

JK LAKSHMIPAT UNIVERSITY, JAIPUR

INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination (Regular/ Backlog), Nov.-Dec. 2015

B. Tech in Mechanical Engineering, Semester V

Roll No.....

ME 506: Industrial Engineering and Operation Research

Time: 3 hours

Max. Marks: 100

Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever required are an integral part of the answer.

Q.1A Objective type multiple choice questions (10 questions @ 1 mark)

10

- i. Value is usually considered as a relationship between
(a) Utility and cost (b) Profit and cost
(c) Psychology and reliability (d) Appearance and utility
- ii. Production cost per unit can be reduced by:
(a) Producing more with increased inputs (b) Producing more with the same inputs
(c) Eliminating idle time (d) Minimizing resource waste
- iii. In value engineering important consideration is given to:
(a) Cost reduction (b) Profit maximization
(c) Function concept (d) Customer satisfaction.
- iv. Simplex method of solving linear programming problem uses
(a) All the points in the feasible region (b) Only the corner points of the feasible region
(c) Intermediate points within the infeasible region
(d) Only the interior points in the feasible region
- v. A feasible solution to the linear programming problem should
(a) Satisfy the problem constraints (b) Optimize the objective function
(c) Satisfy the problem constraints and non-negativity restrictions
(d) Satisfy the non-negativity restrictions
- vi. Vehicle manufacturing assembly line is an example of:
(a) Product layout (b) Process layout (c) Manual layout (d) Fixed layout
- vii. The type of layout suitable for use of the concept, principles and approaches of 'group technology' is:
(a) Product layout (b) Job-shop layout (c) Fixed position layout (d) Cellular layout
- viii. Flow process chart contains
(a) Inspection and operation (b) Inspection, operation and transportation
(c) Inspection, operation, transportation and delay
(d) Inspection, operation, transportation, delay and storage
- ix. MTM is a work measurement technique by:
(a) Stopwatch study (b) Work sampling study
(c) Pre-determined motion time systems (d) Past data comparison
- x. The principles of motion economy are mostly used while conducting
(a) A method study on an operation (b) A time study on an operation (c) A financial appraisal of an operation (d) A feasibility study of the proposed manufacturing plant

- Q.2 Short answer type questions (4 questions @ 2.5 marks) 10
- What is the standard deviation of the project completion time along the critical path? If the standard deviation of the corresponding activity are s_1 , s_2 and s_3 ,
 - In a time study exercise, the time observed for an activity was 54 seconds. The operator had a performance rating of 120. A personal time allowance of 10% is given. The standard time for the activity in seconds is
 - A stop watch time study on an operator with a performance rating of 120 yielded a time of 2 minute. If allowances of 10% of the total available time are to be given, the standard time of the operation is:
 - What are the objectives of method study?
- Q.3A What do you understand by the term Plant Layout? What are the principles of a good plant layout? 05
- Q.3B Propose suitable material handling equipment required in the stores of an automobile factory. Justify your proposals. 05
- Q.4A Define and explain the concept of productivity? How it is related to work study? 05
- Q.4B Write short note on SIMO-chart. 05
- Q.5A Define the term 'standard time' and list the common allowances given in work standard. 05
- Q.5B Give the concept, advantages and applications of value engineering. 05
- Q.6A Two products A and B are to be machined on three machine tools, P, Q and R. Product A takes 10 hrs on machine P, 6 hrs on machine Q and 4 hrs on machine R. The product B takes 7.5 hrs on machine P, 9 hrs on machine Q and 13 hrs on machine R. The machining time available on these machine tools, P, Q, R are respectively 75 hrs, 54 hrs and 65 hrs per week. The producer contemplates profit of Rs. 60 per product A, and Rs. 70 per product B. Formulate LP model for the above problem and show the feasible solutions to the above problem? Estimate graphically/ geometrically the optimum product mix for maximizing the profit. Explain why one of the vertices of the feasible region becomes the optimum solution point. 15
- Q.6B List the various Therbligs with their symbols. Explain the application of Micro Motion Study. 10
- OR
- Q.6B Differentiate between merit rating and job evaluation. In what way is merit rating depend on job evaluation. 10
- Q.7A A building project consists of 10 activities; their estimated duration is given below. 15
- | Activity | Duration |
|----------|----------|
| 1 - 2 | 5 |

2 - 3	2
2 - 4	6
3 - 5	4
3 - 6	4
4 - 5	2
4 - 7	3
5 - 8	7
6 - 8	8
7 - 8	2

Draw the network and compute

- (i) Event times
- (ii) Activity time
- (iii) Total float
- (iv) Critical path

Q.7B What are the principal difficulties with P.E.R.T.? How can they be overcome? 10

OR

Q.7B Differentiate between PERT & CPM in detail. 10