RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. FIFTH SEMESTER EXAMINATION, MARCH 2021

THIRD YEAR [BATCH 2018-21]

Date : 16/03/2021 **MICROBIOLOGY [HONOURS]**

Time : 11 am – 1 pm **Paper : V [Gr.B]** Full Marks : 50

Answer **any five** questions of the following: [5×10]

1. Write short notes on the following [2×5]

   a) Paratope b) Isotype c) Agretope d) Desitope e) Allotype

2. a) What are CDRs? How many CDRs are there in V region?

   b) What is a Hapten? How is it used to detect clinically inconspicuous molecules? [(3+2)+(3+2)]

3. a) What are Bence-Jones proteins? How is it useful to clinical research?

   b) What is the difference between Small Lymphocytes and Lymphoblasts?

   c) What is Positive Selection and Negative selection of T lymphocytes? [(2+3)+2+(1.5+1.5)]

4. a) Air lift bioreactors are also known as pneumatic bioreactors—explain.

   b) What is a bioreactor? State the essential provisions needed to be kept in an industrial bioreactor.

   c) What are cryoprotecting agents? Give two examples.

   d) State the functions of: (i) agitators (ii) baffles and (iii) sparger fitted with a stirred tank bioreactor.

   [2+(1+2)+(2+3)]

5. a) Discuss the importance of downstream processing in industrial production.

   b) What is solid state fermentation? Mention its advantages and disadvantages.

   c) Briefly justify whether the following statements are true or false:

      i) Antibiotics are primary metabolites

      ii) Continuous fermentation is more prone to contamination than batch fermentation. [3+(1+2)+(2+2)]

6. a) The fermentative production of acetic acid requires stringent control of (i) producer organism (ii) raw material (iii) temperature (iv) pH and (v) product separation and purification. Explain the measures taken under each factor to maximize product formation.

   b) Mention important differences between ‘primary metabolites’ and ‘secondary metabolites’.

   c) With respect to the fermentative production of Vitamin B12, describe the separation and purification of the final product. [(1×5)+3+2]

7. a) Give an outline of production of ethyl alcohol to be used as biofuel (steps to be described: choice of producer strain, formulation of medium taking economic consideration, recovery of product and disposal of wastes generated).

b) Explain why:

(i) Slow glucose feeding is good for penicillin fermentation.

(ii) Control of biotin level is very important for large scale production of L-lysine.

(iii) Aeration and agitation cause problem in alpha amylase production.

(iv) Agitation of the fermentation mix may help increase productivity of a fermentation process.

[(1+3+2)+(1×4)]

8. What do you mean by normal flora? Normal flora is restricted to some regions of our body while others are devoid of them-explain. Host-microbe interaction is mostly positive-justify. [2+5+3]

9. Write notes on the following: pathogenicity, virulence, M protein, hyaluronidase and toxoid. [2×5]

10. Write down the differences between exotoxin and endotoxin. Write down the mode of action of botulinum toxin and diphtheria toxin. [4+(3+3)]

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