



OFFICE OF THE DEPUTY PRINCIPAL

ACADEMICS, RESEARCH AND STUDENTS' AFFAIRS

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## UNIVERSITY EXAMINATIONS

**2023 /2024 ACADEMIC YEAR**

**..3.... YEAR .....2... SEMESTER REGULAR EXAMINATION**

**FOR THE DEGREE OF BACHELOR OF BUSINESS**

**MANAGEMENT**

**COURSE CODE: BBM 351 (MAIN EXAM)**

**COURSE TITLE: OPERATION RESEARCH**

**DATE: 19/04/24**

**TIME: 9AM - 12 PM**

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**THIS PAPER CONSISTS OF 5 PRINTED PAGES**

**PLEASE TURN OVER**

**REGULAR – MAIN EXAM**

**BBM 351: OPERATION RESEARCH**

**STREAM: DEGREE**

**DURATION: 3 Hours**

**INSTRUCTIONS TO CANDIDATES**

- i. Answer Question **ONE** and any other **TWO** questions.
- ii. Maps and diagrams should be used whenever they serve to illustrate the answer.
- iii. Do not write on the question paper

**QUESTION ONE**

- a) Explain the advantages of operations research in the modern firms (6 Marks)
- b) Discuss the phases of operations research (6 Marks)
- c) Basic assumptions of linear programming problems (4 Marks)
- d) Solve the given LPP using the graphical method.

Maximize  $Z = 50x_1 + 80x_2$  Subject to the constraints

$$1.0x_1 + 1.5x_2 \leq 600$$

$$0.2x_1 + 0.2x_2 \leq 100$$

$$0.0x_1 + 0.1x_2 \leq 30$$

And  $x_1 \geq 0, x_2 \geq 0$  (10 Marks)

- e) Discuss the limitations of operations research (4 Marks)

**QUESTION TWO**

- a) Find the basic feasible solution of the given transportation problem by applying North – West Corner rule (10 Marks)

	1	2	3	4	SUPPLY
A	42	48	38	37	160
B	40	49	52	51	150
C	39	38	40	43	190
DEMAND	80	90	110	220	500

- b) A computer center has four expert programmers & needs to develop four application programmes. The head of the computer Centre, estimates the computer time (in minutes) required by the respective experts to develop the application programmes as follows:

PROGRAMMES \ PROGRAMMERS	A	B	C	D
1	120	100	80	90
2	80	90	110	70
3	110	140	120	100
4	90	90	80	90

Find the assignment pattern that minimize the time required to develop the application programmes. (10 Marks)

### QUESTION THREE

- a) A small project has been broken down into 10 activities A-J, with the following dependencies and duration

ACTIVITY	PREREQUISITES	DURATION (WEEKS)
A	-	5
B	-	7
C	A,B	8
D	-	10
E	C	10
F	B	5
G	C, F, H	8
H	D	12
I	D	7
J	I	9

REQUIRED;