[Additional Exam]

Biotechnology
SYBSC
Sem IV

06/05/2015

VCD- / / BIOTECHNOLOGY-II S.Y.B.Sc. SEM IV EXAM MARKS 75 $2^{1/2}$ HRS (80)

- **All questions are compulsory.**
- **Draw diagram wherever necessary**

Q I (A) Explain the terms (any three) **(06)**

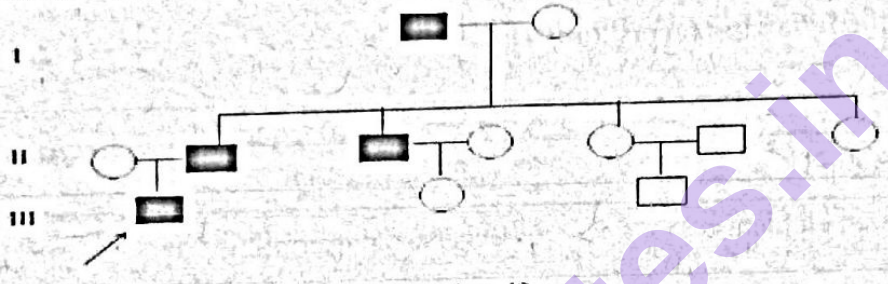
1. Proposita
2. Ascus
3. Tetratype
4. Heterokaryon
5. Linked genes
6. Cis configuration

Q I B) Give symbols used in pedigree for (any two) of the following **(02)**

1. Proband
2. Carrier female
3. Heterozygote Male
4. Dizygotic twins

Q I C) Attempt (any two) of the following **(12)**

1. Observe the following pedigree and answer the following questions:-



i. Which individual is the proband?
ii. What is the mode of inheritance?
iii. What is holandric trait?
iv. What are the characteristics of the condition hypertricosis?
v. The hormone found in males for expressing secondary sexual characteristics?
vi. Why are males referred as hemizygous for Y chromosome?

2. Describe the formation of PD, NPD and TT tetrads at four strand chromatid stage for linked genes.

3. How will you establish gene order using a three point cross, explain with a suitable example

4. Solve:- A *Neurospora* strain that required argenine (arg) but can synthesize methionine (met +) for growth was mated to a strain (arg+ and met) following products were obtained.

	1	2	3	4	5	6	7
Spore pair 1	arg +	arg met	arg met	arg +	arg +	arg met	arg met
Spore pair 2	arg +	arg met	arg +	+ met	+ met	+ +	arg +
Spore pair 3	+ met	+ +	+ met	arg met	arg +.	arg met	+ met
Spore pair 4	+ met	+ +	+ +	+ +	+ met	+ +	+ +
TOTAL	45	10	10	5	15	5	10

Contd 2/...

Q II. (A) State whether the following statements are true or false. (any two). (2)

1. The 5' to 3' DNA strand complementary to template strand is known as non-template strand.
2. The stop codons are used to specify the end of translation of a polypeptide chian.
3. In prokaryotes, the initiator methionine is a modified form of methionine known as formylmethionine.
4. The enzyme transformylase adds the formyl group to the methionine resulting in fMet-tRNA fMet.

Q II. (B) Explain the following terms. (any three) (6)

1. Translation.
2. Non Template Strand.
3. Promoter proximal elements.
4. Degeneracy of Code.
5. Aminoacylation.
6. Reverse Transcription.

Q II. (C) Answer (any two) of the following. (12)

1. Explain the process of Initiation of Translation in *E.coli*.
2. Explain the process of Elongation, Termination of Transcription in prokaryotes.
3. Write in brief about the production of aminoacyl-tRNA with diagram.
4. Describe the action of RNA dependent DNA polymerase.

Q III(A) Fill in the blanks (Any four). (4)

1. ..... is known as sexual differences which are clearly evident from external observation. (Generic control, sexual dimorphism, sex determination, autosomes)
2. X and Y chromosomes are called as .....(Autosomes, sex chromosomes, defective chromosomes, useless chromosomes).
3. Mitochondrial ribosomes consist of..... Subunits. (Four, one, two, eight).
4. For protein synthesis, only..... Mitochondria use the "universal" nuclear genetic code. (Plant, animal, fungi, archaebacterial).
5. The XO method of sex determination is similar to the XY method but the absence of ..... chromosome. (X, O,Y,XX)

Contd 3/...

6. In uniparental inheritance, all progeny have the phenotype of only..... Parent. (Two, none, both, one).
7. The electron transport chain drives cellular ..... production by oxidative phosphorylation. (Water, proton, ATP, electron).
8. In majority of birds, the sex is determined by ..... method.(ZW, XO, XY, XX)

Q III. (B) Explain the following terms (any two). **(4)**

1. Dioecious organisms.
2. Sex chromosomes.
3. Barr bodies.
4. Intersex.

Q III. (C) Answer in brief (any two). **(12)**

1. How does sexual differentiation in dioecious organisms take place? Explain with a suitable example.
2. Explain: chromosomal mechanism of sex determination: XX-XY method.
3. Discuss: non-Mendelian inheritance in mutant of yeast.
4. Give a brief note on structure, functions and replication of extranuclear DNA in mitochondria.

Q IV. Write a note on (any Three) of the following. **(15)**

1. Mitochondrial DNA defects.
2. Environmental control of sex determination in *Crepidula*.
3. 5' capping and 3' poly(A) tail of mRNA.
4. Termination of Translation.
5. Pedigree analysis and its importance in genetic counselling.
6. *Neurospora crassa* sexual life cycle.

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