COURSE CODE: CIT756
COURSE TITLE: Operations Research
CREDIT: 2 Units
TIME ALLOWED: 2 Hours
INSTRUCTION: Answer Question ONE (1) and any other THREE (3) Questions

1(a) Analyse the concept of problem definition in operation research   [5 marks]

(b) Give the Differences between Critical Path Analysis (CPA) and Programme Evaluation and Review Technique (PERT)   [4 marks]

(c) Assume a single channel service system of a library in a school. From past experiences it is known that on an average, every hour 8 students come for issue of the books at an average rate of 10 per hour. Determine the following:
(i). Probability of the assistant librarian being idle   2 marks
(ii). Probability that there are at least 3 students in the system   2 marks
(iii). Expected time that a student is in queue   2 marks

(d) State the steps involved in calculation of replacement policy when money value changes   [5 marks]

(e) Analyse the behavior of customers while waiting in a queue   [5 marks]

2(a) Analyse the concept of solution development in operation research   [[5 marks]

(b) A special diet for a patient in the hospital must have at least 8000 units of vitamins, 100 units of minerals and 2800 units of calories. Two types of foods X and Y are available in the market at the cost of #8 and #6 respectively. One unit of X contains 40 units of vitamins two units of minerals and 80 units of calories. One unit of food B contains 200 units of vitamins, four units of minerals and 80 units of calories. Form a mathematical model and state the constraints to find the combination of foods X and Y that can be used so that the minimum requirement of vitamins, minerals and calories is maintained and the cost incurred by the hospital is minimised?   [10 marks]

3 (a) Arrival rate of customers at a photocopying centre is according to Poisson distribution, with an average time of 12 minutes between two consecutive customers' arrival. The length of