

SCHEME OF EVALUATION					
(Scoring indicators) SET B					
REVISION	2021			COURSE CODE	5001 B
COURSE TITLE	INDUSTRIAL MANAGEMENT AND SAFETY				
QUESTION NO.	SCORING INDICATORS	SPLIT UP SCORE	SUB TOTAL	TOTAL	
	Part A				
1	Organizational structure	1	1	9×1 =9	
2	Authority	1	1		
3	Total Quality Management	1	1		
4	Predecessor Event	1	1		
5	Critical Path Method	1	1		
6	Inadequate machine guarding, Excessive noise	2x0.5	1		
7	Wages	1	1		
8	Earliest Finish Time(EFT)	1	1		
9	Fitness for use.	1	1		
	Part B				
II 1	The just-in-time (JIT) inventory system minimizes inventory and increases efficiency. JIT production systems cut inventory costs because manufacturers receive materials and parts as needed for production and do not have to pay storage costs. Manufacturers are also not left with unwanted inventory if an order is cancelled or not fulfilled.	3x1	3	3	
2	1. Training is crucial for organizational development and success. 2. It is fruitful to both employers and employees of an organization. 3. An employee will become more efficient and productive if he is trained well.	Any three 3x1	3	3	
3	1. Durability 2. Suitability 3. Dependability 4. Reliability 5. Affordability 6. Value of Money.	6x0.5	3	3	
4	<u>Functions of management</u>	List out 1 Explain 4x0.5	3	3	

	<ol style="list-style-type: none"> 1. Planning 2. Organizing 3. Staffing 4. Directing 5. Controlling <p>Write one sentence for each point</p>																								
5	<ol style="list-style-type: none"> 1. Optimistic time, t_o (a minimum time) – In this, it is assumed that everything will go well. It is the time estimate of the minimum possible time which an activity takes for the completion under ideal conditions. In this no provisions are made for delays or breakdowns. 2. Most likely time, t_m (an average time) – In this it is assumed that things go in normal way with a few delays or setbacks. This estimate of time lies between the optimistic and pessimistic time. 3. Pessimistic time, t_p (a maximum time) – This time is based on the assumption that everything will go badly. Thus it is the maximum possible time taken for the completion of an activity. 	3x1	3	3																					
6	<ol style="list-style-type: none"> 1. Gathering the data 2. Selecting Compensable factors 3. Evaluating a Job 4. Assigning pay to the job 	Any three 3x1	3	3																					
7	<table border="1"> <thead> <tr> <th>Sl. No.</th> <th>PERT</th> <th>CPM</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>It is a probabilistic model with uncertainty in activity duration</td> <td>A deterministic model with well known activity timing</td> </tr> <tr> <td>2</td> <td>Has 3 time estimate</td> <td>Has only 1 time estimate</td> </tr> <tr> <td>3</td> <td>Event oriented technique</td> <td>Activity oriented technique</td> </tr> <tr> <td>4</td> <td>Suitable in defence, R&D Projects</td> <td>Suitable for civil, construction work, mechanical works, scheduling of paint maintenance etc.</td> </tr> <tr> <td>5</td> <td>Does not give importance to critical path</td> <td>Gives due importance to critical path</td> </tr> <tr> <td>6</td> <td>It uses statistical method to calculate expected time</td> <td>Need not require statistical techniques</td> </tr> </tbody> </table>	Sl. No.	PERT	CPM	1	It is a probabilistic model with uncertainty in activity duration	A deterministic model with well known activity timing	2	Has 3 time estimate	Has only 1 time estimate	3	Event oriented technique	Activity oriented technique	4	Suitable in defence, R&D Projects	Suitable for civil, construction work, mechanical works, scheduling of paint maintenance etc.	5	Does not give importance to critical path	Gives due importance to critical path	6	It uses statistical method to calculate expected time	Need not require statistical techniques	Any Three 3x1	3	3
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8	<ol style="list-style-type: none"> 1. Improper Safety Wearing 2. Operating equipment without authority 3. Severity of Work 	Any3 points 3x1	3	3
9	<p>i) Accident – It is an unplanned incident that happens unexpectedly typically resulting in damage or injury to person.</p> <p>ii) Performance Index- Performance index is the square root of the product of frequency and severity rate divided by 1000.</p> <p>iii) Severity rate- The number of days compensated for 1000 worked hours, that is the number of days lost by temporary disability for 1000 worked hours.</p>	3x1	3	3
10	<ol style="list-style-type: none"> 1. Formulate the linear programming problems 2. Plot the given constraint lines considering them as equations. 3. From the above graph identify the feasible solution region. 4. Locate the corner points of the feasible solution region. 5. Calculate the value of the objective function on the corner points. 6. Now choose the point where the objective function has optimal value. 	6x0.5	3	3
	Part C			
III	<p><u>Types of Organizational Structure</u></p> <p>The types of organizational structure are</p> <ol style="list-style-type: none"> 1. Line Organization 2. Staff Organization 3. Functional Organization 	List out 1+ Explain (3x2)	7	7
	or			
IV	<ol style="list-style-type: none"> 1.Division of work 2.Authority and responsibility 3.Discipline 4.Unity of command 5. Unity of direction 6.Subordination of individual interest to general interest 7.Remuneration 8.Centralization 9.Scalar chain 10. Order 11.Equity 12. Stability of tenure of personnel 13. Initiation 14. Espirit Decorps 	14x0.5	7	7

