DR. ARVIND'S BIOLOGY CLASSES,CHANDIGARH

(A Unit of Med-Xel Tutorials)

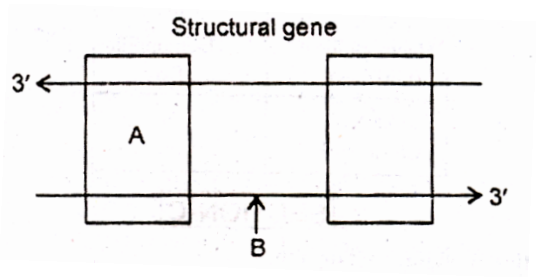
SAMPLE PAPER
BIOLOGY (THEORY)

Duration : 3 hrs
Max. marks : 70

SECTION – A

I. Each question carries 1 mark. **(5 X 1 = 5 marks)**

1. **After a successful in-vitro fertilization, the fertilized egg begins to divide. Where is this egg transferred before it reaches the 8-cell stage and what is this technique named?**
2. **Name the parts 'A' and 'B' of the transcription unit given below.**



3. **Name the two types of cells in which the HIV multiplies after gaining entry into the human body.**
4. **What does 'competent' refer to in competent cells used in transformation?**
5. **According to David Tilman greater the diversity greater is the primary productivity. Can you think of a very low diversity man-made ecosystem that has high productivity?**

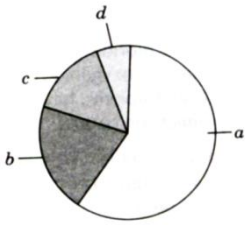
SECTION – B

II. Each question carries 2 marks. **(5 x 2 = 10 marks)**

1. **In the table given below, select and enter one correct device out of the following:**
   Oral pill, condom, Copper T, Saheli, Vasectomy, Diaphragm, Tubectomy, Cervical cap

Method of birth control	Device
Barrier	
IUD	
Surgical Technique	
Administering Hormones	

2. **What would happen if histones were to be mutated and made rich in amino acids aspartic acid and glutamic acid in place of basic amino acids such as lysine and arginine?**
3. **Give the scientific name of the most common species of honey bee reared in India. Why is it advantageous to keep beehives in crop-fields during flowering periods?**
4. **(a) Name the deficiency for which first clinical gene therapy was given.**
   (b) Mention the cause of and one cure for this deficiency.
5. **The figure given inside, shows the relative contribution of four greenhouse gases to global warning.**

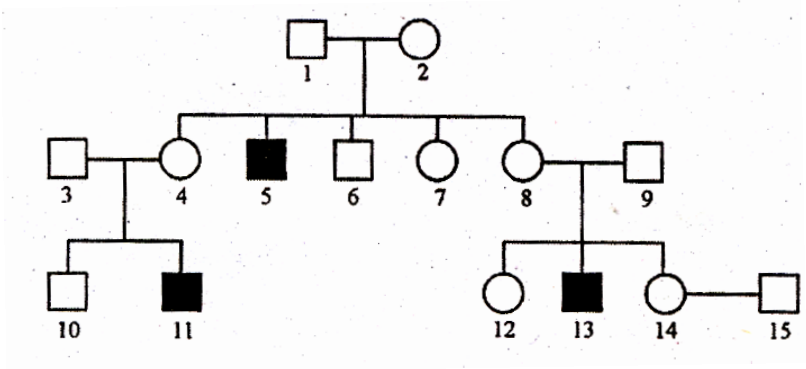


   (i) Identify the gases a and c
   (ii) Why are these four gases called green house gases?

SECTION – C

III. Each question carries 3 marks. (12 x 3 = 36 marks)

1. **(a) Draw a labelled diagram of a sectional view of human seminiferous tubule.**
   (b) Differentiate between gametogenesis in human males and females on the basis of
   (i) time of initiation of the process.
   (ii) products formed at the end of the process.
2. **Explain the process of artificial hybridisation to get improved crop variety in (i) plants bearing bisexual flowers (ii) female parent producing unisexual flowers.**
3. **Expand the following and explain any one of them.**
   (i) IVF (ii) ZIFT (iii) IUI (iv) MTP
4. **Haemophilia is a sex linked recessive disorder of humans. The pedigree chart given below shows the inheritance of haemophilia in one family. Study the pattern of inheritance and answer the questions given.**

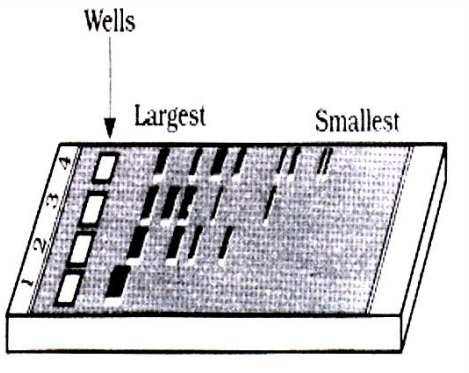


   (a) Give all the possible genotypes of the members 4, 5 and 6 in the pedigree chart.
   (b) A blood test shows that the individual 14 is a carrier of haemophilia. The member numbered 15 has recently married the member numbered 14. What is the probability that their first child will be a haemophilic male?
5. **(a) State Hardy Weinberg principle. Name any two factors which affect it.**
   (b) Draw a graph to show that natural selection leads to directional change.
   (1 + ½ x 2 + 1 = 3 marks)
6. **Fill in the blanks in the different column of the table given below:**

