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B.M.S.College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

February / March 2024 Semester End Main Examinations

Programme: B.E. **Semester: V**
Branch: Industrial Engineering and Management **Duration: 3 hrs.**
Course Code: 22IM5PCHFE **Max Marks: 100**
Course: Human Factors Engineering

Instructions:1.Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	CO	PO	Marks
1	a)	Justify the purpose of production ergonomics.	CO1	PO1	**10**
	b)	How are ergonomics and human factors connected to engineering?	CO1	PO1	**10**
		UNIT - II			
2	a)	List and elaborate on the factor that influences body posture.	CO2	PO4	**10**
	b)	Elaborate on the hierarchy of time-related factors that can be used to describe production assembly work.	CO3	PO2	**10**
		OR			
3	a)	How do you measure posture? Support your answer with example.	CO2	PO4	**10**
	b)	List and elaborate on the terminology concerning to the forces.	CO3	PO4	**10**
		UNIT - III			
4	a)	Elaborate on workplace height design guidelines		PO2	**10**
	b)	What are the Design principles to be adopted in measuring body dimensions	CO3	PO2	**10**
		OR			
5	a)	List and elabotrate on reasons for variation between anthropometric data	CO3	PO3	**10**
	b)	Elaborate on Normal distribution and percentiles. Support your answer with suitable examples.	CO3	PO3	**10**
		UNIT - IV			
6	a)	List and elaborate on the parameters that influences vision	CO3	PO4	**10**

		b)	How do you justify the use of SRK model? List the types of mistakes.	*CO3*	*PO4*	**10**
			UNIT - V			
	7	a)	How do you conduct a heuristics evaluation? Support your answer with appropriate example.	*CO4*	*PO4*	**10**
		b)	List and elaborate on Multi-aspect methods of identify injury risks during work tasks.	*CO4*	*PO3*	**10**

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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

February / March 2024 Semester End Main Examinations

Programme: B.E. **Semester: V**
Branch: Industrial Engineering and Management **Duration: 3 hrs.**
Course Code: 22IM5PCMAE **Max Marks: 100**
Course: Management and Entrepreneurship

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

			CO	PO	Marks
		UNIT - I			
1	a)	What is management? Give its definition and explain how Management and administration are different.	CO1	PO1	**10**
	b)	Explain the role of Management as Art , Science or Profession	CO1	PO1	**10**
		UNIT - II			
2	a)	Define "Planning". List out different types of plans. Explain any one.	CO1	PO1	**10**
	b)	List various smart objectives in practice. Explain any two of them.	CO1	PO1	**10**
		OR			
3	a)	Explain briefly the Nature and Purpose of Organizing with the help of a case study.	CO1 CO2	PO1 PO2	**10**
	b)	Explain advantages and disadvantages of forming committees for smooth functioning.	CO1 CO2	PO1 PO2	**10**
		UNIT - III			
4	a)	List out different Leadership styles and explain any two of them.	CO1	PO1	**08**
	b)	Explain the importance of communication in organizing and controlling	CO1	PO1	**07**
	c)	Explain the attitude of managers having Theory- X and Theory-Y type of behavioral approaches with the help of relevant cases.	CO1 CO2	PO1 PO2	**05**
		OR			
5	a)	Explain the importance of Co-ordination in Management.	CO1	PO1	**05**
	b)	List out the Co-ordination techniques. Explain any two.	CO1	PO1	**07**

		c)	Explain the essentials of a Sound Control system.	*CO1*	*PO1*	**08**
			UNIT - IV			
	6	a)	Explain the idea of "Intrapreneurs". How are they different from Entrepreneurs?	*CO2* *CO3*	*PO2*	**07**
		b)	Explain the characteristics of a "Small Scale Industry" in India.	*CO2*	*PO2*	**08**
		c)	Explain the Policies of Government towards SSIs.	*CO2*	*PO2*	**05**
			UNIT - V			
	7	a)	List out the guidelines to be followed in preparation of a Project Report.	*CO2*	*PO2*	**05**
		b)	Discuss the activities of KIADB in support of SSIs.	*CO3*	*PO2*	**10**
		c)	What are the possible Errors that may come in the process of preparation of Project report?	*CO3* *CO4*	*PO1* *PO9* *PO10*	**05**

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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

February / March 2024 Semester End Main Examinations

Programme: B.E. **Semester: V**
Branch: Industrial Engineering and Management **Duration: 3 hrs.**
Course Code: 22IM5PCOPR **Max Marks: 100**
Course: Operations Research

