

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

BSc. Engineering Examinations (January 2021 Term)

Sub: **IPE 307** (Operations Research)

Full Marks: 20 Section Marks: 105 Time: 20 Mins

ASSUME REASONABLE VALUES FOR MISSING OR INCORRECT DATA, IF ANY

URGENT: Upload your scanned PDF. The document must be saved as **Student Number_CT2**

Q.1 Mr. Jim is skilled maintenance technician. He works in a small factory of two machines. A His job is to keep the two machines in working order. The amount of time that a machine works before breaking down has an exponential distribution with a mean of 10 hours. The time then spent by the maintenance person to repair the machine has an exponential distribution with a mean of 8 hours.

Required:

- a. Present that this process fits the birth-and-death process by defining the states, specifying the values of the λ_n and μ_n , and then constructing the rate diagram. Explain the value of λ_n and μ_n .
- b. Calculate the P_n .
- c. Calculate L , Lq , W , Wq .
- d. Determine the proportion of time that Mr. Jim is busy.
- e. Determine the proportion of time that any given machine is working.