

M.Sc. Examination, 2018

Semester – IV

Biotechnology

Core Course-XVII

(Bioprocess Engineering & Technology, Bioentrepreneurship)

Time: 3 Hours

Full Marks: 40

Questions are of value as indicated in the margin.

Answer any three questions from Group A and any one question from Group B

Group-A

1. What are the different components of a fermentor? Distinguish between batch and continuous fermentation process. Briefly outline the type of fermentor used for industrial production of alcohols, enzymes and hormones. 4+3+3=10
2. Mention six microbial species used in industry for production of organic acids, amino acids and vitamins (two for each product). Describe the process of industrial production of citric acid focusing on organisms used, raw materials, operating conditions of the fermentor and downstream processing. 3+7=10
3. What are single cell proteins (SCP)? Name three organisms used as SCP and their protein value. Describe the mass scale production of *Spirulina* and its beneficial use as food supplement. 1+3+6=10
4. What are biofertilizers? Name the symbiotic and free living nitrogen fixing microorganisms used as biofertilizer for pulses and cereals. Describe the process of mass multiplication of cyanobacteria biofertilizer and its mode of application. 1+4+5=10
5. Write notes on **any four** of the following: 4×2.5=10
 - (i) Photobioreactor and its use
 - (ii) Cell disruption in Down Stream processing
 - (iii) Whole cell immobilization in Down Stream processing
 - (iv) Biodiesel from algae
 - (v) Isolation of industrially important microorganisms
 - (vi) Mycorrhiza

Group-B

1. What are the support mechanisms of Dept. Biotechnology, Govt. of India for biotechnology entrepreneurship? List four different organizations of Govt. of India support biotechnology research. How proposals are prepared and the procedure followed for funding. 5+2+3=10

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(2)

2. Give an account of the knowledge centres for Research and Development in Biotechnology in India. List five different biotechnology products released at these centres for commercialization. 5+5=10
 3. Write notes on *any two* of the following: 5×2=10
 - (a) Small scale set-up of biotechnology industry.
 - (b) Management for technology transfer in Biotechnology.
 - (c) Team building in Biotechnology.
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