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

			UNIT - I	CO	PO	Marks
1	a)		List and explain the phases of operations research	CO1	PO1	**06**
	b)		A firm produces two different types of products, Product M & Product N. The firm uses the same machinery for manufacturing both the products. One unit of Product M requires 10 minutes while one unit of Product N requires 2 minutes. The maximum hours the machine can function optimally for a week is 35 hours. The raw material requirement for Product M is 1 kg, while that of Product N is 0.5 kg. Also, the market constraint on product M is 600 kg, while that of Product N is 800 units per week. The cost of manufacturing Product M is 5 per unit and it is sold at 10, while the cost of Product N is Rs. 6 per unit and sold at Rs. 8 per unit. Calculate the total number of units of Product M and Product N that should be produced per week, so as to derive maximum profit. Formulate the problem as linear programming problem and solve graphically.	CO2	PO2	**14**
			UNIT - II			
2	a)		Formulate the following transportation problem as linear programming problem and solve for initial basic feasible solution by north west corner rule:	CO3	PO3	**10**

		Distribution Centre				Supply
		1	2	3	4	
Plants	1	21	16	15	3	11
	2	17	18	14	23	14
	3	32	27	18	41	9
Demand		6	6	8	14	

		b)	A computer center has three expert programmers. The center wants three application programs to be developed. The head of the computer center, after studying carefully the programs to be developed, estimates the computer time in minutes required by the experts for the application programs as follows: Assign the programmers to the programmers in such a way that the total computer time is minimum.	*CO4*	*PO3*	**10**
			OR			
	3	a)	A factory manager is considering the most economical schedule to transport cement from his three manufacturing centers 1, 2 and 3 to deposit I, II, III, IV and V. The weekly production and demand along with the transportation cost per ton (Rs.) are given below: What should be the optimal distribution schedule.	*CO4*	*PO3*	**10**
		b)	In a textile sales emporium, four salesmen A, B, C and D are available to four counters W, X, Y and Z. Each salesman can handle any counter. The service (in hour) of each counter when manned by each salesman is given below: How should the salesmen be allocated appropriate counters so as to minimize the service time? Each salesman must handle only one counter.	*CO4*	*PO3*	**10**
			UNIT – III			
	4	a)	In a bank, cheques are cashed at a single 'teller' counter. Customers arrive at the counter in a Poisson manner at an average rate of 30 customers per hour. The teller takes, on an average, a minute and a half to cash a cheque. The service time has been shown to be exponentially distributed. (i) Calculate the percentage of time the teller is busy. (ii) Calculate the average time a customer is expected to wait.	*CO4*	*PO3*	**06**

		To					Supply
		I	II	III	IV	V	
From	1	4	1	3	4	4	60
	2	2	3	2	2	3	35
	3	3	3	2	4	4	40
Demand		22	45	20	18	30	

		Salesman			
		A	B	C	D
Counter	W	41	72	39	52
	X	22	29	49	65
	Y	27	39	60	51
	Z	45	50	48	52

		b)	A Bank branch has only one typist. Since the typing work varies in length i.e number of pages to be typed. The typing rate is randomly distributed approximating a Poisson distribution with mean service rate of 8 letters per hour. The letters arrive at a rate of 5 per hour during the entire 8 – hour work day. If the typewriter is valued at Rs. 1.50 per hour, determine: i) The percentage time that an arriving letter has to wait ii) Average system time iii) Average cost due to waiting on the part of typewriter i.e. it remaining idle.	*CO4*	*PO3*	**10**
		c)	Discuss Characteristics of queuing systems.	*CO1*	*PO1*	**04**
			OR			
	5	a)	Explain Kendall-Lee concept for queuing problem	*CO1*	*PO1*	**04**
		b)	Consider a self-service store with one cashier. Assume Poisson arrivals and exponential service times. Suppose that on average nine customers arrive every 5 minutes and that the cashier can serve 10 in 5 minutes. Find: (i) Average number of customers queuing for service (ii) Probability of having more than 10 customers in the system, and (iii) Probability that a customer has to queue for more than 2 minutes. If the service can be speed up to 12 in 5 minutes by using a different cash register, what will be the effect of this on the quantities (i), (ii) and (iii).	*CO4*	*PO3*	**16**
			UNIT – IV			
	6	a)	Use the graphical method to find the optimal strategy for both the players and also value of the game for the following pay – off matrix: Player B B1 B2 B3 Player A A1 1 3 12 A2 8 6 2	*CO4*	*PO3*	**06**
		b)	An art dealer has a client who will buy the masterpiece Rain Delay for $50,000. The dealer can buy the painting now for $40,000 (making a prot of $10,000). Alternatively, he can wait one day, when the price will go down to $30,000. The dealer can also wait another day when the price will be $25,000. If the dealer does not buy by that day, then the painting will no longer be available. On each day, there is a 2/3 chance that the painting will be sold elsewhere and will no longer be available. (a) Draw a decision tree representing the dealers decision making process. (b) Solve the tree. What is the dealers expected prot? When should he buy the painting? (c) What is the Expected Value of Perfect Information (value the dealer would place on knowing when the item will be sold)?	*CO4*	*PO3*	**14**

