

Date: 03/10/15

**03/10/15 BIOTECHNOLOGY-III S.Y.B.Sc. SEM III EXAM MARKS 75 2 1/2 HRS. (70)**

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

**Q I.(A) Fill in the blanks .(Any four)**

(4)

1. The \_\_\_\_\_ enzyme catalyses DNA synthesis. (RNA, DNA polymerase, Amylase).
2. The DNA polymerase have \_\_\_\_\_ exonuclease activity which permits proof reading during DNA synthesis when incorrect nucleotide is inserted. (3'-5', 5'-3', 4'-5').
3. In Messelson- Stahl experiment, a solution of \_\_\_\_\_ form a density gradient. (CsCl, FeCl<sub>3</sub>, NaOH).
4. \_\_\_\_\_ proteins bind to the single strand DNA for stabilizing a preventing it from reannealing. (SSB, Glycoprotein, Lipoprotein).
5. The RNA primers are lengthened by \_\_\_\_\_ to synthesis new DNA strand during DNA replication. ( DNA polymerase I, DNA polymeraseII, DNA polymerase III).
6. The new strand that is made in the direction opposite that of the movement of the replication fork is called the \_\_\_\_\_ strand. (Lagging, leading, template).
7. \_\_\_\_\_ enzyme is a form of topoisomerase which relaxes the tension produced in the DNA a head of the replication fork. (Gyrase, Helicase, Amylase).
8. DNA polymerase I removes RNAprimer with its \_\_\_\_\_ activity. (5'-3' exonuclease, 5'-3' polymerase, 3'-5' polymerase).

**QL.(B) Explain the following terms. (any two).**

(4)

1. Conservative DNA Replication.
2. Semiconservative DNA Replication
3. Semi discontinuous DNA Replication.
4. Unidirectional DNA Replication.

**QL.(C) Answer any two of the following.**

(12)

1. Explain Messelson- Stahl experiment.
2. Explain the process of Initiation of DNA replication in E. coli.
3. Explain Rolling circle mode of DNA replication.
4. Explain the process of primer removing and fragment joining during DNA replication

**QII. (I) State whether the following statements are true or false. (any two).**

(2)

1. Deamination is the process of removal of an amino group from a base.
2. In E. coli, alkylation damage can be repaired by an enzyme called O<sup>6</sup>- methylguanine methyltransferase which removes methyl group.
3. A common base analogy mutagen is 5-bromouracil.
4. In depurination, a pyrimidine either adenine or guanine is removed from the DNA.

Contd/...2

**QII.(B) Explain the following terms. (any three).**

(6)

1. Germ line mutation.
2. Reverse mutation.
3. Transversion mutation.
4. Suppressor mutation.
5. Silent mutation.
6. Induced mutation.

**QII.(C) Answer any two of the following.**

(12)

1. Write in brief about the mutation caused by Base modifying agents such as Nitrous acid and Hydroxyl amine.
2. Write in brief about repair mechanism by Photo reactivation and Alkylation damage.
3. Repair by Methyl-Directed Mismatch repair.
4. Write a note on SOS Response.

**Q III (A) Explain the terms (any three)**

(6)

1. Propositus
2. Cyotological markers
3. Parental ditype
4. Heterokaryon
5. Linked genes
6. Transconfiguration

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

(2)

1. Proposita
2. Carrier female
3. Male
4. Dizygotic twins

**Q III C) Attempt (any two) of the following**

(12)

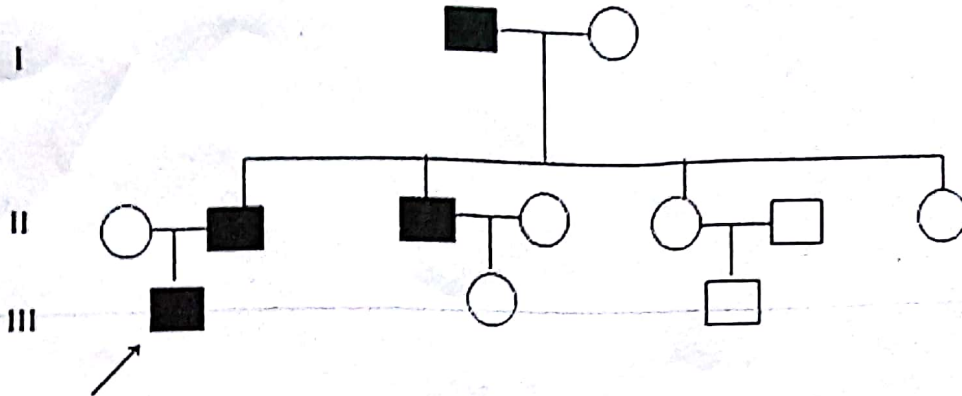
1. Describe the formation of PD, NPD and TT tetrads at four strand chromatid stage for linked genes.
2. How will you establish gene order using a three point cross, explain with a suitable example
3. Solve:-A *Neurospora* strain that required arginine (arg) but can synthesize methionine (met +) for growth was mated to a strain (arg+ and met) following products were obtained. **Compute the gene and centromere distance for the two genes**

	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/...3



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



- Which individual is the proband?
- What is the mode of inheritance?
- What is holandric trait?
- What are the characteristics of the condition hypertrichosis?
- The hormone found in males for expressing secondary sexual characteristics?
- What is hemizyosity?

V. Write a note on (any Three) of the following.

(15)

- Mismatch repair by DNA polymerase proofreading.
- 5-bromo uracil mutagen.
- DNA polymerase I.
- Looped rolling circle DNA replication.
- Holliday model of recombination
- Life cycle of *Neurospora*

XXX