13/ 1·30 pm

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATIONS- 2025

MSc (Micro) - Semester III

COURSE CODE (CREDITS): 24MS1MB311 (3-0-0) MAX. MARKS: 25

COURSE NAME: Microbial Genetics and Physiology

COURSE INSTRUCTORS: Dr Tyson/Dr Ashok Nadda MAX. TIME: 1 Hour 30 Min

Note: *(a) All questions are compulsory.*

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q.No	Question	Marks
Q1	Explain the growth curve of microorganisms in a batch culture.	2
Q2	Compare and contrast batch, and continuous cultivation systems. Discuss the advantages, disadvantages and industrial applications of continuous culture system.	3
Q3	Explain the strategy to avoid the lag phase in batch cultivation system.	2
Q4	Which cultivation method is preferred for producing secondary metabolites like antibiotics and why? Explain how metabolite production (primary vs secondary) differs between batch and continuous cultivation.	4
Q5	Explain the molecular mechanism of catabolite repression in the lac operon of *Escherichia coli*. How does the cAMP-CRP complex interact with the promoter region, and what role does glucose concentration play in this process?	3
Q6	Describe the dual regulatory roles of the AraC protein in the arabinose operon of *E. coli*. How does its conformation change in the presence of arabinose, and what are the implications for transcription initiation at the araBAD promoter?	3
Q7	Outline the mechanism of mating type switching in *Saccharomyces cerevisiae*, focusing on the role of the HO endonuclease and the silent cassettes (HML and HMR).	4
Q8	Define cis-trans complementation tests and explain their use in defining functional units (cistrons) in genetics. Using Seymour Benzer's rII locus in T4 bacteriophage as an example.	4