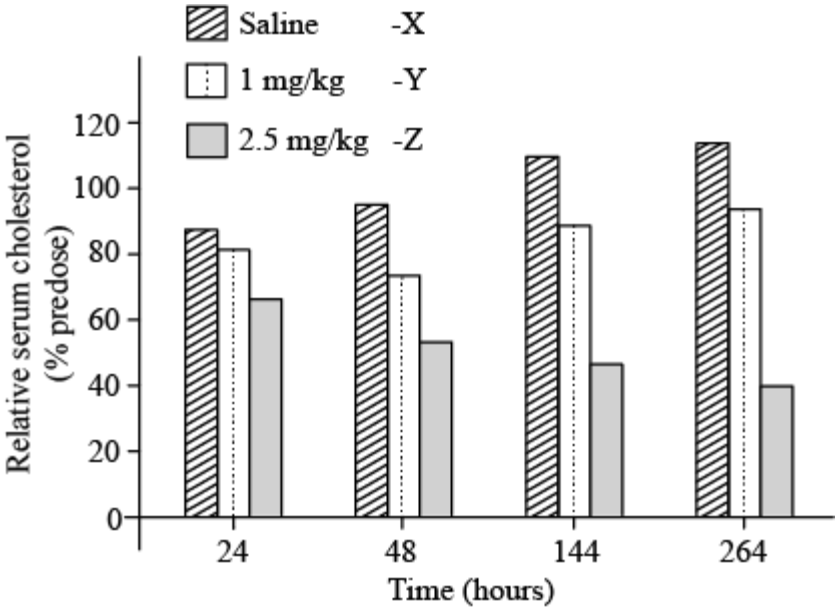
**Q.No.13:** Cloning of genes, play a very Significant role in genetic engineering, helping the transfer of desirable foreign genes into different hosts. The scientists, to make this process easier and effective are creating engineered vectors in such a way that they help easy linking of foreign DNA and selection of recombinants from non recombinants. 'pBR322' is one such engineered vectors developed by scientists. A diagram of an engineered vector pBR322 is given below:




(i) Name the host for this cloning vector.
(ii) Identify 'Rop' and 'Ori' in the diagram from 'U', 'V', 'W', 'X', 'Y' and 'Z'. Write their functions.
(iii) Draw the fragments that will be formed by the action of 'Z' (marked in the diagram) on the specific site of the DNA segment given below:
5' ---GTACGAATTCCTGA---3'
3' ---CATGCTTAAGGACT---5'

**OR**

RNA interference (RNAi) holds great potential as a therapeutic agent for the treatment of human diseases and as biocontrol agents in controlling pests in the field of agriculture. An experiment was carried to study the use of 'RNAi' for the potential treatment of disorders of cholesterol metabolism. Some people possess genetic mutations with elevated levels of ApoB gene which predisposes them to coronary artery diseases.
Lowering the amount of ApoB can reduce the number of lipoproteins and lower the blood cholesterol.
Tracy Zimmerman and her colleagues used RNAi in 2006 to reduce the level of ApoB in non human primates **Cynomolgus** monkeys.
One group of monkeys were given RNAi treatment (small interfering RNAs, SiRNAs) (doses 1 mg/kg SiRNAs), second group of monkeys were given RNAi treatment (doses 2.5 mg/kg SiRNAs) and third group of monkeys were injected with saline.
The results of the study are depicted in the graph below:




(i) How does the treatment with 2.5 mg/kg brings an effect on cholesterol metabolism when compared from 24 hours and 144 hours.
(ii) Write any two natural sources from where dsRNA molecule could be obtained for silencing the specific mRNA.
(iii) How is RNAi used in controlling the infection on the roots of tobacco plants by the nematode ***Meloidogyne incognitia.*** **Marks:[5.00]**