

BACHELOR OF ENGINEERING IN MECHANICAL ENGINEERING EXAMINATION – 2019
Subject: Industrial Management

Time: Three Hours

Full Marks: 100

Different parts of the same question should be answer together. Answer all questions for 100 marks

1. a) **In manufacturing**, we determine the number of units of different products which should be produced & sold by a firm when each product requires a fixed manpower, machine hrs, labourhr per unit of product, warehouse space per unit of the output etc., in order to make maximum profit.

A manufacturing company makes two models A and B of a product. Each piece of Model A requires 9 labour hours for fabricating and 1 labour hour for finishing. Each piece of Model B requires 12 labour hours for fabricating and 3 labour hours for finishing. For fabricating and finishing, the maximum labour hours available are 180 and 30 respectively. The company makes a profit of Rs. 8000 on each piece of model A and Rs 12000 on each piece of Model B. How many pieces of Model A and Model B should be manufactured per week to realise a maximum profit? What is the maximum profit per week? Use Graph paper.

1. b) In past ten weeks, sales of Gear Boxes of M/s XYZ Gears Ltd. have been as follows. Use a 3 period weighted moving average to forecast the sales for week 11 giving a weight of 0.6 to the most recent period, 0.3 to the second most recent period, and 0.1 to the third most recent period. What are the common smoothing methods in forecasting?

Week	Sales	Week	Sales	Week	Sales	Week	Sales
1	110	4	120	7	130	10	130
2	115	5	125	8	115		
3	125	6	120	9	110		

1. c) Explain MAD and Tracking.

Marks Distribution : 8+ 8 + 2+2 = 20

2. a) Establish the relationship among the activities, A, B, C & D in Activity-on-Arrow system in network analysis below in project management.

Figure A:

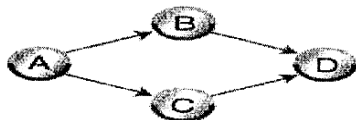
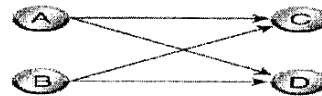


Figure B:



2. b) A manufacturing company brings new product in their facility identifying 11 activities and their precedence relationships below. Calculate ES, LS, EF, LF and slack.

Activity	Description	Immediate Predecessor	Duration (wks)
A	Develop product specifications	None	4
B	Design manufacturing process	A	6
C	Source & purchase materials	A	3
D	Source & purchase tooling & equipment	B	6
E	Receive & install tooling & equipment	D	14
F	Receive materials	C	5
G	Pilot production run	E & F	2
H	Evaluate product design	G	2
I	Evaluate process performance	G	3
J	Write documentation report	H & I	4
K	Transition to manufacturing	J	2

2. c) Analyze Process Layout and Product Layout for a manufacturing process.

Marks Distribution : 8+ 8 + 2+2 = 20

3. a) Identify business risks and associated actions required for improvement for clauses number of the ISO 9001:2015 standard in the following table.

[Turn over

Clause No & Clause title in ISO 9001:2015	Associated risk	Action required
7.1.4 Environment for the operation of processes		
7.2 Competence		
8.3.5 Design and development outputs		
8.5.2 Identification and traceability		
8.5.5 Post-delivery activities		
10.2 Nonconformity and corrective action		

OR : Find out the sequence and corresponding schedules in the following case. The matrix shows the machining times (in time unit) in different machines. Machining sequence: M1→M2→M3.

Job: A B C D E F G

M1: 1 3 7 9 4 5 2

M2: 1 3 8 2 8 6 1

M3: 8 10 9 11 9 14 12

3. b) Prepare a Quality Assurance Plan (QAP) for the inspection of the CI Spur Gear with a standard specification of your choice. The contents in the header of the format need to be prepared.

OR. Define the term 'Quality'. With appropriate examples discuss about quality control by (i) attributes and (ii) variables.

Marks Distribution : 14+ 6 = 20

4. a) Prepare a flow chart mentioning all the steps required in purchase function. Mention the required format/s in appropriate activity in the flow chart.

OR: a) A time study has been conducted to observe the response time of a bellboy against the customers' call in a 5-star hotel. Observed times are as follows:

Sl.	1	2	3	4	5	6	7	8	9	10	11	12
Time	5.86	5.67	5.94	4.51	4.65	6.01	5.17	16.09	4.22	4.19	5.24	4.81

The performance rating is given as 1.10. Allowances of 5% and 2% are applicable for the work. Find out the standard time of the bellboy for the job.

b) Prepare a Cause and Effect Diagram of the Failure due to Blow Holes in Cast Iron gear blank component. taking at least three root causes of each main cause.

c) Critically analyze the requirements of an appropriate type of organization structure in a Constriction Company.

Marks Distribution : 10+6+ 4 = 20

5. a) Define Item Cost, Holding Costs, Ordering Cost, Lead time and Fixed-order quantity- any four.

b) Derive the expression of Economic Ordering Quantity. Mention the assumptions.

c) XYZ mfg. co. is offering price discount facilities for a particular product to its customers as shown below. A retailer of the company at Jhansi has an annual demand of 2500 units of the said product. The carrying cost, as estimated by the retailer according to the past experience, is 10% of the price per product and the ordering cost is estimated at Rs.100 per order. Determine the size of the order the retailer should place with the company so that the total annual stocking cost is minimum. What is the feasible EOQ?

Number of units	50-99	100-149	150 and above
Rs./unit	2000	1900	1800

d) With neat sketch analyze the stages of maintenance of machine.

Marks Distribution : (1.5X4) = 6+6+5+ 3 = 20