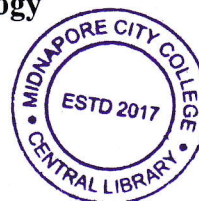


The West Bengal University of Health Sciences
B.Sc. in Medical Microbiology 2nd Semester December, 2022
Examination

Subject : Microbial Physiology

Time : 2 hrs.

Attempt *all* questions



Full Marks : 50

1. Attempt all the questions : 10 x 1
- a) Primary metabolites are produced during :
 - i) Lag phase. ii) Exponential phase. iii) Stationary phase. iv) Death phase.
 - b) DNA and proteins are protected by :
 - i) Mn-SOD & Fe-SOD. ii) Mg-SOD & Ni-SOD.
 - iii) Cd-SOD & Zn-SOD. iv) Na-SOD & Si-SOD.
 - c) CheB is responsible for :
 - i) Sporulation. ii) Competence. iii) Cell division. iv) Luminescence.
 - d) Piezophilic meaning :
 - i) Thermotolerance. ii) Osmotolerant. iii) pH-tolerance. iv) Pressure-tolerant.
 - e) A good example of biofilm producer is :
 - i) *Pseudomonas* sp. ii) *Escherichia coli*. iii) *Aspergillus* sp. iv) *Alcaligenes* sp.
 - f) Reductive potential means :
 - i) Donate electrons. ii) Accept protons.
 - iii) Accept electrons. iv) Donate protons.
 - g) A good electron source of anaerobic bacteria :
 - i) Oxygen. ii) Benzene. iii) Water. iv) Nitrate.
 - h) σ -factor is involved in :
 - i) Replication. ii) Transcription.
 - iii) Conjugation. iv) Translation.
 - i) GroEL is responsible for :
 - i) Thermal response. ii) Osmotic response.
 - iii) Oxidative response. iv) pH-response.
 - j) Quorum sensing is not followed in :
 - i) Production of biofilm. ii) Production of repellent.
 - iii) Production of bioluminescence. iv) Production of toxin.
2. Answer *any four* of the following questions : 4 x 2
- a) What do you mean by compatible solutes?.
 - b) What is the role of ppGpp?
 - c) What is the function of cytochrome *o* and cytochrome *d*?
 - d) State the role of aquaporins with an example.
 - e) What is cardinal temperature?
 - f) What is the significance of membrane derived oligosaccharides?
3. Answer *any four* of the following questions. 4 x 4
- a) State the molecular mechanisms started during starvation particularly for Gram-negative bacteria.
 - b) Write down the roles of Che and MCP in flagellar motility.
 - c) Mention the molecular mechanisms of competence in Gram-positive bacteria.
 - d) How ArcAB operates in low oxygen tension?
 - e) How quorum sensing operating in the production of virulence proteins in *Staphylococcus aureus*?
 - f) State the functions of σ^H in thermal stress response.
4. Answer *any two* of the following questions :
- a) How sporulation is regulated at molecular level in *Bacillus subtilis*? How different antibiotics obstruct the pathway of peptidoglycan synthesis? 5+3
 - b) Initial density of a culture of bacteria with a generation time of 30 mins was 1×10^5 cells/mL. After 5 hours of incubation, what serial dilution will have to plate out to get approximately 100 colonies per mL? Given some examples of osmoprotectants and how do they function in high osmolality environments? 5+3
 - c) Briefly describe different techniques practised for bacterial growth measurements? How different antioxidative enzymes protect bacteria from oxidative stress? 5+3