

2008

ZOOLOGY

PAPER—Z-203

Full Marks : 40

Time : 2 hours

The figures in the right-hand margin indicate marks

Candidates are required to give their answers in their own words as far as practicable

GROUP—A

(Molecular Biology)

1. Answer two questions from the following: 2×2

(a) Which of the following are steps in protein synthesis in prokaryotes?

(i) Binding of tRNA to a 30s particle.

(ii) Binding of tRNA to a 70 s ribosome.

(Turn Over)

- (iii) Coupling of an amino acid to a ribosome by an amino acyl synthetase.
- (iv) Separation of the 70 s ribosome to form 30 s and 50 s particles. 2
- (b) (i) What amino acid is bound to charged tRNA^{Leu} ?
- (ii) What amino acid is bound to seryl-tRNA^{Leu} ? 1 + 1
- (c) Name two activities possessed by RNA polymerase and not by DNA polymerase. 2
- (d) Suppose *E. coli* is growing in a lactose containing growth medium. The genotype is $i^- z^+ y^+$. Glucose is then added. Which one of the following will happen ?
- (i) Nothing
- (ii) Lactose will no longer be utilized by the cell
- (iii) Lac mRNA will no longer be made
- (iv) The repressor will bind to the operator. 2

2. Answer *two* questions from the following: 4 × 2

(a) Mention briefly the Constituent and their function of primosome and replisome. 4

(b) How does prepriming proteins interact with Ori C in *E. coli* to form a replication bubble? 4

(c) (i) A portion of the sense strand sequence of trp A intrinsic terminator in *E. coli*,

5' ACCCAGCGCGCCTAATGGCGCGCTTTTTTTTTT 3'

Draw the most probable structure of the mRNA that includes this sequence of nucleotides when the hairpin structure is formed.

(ii) What is the role of nus A protein? 2 + 2

(d) State the role of the transcription factors (Tfs) for the release of RNA Pol II from the promoter to start elongation. 4

3. Answer *one* question from the following: 8 × 1

(a) (i) In lac^{-d} / lac^{+} partial diploids, lac enzymes are produced constitutively even in the presence of the normal repressor. Explain briefly.

- (ii) The mmm operon, which has sequence *A*, *B*, *C* and *D* encodes enzyme 1 and 2, Mutations in *A*, *B*, *C*, *D* have the following effects, where + = synthesis and - = no synthesis.

Mutation in sequence	<u>Mmm absent</u>		<u>Mmm Present</u>	
	Enzyme 1	Enzyme 2	Enzyme 1	Enzyme 2
<i>A</i>	-	+	-	-
<i>B</i>	+	+	+	+
<i>C</i>	+	+	-	-
<i>D</i>	-	-	-	-

(A) Is the mmm Operon inducible or repressible?

(B) Indicate which sequence (*A*, *B*, *C* or *D*) is part of the following components of the Operon:

Regulator gene —
 Promoter —
 Structural gene for enzyme 1 —
 Structural gene for enzyme 2 —.

- (b) (i) Mention the sequences involved in binding of ribosomes to the mRNA in the initiation of protein synthesis.
- (ii) Briefly describe the elongation stage of translation in prokaryotes sequentially.

GROUP—B

(Parasitology)

4. Answer *two* questions from the following: 2 × 2
- (a) Define Commensalism. State its difference with mutualism.
- (b) What is Glycocalyx? Mention its function.
- (c) What do you mean by hyperparasite?
- (d) What is meant by antigenic variation?
5. Answer *two* questions from the following: 4 × 2
- (a) What are stable and unstable malaria?
- (b) How microfilaria (mf) of *Wuchereria* differs from microfilaria (mf) of *Brugia*?

(c) Enumerate the structure of cestode tegument.

(d) Discuss the role of mosquito as vector of parasitic diseases.

6. Answer *one* question from the following: 8 × 1

(a) Describe briefly about the life cycle of *Paragonimus Westermani*. Mention its Pathogenesis and Prophylaxis. 5 + 2 + 1

(b) (i) Explain the role of spleen in immunity of malaria.

(ii) Discuss the environment and vector factors in relation to epidemiology of malaria. 3 + 5