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# GUJARAT TECHNOLOGICAL UNIVERSITY

**MBA SEMESTER-2 EXAMINATION– WINTER 2018**

**Subject Code: 820007 Date: 28/12/2018**

**Subject Name: Research Methodology and operations research (RM & OR)**

**Time:2:30PM To 5:30PM Total Marks: 70**

**Instructions:**

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

| Q. No. | | Question Text and Description | Marks |
|---|---|---|---|
| Q.1 | **(a)** | What, if any, are the differences between solicited and unsolicited proposals? | **07** |
| | (b) | Distinguish between the following:<br>(1) Exploratory and formal studies.<br>(2) Experimental and ex post facto research designs. | **07** |
| Q.2 | **(a)** | Write the dual of the following problem.<br><br>Minimize Z = 3u + 4v<br>subject to 5u + 6v ≥ 7,<br>8u + 9v ≥ 10,<br>u, v ≥ 0. | **07** |
| | **(b)** | Explain the difference between Qualitative and Quantitative Research. | **07** |
| | | **OR** | |
| | **(b)** | Explain in detail various steps of the research process. | **07** |
| Q.3 | **(a)** | An automobile company wants to launch premium segment SUV in Indian market. Before launching it, the company wants to conduct market research on"Understanding Customer preference and purchase intention for premium segment SUV in India". Prepare a questionnaire for the same. | **07** |
| | **(b)** | On an average, 5 customers reach a barber's shop every hour. Determine the probability trust exactly 2 customers will reach in a 30 minute period, assuming the arrivals follow poisson distribution. | **07** |
| | | **OR** | |
| Q.3 | **(a)** | What is Simulation? Describe Monte Carlo Simulation. Explain applications of simulation in business environment. | **07** |
| | **(b)** | What do we mean by 'Duality'? Write some important features of 'Primal & Dual' problem.<br><br>Write the dual of the following problem<br>Minimise $Z=10X_1+20X_2$<br><br>Subject to $3X_1+2X_2\geq 18$<br>$X_1+3X_2\geq 8$<br>$2X_1-X_2\leq 6$<br>$X_1,X_2\geq 0$ | **07** |



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**Q.4** **(a)** Explain the basic concepts of Sensitivity Analysis. What are the different factors affecting the given solutions and how do we resolve them? Give a brief comment on each of them. **07**

**(b)** Solve Graphically: **07**

Maximise $Z=10X_1+15X_2$

Subject to $2X_1+X_2 \leq 26$
$2X_1+4X_2 \leq 56$
$X_1-X_2 \geq -5$
$X_1, X_2 \geq 0$

**OR**

**Q.4** **(a)** What is a research? State each aspect of a good research and write distinct features or characteristics of that aspect. **07**

**(b)** **07**

Find a simple (linear) regression using the following data.

| X | Y |
|---|---|
| 5 | 58 |
| 10 | 41 |
| 10 | 45 |
| 15 | 27 |
| 15 | 26 |
| 20 | 12 |
| 20 | 16 |
| 25 | 3 |

**Q.5** (a) Define hypothesis in research terminology. What is a null hypothesis? Give important features on each of the followings. **07**
(1) Descriptive Hypothesis (2) Explanatory Hypothesis.
Explain type-I and type –II errors

(b) A Travelling salesman has to visit five cities. He wishes to start from a particular city, visit each city once and then return to his starting point. The travelling cost (in Rs.) of each city from a particular city is given below. What should be the sequence of the salesman's visit, so that the cost is minimum? **07**

| | | To city | | | | |
|---|---|---|---|---|---|---|
| | | **A** | **B** | **C** | **D** | **E** |
| **From city** | **A** | α | 2 | 5 | 7 | 1 |
| | **B** | 6 | α | 3 | 8 | 2 |
| | **C** | 8 | 7 | α | 4 | 7 |
| | **D** | 12 | 4 | 6 | α | 5 |
| | **E** | 1 | 3 | 2 | 8 | α |

**OR**



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**Q.5** (a) Explain salient features of 'Goal Programming'. **07**

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(b) You work as a sales manager for a toy manufacturer, and you currently have three salespeople on the road meeting buyers. Your salespeople are in Austin, TX; Boston, MA; and Chicago, IL. You want them to fly to three other cities: Denver, CO; Edmonton, Alberta; and Fargo, ND. The table below shows the cost of airplane tickets in dollars between these cities. **07**

Denver Edmonton Fargo Austin 250 400 350 Boston 400 600 350 Chicago 200 400 250 Where should you send each of your salespeople in order to minimize airfare?

| From \ To | D | E | F |
|---|---|---|---|
| A | 250 | 400 | 350 |
| B | 400 | 600 | 350 |
| C | 200 | 400 | 250 |

Where should you send each of your salespeople in order to minimize airfare?

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