V	<p><u>ABC Model</u></p> <p>In this model material is classified into three class A class B and class C.</p> <p>1)Class A: It consists 10 % of the total no of items and 70 % of the total money value for all the items. High value item, high control and security is required.</p> <p>2)Class B: It consists 20 % of the total no of items and 20 % of the total money value for all the items. It's between Class A and Class C moderately control materials.</p> <p>3)Class C: It consists 70 % of the total no of items and 10 % of the total money value for all the items. It consist low value material.</p>	List out 1 + Explain (3X2)	7	7
or				
VI	<p>ISO 9000 Series</p> <ol style="list-style-type: none"> 1.ISO 8402 2.ISO 9001 3.ISO 9002 4.ISO 9003 5.ISO 9004 	List out 2 + Explain (5x1)	7	7
VII	<p><u>CPM application</u></p> <ol style="list-style-type: none"> 1. Construction of civil and mechanical projects 2. Electrical and electronic product manufacturing and assembling 3. Equipment maintenance 4. Setting up new industry <p><u>PERT Application</u></p> <ol style="list-style-type: none"> 1. Research and development activity 2. Military operations 3. Design and development of new product. 4. Weather forecasting 	CPM 4 + PERT 3	7	7
or				

A furniture manufacturer makes two products x_1 and x_2 namely chairs and tables. Each chair contributes a profit of Rs. 20 and each table that of Rs. 40. Chairs and tables, from raw material to finished product, are processed in three section S_1 , S_2 , and S_3 . In section S_1 each chair (x_1) requires one hour and each table (x_2) requires 4 hours of processing. In section S_2 , each chair requires 3 hours and each table 1 hour and in section S_3 the times are 1 and 1 hour respectively. The manufacturer wants to optimize his profits if sections S_1 , S_2 and S_3 can be availed for not more than 24, 21 and 8 hours respectively.

Solution :

The first step is to formulate the linear programming model, ie, a mathematical model from the data given above. The model is as under :

$$\begin{aligned} \text{Maximize } z_{\max} &= 20x_1 + 40x_2 \\ \text{Subject to } x_1 + 4x_2 &\leq 24 \quad \text{---} \quad (C_1) \\ 3x_1 + x_2 &\leq 21 \quad \text{---} \quad (C_2) \\ x_1 + x_2 &\leq 8 \quad \text{---} \quad (C_3) \\ x_1, x_2 &\geq 0 \quad \text{---} \quad (C_4) \end{aligned}$$

C_1 is constraint no. 1 and so on.

The second step is to convert the constraint inequalities temporarily, into equations, ie,

$$\begin{aligned} x_1 + 4x_2 &= 24 \quad \text{---} \quad (C_1) \\ 3x_1 + x_2 &= 21 \quad \text{---} \quad (C_2) \\ x_1 + x_2 &= 8 \quad \text{---} \quad (C_3) \end{aligned}$$

In third step axis are marked on the graph paper and are labelled with variables x_1 and x_2 .

VIII

Formulate 2
+Graph 3+
Result 2

7

7

Fourth step is to draw straight lines on the graph paper using the constraint equations, and to mark the feasible solution on the graph paper. For example, taking first constraint equation,

$$x_1 + 4x_2 = 24.$$

Substitute, $x_1 = 0$, then $x_2 = \frac{24}{4} = 6$.

Next substitute, $x_2 = 0$, then $x_1 = 24$.

Mark the points (0,6) and (24,0), join them. This straight line represents C_1 equation. Similarly constraint equations C_2 and C_3 can be plotted.

$$3x_1 + x_2 = 21$$

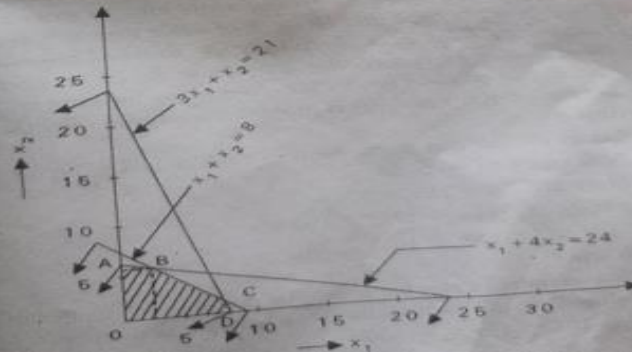
If $x_1 = 0$, $x_2 = 21$. (0, 21)

$x_2 = 0$, $x_1 = \frac{21}{3} = 7$ (7, 0)

$$x_1 + x_2 = 8,$$

If $x_1 = 0$, $x_2 = 8$ (0,8)

$x_2 = 0$, $x_1 = 8$ (8,0)



Any combination of values x_1 and x_2 , which satisfies the constraints and meets the non-negativity condition is called feasible solution. Area OABCD in the Fig. 1, satisfied by the constraints is shown by shaded area and is known as feasible solution region.

