[106] SEAT No._____ No. of Printed Pages: 2

SARDAR PATEL UNIVERSITY
M. Sc. Genetics, Second Semester Examination
Day and Date: Wednesday, 20-03-2019
Time: 02:00 pm to 5:00 pm
Paper Code and Subject: PS02CGEN22, Microbial Genetics

Total Marks: 70

Q-1 Multiple choice questions (**All are compulsory**). [8x1=8]

(i) Which base is generated by the deamination of 5-methylcytosine?
a) Thymine b) Adenine c) Guanine d) Uracil

(ii) Xeroderma pigmentosum (XP) in human is associated with a mutation in
a) Photoreactivation b) Nucleotide excision repair (NER)
c) Base excision repair (BER) d) Mismatch repair

(iii) If there is 8 bp sequence flanking oppositely oriented 13bp symmetry elements like LoxP, what will be the fate of it after recombination?
a) It will be excised out b) It will be inverted
c) It will be broken in the middle d) It will be inserted in another region

(iv) Although bacterial cells are haploid, F' plasmids carrying bacterial genes can create specific regions of _____.
a) partial diploidy b) F^+ cell c) F^- cell d) F' cell

(v) The techniques in which pulsed electrical fields generate pores in the cell membranes, allowing DNA molecules to enter the cells is
a) Microinjection b) Electroporation c) Electric impulse d) Gene gun

(vi) A small pore Embedded at the base of the blebs is a protein which specifically binds to the base pair sequence of DNA is
a) 5'AAGTGCGGTCA 3' b) 5' AAGTTCGGTCA 3'
c) 5' AAGTGCGGTAA 3' d) 5' AAGTGCCGTCA 3'

(vii) What is the term used for a segment of DNA with one or more genes in the center and the two ends carrying inverted repeat sequences of nucleotides?
a) Plasmid b) Transposon c) Insertion sequence d) None of these

(viii) Opine synthesis is the property
a) conferred to plant cells when it transformed by *Agrobacterium tumefaciens*
b) determined by the bacteria *Agrobacterium tumefaciens*
c) both (a) and (b) d) of normal plant cells

Q-2 Answer the following questions in short. (**Any Seven**) [7x2=14]

(i) Define mutagen giving an example.

(ii) Define plasmid.

(iii) Write a note on virulence region.

(iv) Write a short note on Transformasome.

(v) Write the importance of pilin protein.

(vi) Write the importance of competence in transformation.

(vii) What do you mean by merodiploid?

(viii) Write the importance of DNA methyltransferases (MTases).

(ix) What a note on non-composite transposon.

(P.T.O)

Q-3 (A) Discuss how Nucleotide Excision Repair (NER) enzymes cleave damaged DNA on either side of the lesion? [06]

(B) Discuss how DNA is damaged by alkylation, radiation, and intercalating Agents. [06]

OR

(B) Explain SOS repair mechanism for damaged DNA. [06]

Q-4 (A) Draw labeled ColE1 plasmid map and explain importance of RNA1-RNAII complex formation for its regulation. [06]

(B) Explain Mating type switch mechanism in *Saccharomyces cerevisiae*. [06]

OR

(B) Discuss Holliday model for genetic recombination. [06]

Q-5 (A) Discuss the mechanism of transformation in *Streptococcus pneumoniae* in detail. [06]

(B) Discuss the mechanism of conjugation between F + and F – cell. [06]

OR

(B) Explain Generalized transduction mechanism of P22, which infects *Salmonella typhimurium*. [06]

Q-6 (A) Give the figure of labeled Ti (Tumor Inducing) plasmid and discuss the mechanism of Agrobacterium mediated genetic transformation. [06]

(B) Discuss the genetic organization of Tn3 and its mechanism of transposition. [06]

OR

(B) Explain Insertion sequences and discuss the mechanism of transposition for bacterial Insertion sequences. [06]

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