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5 SEM TDC ZOOH (CBCS) C 11

2024

(November)

ZOOLOGY

(Core)

Paper : C-11

(Molecular Biology)

Full Marks : 53

Pass Marks : 21

Time : 3 hours

*The figures in the margin indicate full marks
for the questions*

1. Fill in the blanks :

1×5=5

- (a) The enzyme responsible for synthesizing RNA from DNA template is ____.
- (b) In eukaryotes, the removal of introns and joining of exons in the pre-mRNA is called ____.
- (c) The technique used to separate DNA fragments based on their size is called ____.

(2)

- (d) The phase of the cell cycle where DNA is replicated is known as ____ phase.
- (e) The genetic code consists of ____ different codons.
2. Write briefly about the following (any two) : $4 \times 2 = 8$
- (a) Wobble hypothesis
- (b) Genetic code
- (c) Gene silencing
3. Explain the following (any two) : $4 \times 2 = 8$
- (a) Initiation of transcription in prokaryotes
- (b) RNA editing
- (c) Ribo-switches
4. Describe the mechanism of semi-conservative replication of DNA. How did the Meselson and Stahl experiment provide evidence for this model? $4 + 4 = 8$

Or

What is nucleic acid? Describe the structure and function of different types of RNA. $1 + 7 = 8$

5. What is the role of RNA polymerase in transcription? How does RNA polymerase recognize and bind to the promoter? Explain the process of termination of transcription. $1 + 1 + 6 = 8$

(3)

Or

Explain the difference between transcription in prokaryotes and eukaryotes. Highlight the key enzymes involved in the process. $4 + 4 = 8$

6. What do you mean by transcription? Write about post-transcriptional modifications. $2 + 6 = 8$

Or

List the inhibitors of protein synthesis in prokaryotes. Briefly explain the mechanisms by which these inhibitors inhibit translation. $3 + 5 = 8$

7. What is an operon? Describe the structure and regulation of lac operon. $2 + 6 = 8$

Or

Discuss briefly about the molecular mechanisms involved in the formation of pyrimidine dimers. Explain the mechanism involved in the repair of pyrimidine dimers. $2 + 6 = 8$

Total No. of Printed Pages—4

5 SEM TDC ZOOH (CBCS) C 12

2024

(November)

ZOOLOGY

(Core)

Paper : C-12

(Principles in Genetics)

Full Marks : 53

Pass Marks : 21

Time : 3 hours

*The figures in the margin indicate full marks
for the questions*

1. Fill in the blanks : 1×5=5

- (a) Interrupted mating technique was developed by _____.
- (b) In *Drosophila*, sex is not determined by _____ chromosome.
- (c) _____ genes will not allow mutant allele of another gene to express either fully or partially.

(2)

(d) Hybrid dysgenesis describes the phenomenon which involves damage in ____.

(e) Cytoplasmic male sterility in maize was discovered by ____.

2. Write briefly on any two of the following : 3×2=6

(a) Epistasis

(b) Transposons in humans

(c) Types of gene mutation

3. What do you understand by recombination? Discuss various models available to explain molecular mechanism of recombination. 7

Or

How will you prove that crossing-over has a cytological basis? Give a brief account of the procedure used in preparing a crossover map with the help of three-point crosses. 2+5=7

4. Discuss the detailed procedure utilized for detection of sex-linked lethal mutation using CLB method. 7

Or

Discuss different kinds of radiations and chemical mutagens utilized for induction of mutation. 3+4=7

(3)

5. Explain the mechanism of sex determination in man or *Drosophila*. 7

Or

Differentiate between (any two) : $3\frac{1}{2} \times 2 = 7$

(a) Codominance and Incomplete dominance

(b) Linkage and Crossing-over

(c) Sex-limited and Sex-influenced trait

6. What is antibiotic resistance in bacteria? Discuss antibiotic resistance in *Chlamydomonas*. 1+6=7

Or

Explain the law of independent assortment with suitable cross displaying phenotypic and genotypic ratio. 7

7. What are polygenes or multiple factors? Describe briefly the multiple-factor hypothesis. 7

Or

Describe the role of sex factor in bacterial conjugation with reference to F^+ and Hfr strains.

(4)

8. How can transposons be utilized for genetic study? Describe A_c - D_s system in maize.

2+5=7

Or

Define aneuploidy. Discuss any three types of disorders with respect to aneuploidy. 1+6=7

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