

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION MO/2024)

CLASS: BTECH
BRANCH: BIOTECHNOLOGY

SEMESTER : VII
SESSION : MO/2024

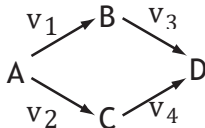
SUBJECT: BE313 METABOLIC ENGINEERING

TIME: 02 Hours

FULL MARKS: 25

INSTRUCTIONS:

1. The question paper contains 5 questions each of 5 marks and total 25 marks.
 2. Attempt all questions.
 3. The missing data, if any, may be assumed suitably.
 4. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates
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|---|-----|-----------|---------------------|
| Q.1(a) With a neat flow chart, explain the steps involved in the biosynthesis of secondary metabolites? | [5] | CO
CO1 | BL
Understanding |
| Q.2(a) What is metabolism, catabolism, anabolism? | [2] | CO1 | Applying |
| Q.2(b) Discuss about the regulation of metabolic pathways. | [3] | CO1 | Remembering |
| Q.3(a) Define feedback inhibition. | [2] | CO1 | Analyzing |
| Q.3(b) Write about isotopic flux measurement and its uses? | [3] | CO2 | Remembering |
| Q.4(a) Derive the stoichiometry matrix for each of the following networks. Write out the mass-balance equation for the following branched system: | [5] | CO2 | Evaluating |
|  | | | |
| Q.5(a) Consider a pharmaceutical company that manufactures two drugs, say x and y, from two genetically engineered organisms, A and B. Let us assume that organism A can produce at maximum 4 kg of drug x per day and organism B a maximum of 2 kg of y per day. Let us also assume that the factory can only process a total of 5 kg of any drug per day due to packaging equipment limitations. If the company can make a profit of \$100 per kg for drug x and a profit of \$150 per kg for drug y, what is the optimal rate at which each drug should be manufactured in order to maximize profit? | [5] | CO2 | Evaluating |

:20/09/2024:M