		UNIT - V				
7	a)	A project consists of the following activities with the duration in days: i. Draw the network of the above project ii. Identify the critical path and determine the project duration Calculate early & late start, early & late finish, total float, independent float and free float for the network.	*CO4*	*PO3*	**10**
	b)	The table shows the jobs of a network along with their time estimates. i. Draw the project network ii. Find the critical path iii. Find the probability that the project will not be completed in 18 weeks.	*CO4*	*PO3*	**10**

Activity	A	B	C	D	E	F	G	H	I
Precedence	-	A	A	B,C	A	D,E	C	F,G	H
Duration	10	4	12	10	9	8	7	9	6

Job	Precedence	Optimistic Time	Normal Time	Pessimistic Time
A	-	1	1	7
B	-	1	4	7
C	-	2	2	8
D	A	1	1	1
E	B	2	5	14
F	C	2	5	8
G	D,E	3	6	15

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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

February / March 2024 Semester End Main Examinations

Programme: B.E. **Semester: V**
Branch: Industrial Engineering and Management **Duration: 3 hrs.**
Course Code: 22IM5PEOBE **Max Marks: 100**
Course: Organizational Behavior

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

			CO	PO	Marks
		UNIT - I			
1	a)	Discuss the impact of Diversity and Ethics on organizational behavior, considering their effects on workplace dynamics.	*CO1*	*PO1*	**10**
	b)	Define and explain the concept of ability in the context of organizational behavior using suitable examples.	*CO1*	*PO1*	**10**
		OR			
2	a)	Discuss how the historical development of Organizational Behavior has contributed to our understanding of workplace dynamics.	*CO2*	*PO2*	**10**
	b)	Define Organizational Behavior and explain its importance in the context of business management.	*CO1*	*PO1*	**10**
		UNIT - II			
3	a)	Discuss three factors that influence perception in the workplace and provide examples of how they can impact organizational dynamics.	*CO2*	*PO2*	**10**
	b)	Identify and explain two types of values, give examples of how they can influence decision-making and behavior in organizational settings.	*CO1*	*PO1*	**10**
		UNIT - III			
4	a)	Explain Maslow's Hierarchy of Needs and discuss its application in understanding employee motivation.	*CO1*	*PO1*	**10**
	b)	Explain Herzberg's Motivation Theory and discuss how it contributes to job satisfaction and motivation.	*CO1*	*PO1*	**10**
		OR			
5	a)	Identify and explain three factors that affect the formation of groups in organizational settings.	*CO1*	*PO1*	**10**

		b)	Define conflict and distinguish between functional and dysfunctional conflict in organizational settings.	*CO1*	*PO1*	**10**
			UNIT - IV			
	6	a)	Discuss two key attributes or qualities that are essential for effective leadership.	*CO2*	*PO2*	**10**
		b)	Discuss Blanchard's Situational Leadership Theory, highlighting its key principles and applications.	*CO2*	*PO2*	**10**
			UNIT - V			
	7	a)	Discuss the advantages and disadvantages of mechanistic and organic structures.	*CO2*	*PO2*	**10**
		b)	Discuss the concept of Quality of Work Life (QWL) and its relevance to employee satisfaction and productivity.	*CO2*	*PO2*	**10**

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Autonomous Institute Affiliated to VTU

February / March 2024 Semester End Main Examinations

Programme: B.E. **Semester: V**
Branch: Industrial Engineering and Management **Duration: 3 hrs.**
Course Code: 22IM5PEPDD **Max Marks: 100**
Course: Product Design and Development

