

GUJARAT TECHNOLOGICAL UNIVERSITY
M. E. - SEMESTER –IV • EXAMINATION – SUMMER • 2014

Subject code: 744601**Date: 04-06-2014****Subject Name: Productivity Engineering and Management****Time: 02:30 pm - 05:00 pm****Total Marks: 70****Instructions:**

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

- Q.1** (a) Explain the conventional concept of productivity. Also mention the relevance of quality and financial aspect with productivity. **07**
- (b) Explain the difficulties encountered at different levels while calculating productivity of a system. **07**
- Q.2** (a) Joanna French is currently working a total of 12 hours per day to produce 240 dolls. She thinks that by changing the paint used for the facial features and fingernails that she can increase her rate to 360 dolls per day. Total material cost for each doll is approximately \$3.50; she has to invest \$20 in the necessary supplies (expendables) per day; energy costs are assumed to be only \$4.00 per day; and she thinks she should be making \$10 per hour for her time. Viewing this from a total (multifactor) productivity perspective, what is her productivity at present and with the new paint? How would total (multifactor) productivity change if using the new paint raised Ms. French's material costs by \$0.50 per doll? **07**
- (b) Define productivity. What is its significance? How do you evaluate different productivity measures/indices so that the firm can grow? **07**
- OR**
- (b) Explain multi-factor productivity. Also explain different factors affecting productivity. **07**
- Q.3** (a) Define Business Process Reengineering. What are the basic principles of BPR? Also mentions the myths about BPR. **07**
- (b) Explain the role of information technology in reengineering. **07**
- OR**
- Q.3** (a) Explain the different BPR methodologies given by Hammer and Champy and Devenport. **07**
- (b) Explain the barriers and critical success factors to BPR. **07**
- Q.4** (a) Explain the step-by-step approach of Performance Objectives i Productivity (PO-P) Model. **07**
- (b) List typical Key Performance Areas (KPA's) and their related Performance Objectives for production and materials sub-systems. **07**
- OR**
- Q.4** (a) Comprehensively explain strengths and limitations of small scale industries. **07**
- (b) Explain the difficulties in measuring productivity of service sectors. **07**
- Q.5** (a) Comprehensively compare following three models of productivity measurement. **07**
- i) Surrogate model
- ii) Economic utility model
- iii) Systems approach model

Q.5 (b) DeWitt productivity measurement model suggests calculation of following three parametersé **07**

- i) Personnel productivity (Revenue per employee, Operating income per employee, Net earnings per employee)
- ii) Capital productivity (Revenue per stock holder's equity, Operating income per stock holder's equity, Net earnings per stock holder's equity)
- iii) Facilities productivity (Revenue per plant and equipment invested, Operating income per plant and equipment invested, Net earnings per plant and equipment invested)

You have to use this model to compare the performance of two supermarket stores of a large public limited company dealing in supermarket chains. One store is located in Mumbai and another in Gandhidham.

Will the approach of data collection and analysis remain same for both the stores? ĩ Justify your answer.

OR

Q.5 (a) A small firm engaged in manufacturing a product which requires moderate investments in plant and machinery. The product requires standard raw materials, easily available in the market. However, the product needs skilled and trained manpower. At present the firm has total 10 employees. In the current period the firm has produced total products worth Rs. 90,00,000/- . For this they have worked for 300 days with all the employees working in single shift of 8 hours. The firm has arrived at the common hourly rate of employees at Rs. 100/hour. Similarly, they have also worked out the common capital equipments input in terms of money as Rs. 1,00,000/year. For total production worth 90 lacs they have purchased two types of raw materials one totaling at 25,000/- and another at 35,000/- **07**

The firm wishes to find out their Total Productivity Index (TPI) and for that the base period figures considered are as below.

- i) Total production = Rs. 87,00,000/-
- ii) Total no. of days worked = 301 days with one shift of 8 hours
- iii) Total no. of employees involved = Same as current period
- iv) Common hourly rate of employees = Rs. 90/hour
- v) Total amount of raw materials purchased = Rs. 55,000/-
- vi) Equivalent capital equipments input in terms of money = Same as current period

Apply following model and find out Total Productivity Index (TPI) for the firm.

$$\text{Total Productive Measure (TPM)} = V / (M+Q+C)$$

Whereé

V = value of the total output

M = input of manpower in cash or man-years

Q = input of materials in cash or man-years

C = input of capital equipment in cash or man-years

$$\text{Total Productivity Index (TPI)} = \text{TPM}_{(\text{current})} / \text{TPM}_{(\text{base})}$$

(b) The Performance Objectives ĩ Productivity (PO-P) Model has been derived from Management by Objectives (MBO). ĩ Justify the statement. **07**
