

2015

BIOCHEMISTRY

Paper – BCO – 402

(Microbial Ecology and Pathogenesis)

Full Marks – 25

The figures in the margin indicate full marks

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

Group – A

1. (a) "Burned Patients are especially susceptible to *Pseudomonas aeruginosa*" — why?

(b) How is meningitis diagnosed in the laboratory?

(c) What is nosocomial infection? 2+1+1½

Or

(a) Indicate the sites of infection on human bodies.

(b) What is the cause of Dental cavies? Name the causative agent. 2+(1½+1)

Or

(a) What roles are played by normal microflora within the human body?

(b) What is the significance of normal microflora in 'Inflammatory Bowel Disease'? 2+2½

2. (a) '*Plasmodium falciparum* show extensive parasitemia within the human body' — why? In what ways it is different than *Plasmodium vivax*?

(b) Why is vaccine development difficult against malarial parasites?

(c) What is 'hemozoin'? 2+1+1

Or

(a) What is mode of action of chloroquin?

(b) Glucose-6-phosphate dehydrogenase deficient persons are resistant to malarial infection — why?

(c) Why Primaquin is much more effective drug in malaria than the other? 2+1+1

Or

(a) Describe the function of Botulinum toxin. How does it differ from Tetanus toxin?

(b) Define Bacterinia. 3+1

Or

(a) What are the physiological responses mediated by LPS toxin?

(b) How can you detect and quantitate endotoxin? 3+1

[Turn Over]



Group - B

3. (a) Why does *H. pylori* colonize mostly to antrum but not to fundus of the stomach? Explain.

(b) Compare and contrast cholera toxin and pertusis toxin with respect to their structure and function.

(c) What is reactive arthritis? Name one of the causative agents. Why is reactive arthritis seen commonly in people with HLA B27 haplotype?

(d) What is nosocomial infection? 2 + 2½ + (1+1+1) + 1

Or

4. (a) Briefly discuss the contribution of plasminogen activator protease (pla) in *Y. pestis* infection.

(b) Why the incubation period of *S. typhi* is longer than that for *S. typhimurium*?

(c) Which viro type of *E. coli* produces heat - stable toxin?

(d) ID₅₀ for *Shigella spp.* is much lower than that for *V. cholerae* — Justify.

(e) Distinguish between endemic, epidemic and pandemic stages of a disease.

(f) Briefly discuss the mechanism of survival of *Salmonella spp.* in phagocytes. 2½ + 1 + 1 + 1 + 1 + 2

Or

5. (a) Discuss briefly how is phase variation of the *pap* genes regulated in uropathogenic *E. coli*.

(b) What is the role of Ipa B protein in *Shigella* infection?

(c) What is the full form of EPEC? State briefly how does it cause disease.

(d) What is pyelonephritis?

(e) Why sereny conjunctivitis test is done in laboratory?

(f) How does antibody to Fha provide protection against *B. pertusis* infection? 2 + 1 + (1 + 1½) + 1 + 1 + 1

Group - C

Answer **any two** questions

6. Write down using a schematic the steps involved in construction and screening of a metagenomic library. What is substrate-induced gene expression screening (SIGEX)? 2+2

7. Name the major bacteria phyla that represent normal and healthy gut. How does diet influence the structure of gut microbiome? 1+3

8. Give a schematic representation of intestinal immune system. How may be intestinal permeability may be altered in individuals with alcohol dependence? 2+2

9. Discuss how the variation in the intestinal microbiota influence immunosenescence and frailty in of elderly individuals. 4