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## B.Tech DEGREE EXAMINATION, NOVEMBER 2023

Fifth and Seventh Semester

### 18MEO111T - INDUSTRIAL ENGINEERING

(For the candidates admitted during the academic year 2020 - 2021 & 2021 - 2022)

**Note:**

- i. **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40<sup>th</sup> minute.
- ii. **Part - B** and **Part - C** should be answered in answer booklet.

**Time: 3 Hours**

**Max. Marks: 100**

#### PART - A (20 × 1 = 20 Marks)

Answer all Questions

		Marks	BL	CO
1. Time and motion study is invented by		1	1	1
(A) Taylor	(B) Gilbert			
(C) Taylor and Gilbert	(D) Newton			
2. The term 'O' is represented in the process flowchart		1	1	1
(A) Operation	(B) Storage			
(C) Transportation	(D) Delay			
3. It is observed that the time for an operation is 0.7 minutes. The operator rating is 120. Determine the basic time.		1	3	1
(A) 0.80	(B) 0.82			
(C) 0.84	(D) 0.83			
4. The flow process chart contains		1	2	1
(A) Inspection, and Operation	(B) Inspection, Operation, and Transportation			
(C) Inspection, Operation, Transportation, and Delay	(D) Inspection, Operation, Transportation, Delay, and Storage			
5. Paper industries follow which type of production layout		1	2	2
(A) Line Layout	(B) Process Layout			
(C) Group Layout	(D) Combined Layout			
6. Which is not required for developing the layout		1	2	2
(A) Template and scale model	(B) Flow diagram			
(C) String diagram	(D) Therbligs			
7. Which is not a key element in computerized layout planning?		1	1	2
(A) Logic information	(B) Graphical information			
(C) Process flow information	(D) Numerical information			
8. CRAFT stands for		1	1	2
(A) Computerized Relative Allocation of Facilities Technique	(B) Computerized Rotation Allocation of Facilities Technique			
(C) Computerized Run Allocation of Facilities Technique	(D) Computerized Required Allocation of Facilities Technique			

9. The basic approach of the Job Design is	1	2	3
(A) The behavioral approach to job design			
(B) Efficiency through job specialization			
(C) Efficiency through job specialization and The behavioral approach to job design			
(D) The Environmental approach to job design			
10. Which is not true for the design of the work system	1	2	3
(A) Teams			
(B) Motion Study			
(C) Working Conditions			
(D) Capital Cost			
11. Sugar is developed by using which production line	1	2	3
(A) Mass production flow			
(B) Process production flow			
(C) Project production flow			
(D) Batch production flow			
12. The output in a given period divided by the labor hours used in that period is known as	1	1	3
(A) Total Productivity			
(B) Partial productivity			
(C) Productivity			
(D) Efficiency			
13. In ABC inventory analysis, B represents	1	1	4
(A) 70-80% of the consumption			
(B) 10-20% of the consumption			
(C) 5-10% of the consumption			
(D) Less than 5% of the consumption			
14. Calculate the economic order quantity, when the annual requirement is 2000 units, the cost of materials per unit is Rs 20, and the cost of placing and receiving an order is Rs 40, The annual carrying cost is 20% of the unit price.	1	3	4
(A) 200			
(B) 201			
(C) 199			
(D) 204			
15. Which process is not used for inventory control?	1	2	4
(A) ABC Analysis			
(B) SED Analysis			
(C) SDE Analysis			
(D) VED Analysis			
16. CAPP stands for	1	1	4
(A) Computer-Aided Process Planning			
(B) Computer-Aided Product Planning			
(C) Computer-Aided Priority Planning			
(D) Computer-Aided Performance Planning			
17. Wages paid to	1	1	5
(A) Blue collar employees			
(B) White collar employees			
(C) Yellow collar employees			
(D) Navy blue-collar employees			
18. Who proposed the average price of labor is equal to the cost of production?	1	1	5
(A) Karl Marx			
(B) Taylor			
(C) Gilbert			
(D) Therbligs			
19. The alternative name of the incentives is	1	1	5
(A) Graduity			
(B) Payment by result			
(C) Bonus			
(D) Paid holiday			
20. Who are the two main stakeholders in an organization?	1	1	5
(A) Employees and Employers			
(B) Executives and owners			
(C) Executives and Employees			
(D) Executives and Employers			

**PART - B (5 × 4 = 20 Marks)**

Answer any 5 Questions

Marks BL CO

21. Write down the name of the chart used in the measurement of motion study. Explain with a proper diagram.	4	2	1
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22. What are the different tools and techniques used for method study? Explain anyone with a suitable diagram. 4 2 1
23. What do you mean by CRAFT? Write down its features and input required in CRAFT. 4 1 2
24. Explain the layout that is used in ship building with its advantages and disadvantages. 4 2 2
25. A mechanical engineer working for an automobile manufacturer presented the below information to the operation manager. The assembly worker takes a mean time of 120 minutes to assemble a single car with a standard deviation of 5 minutes. The confidence limit is 95%, and the related data is 1.96. Determine how many studies are required if the maximum error is 5%. 4 3 3
26. What are the different factors affecting the level of inventory? Explain in brief. 4 2 4
27. Why do we need to study the salary and wages administration? 4 1 5

**PART - C (5 × 12 = 60 Marks)**

Answer **all** Questions

**Marks BL CO**

28. (a) An industrial engineer has obtained the following data in connection with a time study on the lines of the Hawthorne studies taking 6 elements and five cycles of the job. Determine (Measuring units are in minutes)
1. Normal time for the job based on the given data
  2. The standard time for the job if the permissible allowance is 17% of the normal time.

Elements	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5	Performance Rating
A	6.1	6.5	6.2	6.3	6.21	90
B	2.3	2.32	2.4	2.2	2.31	100
C	7.1	7.3	7.32	7.31	7.2	110
D	6.3	6.13	6.2	6.4	6.12	95
E	5.1	5.3	5.2	5.4	5.21	100

**(OR)**

- (b) What are the basic principles used to identify the motion? Explain all in detail. 12 3 1
29. (a) An assembly consists of the following elements as given in the table below. 420 bicycles are required each day with a production time of 420 minutes per day. Determine the balance that minimizes the number of workstations, cycle time, and efficiency. 12 3 2

Activity	Activity Time (Sec.)	Precedence Activity
A	50	--
B	16	A
C	14	B
D	55	--
E	20	D
F	17	C
G	17	C
H	17	E
I	17	E
J	13	F, G, H, I
K	14	J

**(OR)**

- (b) What do you mean by material handling system and its basic objective? Explain the principles involved in the material handling system.

30. (a) (i) What do you mean by ergonomics? Explain its principle in detail. 12 2 3  
(ii) Write a short note on Man-Machine System with suitable example.  
**(OR)**  
(b) What do you mean by Job design? What are the different factors affecting the job design? Explain in detail.
31. (a) What do you mean by the Pareto principle? Explain the basic purpose of ABC analysis and the criteria for its classification with a neat sketch. 12 2 4  
**(OR)**  
(b) What do you mean by group technology? What are the different tasks of group technology? Further, explain the different types of group technology with suitable examples.
32. (a) What do you mean by wages, salary, and compensation? Explain the various theories involved in defining wages and salary. 12 2 5  
**(OR)**  
(b) Define the procedure to conduct the survey for wages and salary. What do you understand by wage salary structure? How to design the wage structure and method of wage payment.

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