Corner point	Coordinate (x_1, x_2)	$Z = 20x_1 + 40x_2$
O	(0, 0)	$20 \times 0 + 40 \times 0 = 0$
A	(0, 6)	$20 \times 0 + 40 \times 6 = 240$
B	(2.5, 5.375)	$20 \times 2.5 + 40 \times 5.375 = 265$
C	(6.25, 1.5)	$20 \times 6.25 + 40 \times 1.5 = 185$
D	(7, 0)	$20 \times 7 + 40 \times 0 = 140$

$$\text{Max } z = 265$$

$$x_1 = 2.5 \text{ and } x_2 = 5.375 \text{ Ans.}$$

9.The 4 E's of accident prevention technique

The 4 E's of accident prevention technique are

1. Engineering

2. Education

3. Enterprising

4. Enforcement

1. **Engineering Methods:** This involves using of proper machine tools, proper transport use protective devices, alarm system, evacuation plan in case of fire etc.

2. **Education:** Educate employees to practices to be followed to

IX

Listout1
+Explain
(4x1.5)

7

7

	<p>ensure safety. It can be done through induction, training, using proper supervisor, forming safety committees etc.</p> <p>3. <u>Enforcement:</u> It's forcing everyone to follow the rules. Everyone should be contributed to ensure safety.</p> <p>4. <u>Emergency Care:</u> Nearly 50% of people in India die on the spot or while transiting to the hospital. If the occurrence of accidents and location can be shared to provide emergency care with in golden hours a lot of lives can be saved.</p>			
	or			
X	<p>Seven ways to prevent accidents in the workplace:</p> <ol style="list-style-type: none"> 1. Always be alert. 2. Conduct 4 E program 3. Don't rush to work. 4. Do safety analysis 5. Wear required safety equipment's. 6. Follow instructions properly . 7. Insist upon proper training 	7x1	7	7
XI	<p><u>TEN MANTHRAS OF TQM</u></p> <ol style="list-style-type: none"> 1. Quality is through continuous involvement and effort. 2. Quality involves hard work and devotion 3. Quality is everybody's business 4. Quality begins cleanliness 5. Take quality and quality will take care everything 6. Make it right for first time 7. Quality is achieved through team work. 8. Document is dependable. 9. Quality is end and begins with education 10. Quality used to evaluate product and services. 	10X0.7	7	7
	or			
XII	Linear Programming is a mathematical tool/technique for	Define 2+ Steps of LPP	7	7

	<p>determining the best uses of an organization's resources. Linear programming deals with the optimization (maximization or minimization) of a function of variables known as objective function subject to a set of linear equalities and/or inequalities known as constraints.</p> <p>Steps to solve Linear Programming Problem</p> <ol style="list-style-type: none"> 1. Formulate the linear programming problems 2. Plot the given constraint lines considering them as equations. 3. From the above graph identify the feasible solution region. 4. Locate the corner points of the feasible solution region. 5. Calculate the value of the objective function on the corner points. 6. Now choose the point where the objective function has optimal value. 	(5X1)	
XIII	<p>1.Activity: It is an individual operation which consumes resource and time. It has beginning and end. An arrow represents an activity</p> <p>2.Event: Event represent a point in time where completion of some activity and beginning of new activity. A circle represents a node.</p> <p>3.Successor event: An event which follows another event is called successor event.</p> <p>4.Predecessor event: The event which occurs before another event is known as predecessor event.</p> <p>5.Dummy activity: A dummy activity which is not utilizing time or resource. It is an imaginary activity represented by dotted arrow line.</p> <p>6.EFT (Earliest finish time): This is the earliest possible time at which an activity can finish. This is represented on the top right corner outside operation in a rectangle.</p> <p>7.LFT (Latest finish time): It is the total time by which and activity should be completed. It is represented by triangle.</p> <p>8.Critical path: The path in which a LFT and EFT are equal is called critical path. It can be represented by double line</p> <p>9.Slack or float: It is the difference between LFT and EFT. In critical path slack or float will be zero.</p>	Any 7 Points 7x1	7
	or		

XIV	Types of Incentives 1. Financial Incentives 2. Non-financial Incentives 3. Semi financial Incentives	List out 1+ Explain (3x2)	7	7
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