Disease	Casual organisms	Medium of transfer	Symptoms
Amoebiasis	*Entamoeba histolytica*	a	Diarrhoea
Typhoid	b	Contaminated food	Sustained high fever
c	*Plasmodium*	Bite of infected female Anopheles mosquito	Chill and high fever
Pneumonia	*Steptococcus*	d	Fever and cough

7. **Mention the product and its use produced by each of the microbes listed below:**
   (i) Streptococcus (ii) Lactobacillus (iii) Saccharmyces cerevisiae
8. **Suggest and describe a technique through which a virus-free healthy plant can be obtained from a diseased sugarcane plant.**

9.



(a) What does this diagram depict?

(b) What is meant by largest and smallest in the picture.

(c) Name the compound used to visualise them

(d) Define elution. **(½ + ½ + 1 + 1 = 3 marks)**

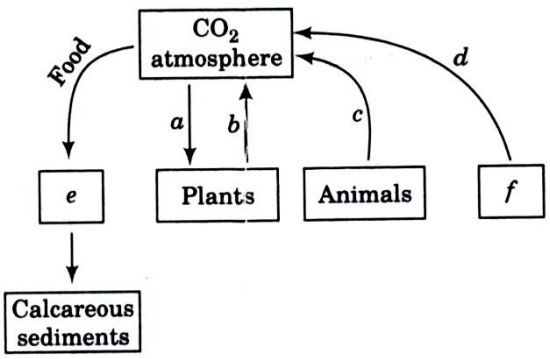
10. Few gaps have been left in the following table showing certain terms and their meanings. Fill up the gaps. **(½ x 6 = 3 marks)**

Terms	Meanings
(i) -	Non coding sequence in eukaryotic DNA
(ii) -	Technique used in solving paternity disputes
(iii) Restricted endonuclease	_____
(iv) Plasmid	_____
(v) Transgenics	_____
(vi) -	Nucleotide sequence with single base differences

11. Construct an ideal pyramid of energy when 1,000,000 joules of sunlight is available. Label all its trophic levels.

12. Draw and complete the following model of carbon cycle filling a, b, c, d, e and f.

Draw and complete the following model of carbon cycle filling *a*, *b*, *c*, *d*, *e* and *f*.



SECTION – D

IV. This question carries 4 marks. **(4 X 1 = 4 marks)**

1. Savita, the head teacher of Class-12, was teaching the students about the intimate relationship of human beings with flowers since time immemorial, telling flowers as object of ornamental and social and cultural values, etc.
(i) Name any two flowers of ornamental value cultivated in home garden.
(ii) Name any two flowers used in social and cultural celebrations.
(iii) Name the branch concerned with cultivation of flowering plants.
(iv) Write your view on the situation.

SECTION – E

V. Each question carries 5 marks. **(5 x 3 = 15 marks)**

1. (a) Trace the succession of plant on a dry bare rock.
(b) How does phosphorus cycle differ from carbon cycle?

2. Study the following carefully and explain why mutation (A) did not cause any sickle cell anemia inspite of change in the molecular structure of the gene which codes for Haemoglobin, when as a similar mutation (B) did. (The question is based on properties of the genetic code. c = codon, a = amino acid, Hb = Hoemoglobin)

Codons for Hb : $C_1 – C_2 – C_3 – C_4 – C_5 – GAA – GAA – C_8$ ……

Amino acids in Hb : $a_1 – a_2 – a_3 – a_4 – a_5$ – Glutamic acid –Glutamic acid – a_8 ……

(Normal Haemoglobin)

Mutation (A) : $C_1 – C_2 – C_3 – C_4 – C_5 – GAG – GAA – C_8$ ……

$a_1 – a_2 – a_3 – a_4 – a_5$ – Glutamic acid –Glutamic acid – a_8 ……

(Normal Haemoglobin)

Mutation (B) : $C_1 – C_2 – C_3 – C_4 – C_5 – GUG – GAA – C_8$ ……

$a_1 – a_2 – a_3 – a_4 – a_5$ – Valine – Glutamic acid – a_8 ……

(Sickle cell Haemoglobin)

3. Give reasons why:
(i) Most zygotes in angiosperms divide only after certain amount of endosperm is formed.
(ii) Groundnut seeds are exalbuminous and castor seeds are albuminous.
(iii) Micropyle remains as a small pore in the seed coat of a seed.
(iv) Integuments of an ovule harden and the water content is highly reduced, as the seed matures.
(v) Apple and cashew are not called true fruits.