Progressive Education Society's
Modern College of Arts, Science & Commerce Ganeshkhind, Pune – 16
End Semester Examination:
Faculty: Science and Technology

Program: B.Sc.Gen03 **Semester: II** **SET: A**
Program (Specific): Microbiology **Course Type: DSC**
Class: T.Y.B.Sc. **Max.Marks: 35**
Name of the Course: Metabolism.
Course Code: 24-MB-363 **Time: 2Hr**
Paper: III

Instructions to the candidate:

1) ***There are 4 sections in the question paper. Write each section on separate page.***
2) ***All Sections are compulsory.***
3) ***Figures to the right indicate full marks.***
4) ***Draw a well labelled diagram wherever necessary.***

SECTION: A

Q1) Answer the following **5 Marks**

a) Which type of membrane transport system in bacteria involves the phosphorylation of transported sugars?
i) Simple diffusion ii) Group translocation
iii) Facilitated transport iv) ABC transporter

b) The Second Law of Thermodynamics states that:
i) Energy can be transferred without any loss
ii) Entropy of an isolated system decreases over time
iii) Entropy of the universe always increases
iv) Free energy always increases in a closed system

c) In peptidoglycan biosynthesis, which enzyme catalyzes the final cross-linking step?
i) Transpeptidase
ii) Glucosyltransferase
iii) Autolysin
iv) Penicillinase

d) Which of the following best describes the primary function of photosynthetic pigments in bacteria?
i) Directly producing ADP from light energy
ii) Absorbing specific wavelengths of light and transferring energy to reaction centers
iii) Fixing CO_2 through the Calvin cycle
iv) Generating hydrogen by splitting water molecules

e) The formation of polysaccharides from monosaccharides occurs through which type of reaction?
i) Hydrolysis
ii) Condensation
iii) Oxidation-reduction
iv) Transamination

Q2) Answer the following (Attempt any 4/6) 4 Marks

a) Explain how osmosis differ from diffusion.
b) Define Gibbs free energy.
c) Describe the membrane organization of the mitochondria.
d) Mention the process of activation of sugars in polymerization process.
e) Comment on photosystems present in cyanobacteria.
f) Enlist two examples of chemolithotropic organisms.

SECTION: B

Q3) Answer the following (Attempt any 4/6) 8 Marks

a) Ion channels present in passive transport are selective for particular ions. Justify.
b) Explain why ATP is high energy compound.
c) Describe how reduction potential can be converted in the useful form of energy in half cell reactions.
d) Enlist any two enzymes present in fatty acid synthesis complex along with their actions.
e) Enlist any two pathways responsible for cabon fixation in bacteria. Explain any one in detail
f) Discuss why thioesters are high energy compounds.

SECTION: C

Q4) Answer the following (Attempt any 4/6) 8 Marks

a) Enlist two inhibitors of electron transport chain.
b) Enlist two antibiotics inhibiting peptidoglycan synthesis.
c) Describe how modifications in membrane structures leads to increase in the efficiency of photosynthesis.
d) Draw structure of Sodium Potassium ATPase.
e) Describe types of ionophores.
f) Explain cyclic photophosphorylation.

SECTION: D

Q5) Attempt any two of the following **10 Marks**

a) Describe the organization of the mitochondrial electron transport chain (ETC) and its major components.
b) Describe the process of starch synthesis.
c) Compare oxygenic and anoxygenic photosynthesis.
d) Explain mode of nutrition in chemolithotrophs.