

**2021**  
**MICROBIOLOGY**  
**[HONOURS]**  
**Paper : VII**

Full Marks : 80

Time : 4 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.**Write the answers to questions of each Group in separate books.***Answer all the questions.****GROUP-A****(Recombinant DNA Technology)****(Marks : 40)**

1. Write whether the statements are **true** or **false**, any **two** of the following: 1×2=2
- i) Cosmid can be packaged in M13 phage.
  - ii) Blue white screening is used to identify recombinant plasmid with foreign insert.
  - iii) Electroporation is used to analyse Restriction fragment length Polymorphism.

- iv) Digestion of DNA with ECoRI generates cohesive ends.
2. Answer any **two** of the following: 2×2=4
- i) What is the advantage of using Type II restriction enzymes in manipulation of DNA?
  - ii) What do you mean by isochizomers?
  - iii) What are the basic features present in a plasmid?
  - iv) How would you visualise DNA in agarose gel?
3. Answer any **four** of the following: 6×4=24
- a) If you aim to check whether purified protein 'X' binds with the promoter of a gene 'Y' in vitro, what technique would you prefer? Schematically present this technique. 6
  - b) Schematically present any one method of in vitro mutagenesis. 6
  - c) Write short notes on : 3+3
    - i) Edible vaccine
    - ii) Development of BT (insect resistance) crops.
  - d)
    - i) What is northern blot?
    - ii) What is its application?

- iii) What is cosmid? Compare plasmid with cosmid?  $2+2+2=6$
- e) Suppose your aim is to join ECoRI insert at ECoRI site of a plasmid. What strategy would you prefer to prevent self-ligation of linearized plasmid? 6
- f) Write two application of PCR?  
What is cDNA library?  $2+2+2=6$
4. Answer any **one** of the following:  $10 \times 1 = 10$
- i) a) Schematically present the strategy of Sanger's method of DNA sequencing.
- b) If you would like to express a protein in *E.coli*, how would you select the suitable vector?  $5+5=10$
- ii) Write short notes on :  $2\frac{1}{2} \times 4 = 10$
- a) Shuttle vector
- b) BAC
- c) Reverse transcriptase
- d) Genomic libraries

**GROUP-B**  
**(Food & Industrial Microbiology)**

**(Marks : 40)**

5. Answer the following (any **two**):  $1 \times 2 = 2$
- i) Name one organism used for the production of Yoghurt.
- ii) Name one organism involved in intoxication of stored nuts and grains.
- iii) Name two organisms used for the production of  $\alpha$ -amylase commercially.
- iv) Name the causative agent of botulism.
6. Answer any **two** of the following:  $2 \times 2 = 4$
- i) What is probiotics? What are its health benefits?
- ii) What is an "Alcograph"?
- iii) What is "Green Cheese"?
- iv) Write down two major health benefits of mushroom consumption.
7. Answer any **four** of the following:  $6 \times 4 = 24$
- i) What is SCP? What are its uses? What is Radurization? How high concentration of sugar can prevent spoilage of foods?

$$(1 + 2) + 1\frac{1}{2} + 1\frac{1}{2} = 6$$

ii) Differentiate between bubble column and airlift bioreactors. What is a chemostat? Mention the processes for immobilisation of enzymes.  $2+2+2=6$

iii) Is Pasteurization a process of sterilization? Explain. What should be the ideal characteristics of an industrially important microbial strain of high yielding potential? What is auxanography?  $2+2+2=6$

iv) Write down two advantages and two disadvantages of solid state fermentation. What is HACCP?  $(2+2)+2=6$

v) Write down two microorganisms responsible for the retting of jute. What is HET strains? Mention its importance in industrial production of alcohol. Why phenyl acetic acid is considered to be an essential component in the growth medium for penicillin production?  $2+(1+1)+2=6$

vi) Differentiate between fed-batch and continuous culture systems. Draw a flow chart for the production of microbial biopolymer in industrial scale. Name one organism used for industrial production of citric acid.  $3+2+1=6$

8. Answer any **one** of the following:  $10 \times 1 = 10$

i) Write short notes on the following (any **four**):  $2\frac{1}{2} \times 4 = 10$

a) Idli,

b) Appertization

c) Prerequisite of a fermenter

d) Lyophilisation

e) Isolation of a protease producing microorganism

f) Alidophilus milk.

ii) a) Name the causative agent of Salmonellosis. What are the symptoms of this disease?

b) What are 'Z value' and 'D value'? What are the importances of these two parameters in heat mediated preservation processes of food items? Mention the reasons for spoilage of canned food items?

$(1+2)+(3+2)+2=10$