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	CO	PO	Marks
1	a)	What are some key characteristics of successful product development?	CO1	PO1	**10**
	b)	What are the various challenges one experiences in the Product Development Process?	CO1	PO1	**10**
		UNIT - II			
2	a)	Making use of a neat sketch, elaborate on the steps required during the Product Planning process.	CO2	PO1	**10**
	b)	How do companies typically evaluate and prioritize projects during the product planning process?	CO2	PO1	**10**
		OR			
3	a)	How do companies typically gather raw data from customers during the product development process?	CO2	PO1	**10**
	b)	Why is it important to establish the relative importance of customer needs during the product development process?	CO2	PO1	**10**
		UNIT - III			
4	a)	How does concept generation contribute to clarifying the problem during the product development process?	CO2	PO1	**10**
	b)	Why is it important for teams to reflect on the results and the process during concept generation activities?	CO2	PO1	**10**
		OR			
5	a)	What is the primary purpose of conducting a concept test during the product development process?	CO3	PO2	**10**

		b)	How do companies typically choose a survey population for conducting a concept test?	*CO3*	*PO2*	**10**
			UNIT - IV			
	6	a)	How does product architecture impact supply chain considerations and platform planning in product development?	*CO3*	*PO2*	**10**
		b)	How does the industrial design process contribute to assessing the quality of a product's design?	*CO3*	*PO2*	**10**
			UNIT - V			
	7	a)	How does Design for Manufacturing (DFM) impact various factors beyond manufacturing cost reduction?	*CO3*	*PO2*	**10**
		b)	How do the principles of prototyping influence the planning process for creating prototypes?	*CO3*	*PO2*	**10**

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February / March 2024 Semester End Main Examinations

Programme: B.E. **Semester: V**
Branch: Industrial Engineering and Management **Duration: 3 hrs.**
Course Code: 22IM5PCCEF **Max Marks: 100**
Course: Corporate Economics & Finance

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.
3. Use of Interest factor tables is permitted.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	*CO*	*PO*	Marks
1	a)	With suitable example, discuss why the Time Value of Money matters to Investors	*CO1*		**05**
	b)	A material testing laboratory has two alternatives for purchasing a compression testing machine which will be used for determining the compressive strength of different construction materials. The alternatives are from two different manufacturing companies. The cash flow details of the alternatives are as follows; Alternative-1: Initial purchase price = Rs.1000000/- Annual operating cost = Rs.10000, Expected annual income to be generated from testing of different construction materials = Rs.1,75,000/- Expected salvage value = Rs.2,00,000/- Useful life = 10 years. Alternative-2: Initial purchase price = Rs.7,00,000/- Annual operating cost = Rs.15,000/- Expected annual income to be generated from testing of different construction materials = Rs.165000, Expected salvage value = Rs.2,50,000/- Useful life= 5 years. Using present worth method, find out the most economical alternative at the interest rate of 10% per year.	*CO1* *CO2*	*PO1* *PO2*	**15**
		UNIT - II			
2	a)	There are two alternatives for purchasing a concrete mixer and following are the cash flow details; Alternative-1: Initial purchase cost = Rs.3,00,000/- Annual operating and maintenance cost = Rs.20,000/- Expected salvage	*CO1* *CO2*	*PO1* *PO2*	**10**

			value = Rs.1,25,000/- Useful life = 5 years. Alternative-2: Initial purchase cost = Rs.2,00,000/- Annual operating and maintenance cost = Rs.35,000/- Expected salvage value = Rs.70,000/- Useful life = 5 years. The annual revenue to be generated from production of concrete (by concrete mixer) from Alternative-1 and Alternative-2 are Rs.50,000/- and Rs.45,000/- respectively. Compute the equivalent uniform annual worth of the alternatives at the interest rate of 10% per year and find out the economical alternative.			
	b)	A firm has identified three mutually exclusive investment proposals whose details are given below. The life of all the three alternatives is estimated to be five years with negligible salvage value. The minimum attractive rate of return for the firm is 12%. *Alternative* *A1* *A2* *A3* Investment Rs. 1,50,000 Rs. 2,10,000 Rs. 2,55,000 Annual net income Rs. 45,570 Rs. 58,260 Rs. 69,000 Find the best alternative based on the rate of return method of comparison.	*CO1* *CO2*	*PO1* *PO2*	**10**
		OR			
3	a)	A construction firm is planning to invest Rs.8,00,000/- for the purchase of a construction equipment which will generate a net profit of Rs.1,40,000/- per year after deducting the annual operating and maintenance cost. The useful life of the equipment is 10 years and the expected salvage value of the equipment at the end of 10 years is Rs.2,00,000/-. Compute the rate of return based on present worth, if the construction firm's minimum attractive rate of return (MARR) is 10% per year.	*CO1* *CO2*	*PO1* *PO2*	**10**
	b)	A material supply contractor has two options (i.e. from two different manufacturing companies, Company-1 and Company-2) to purchase a tractor for supply of construction materials. The details of cash flow of the two options are given below; Company-1 Tractor: Initial purchase cost = Rs.2,00,0000/- Annual operating cost including labor and maintenance = Rs.50,000/- Cost of new set of tires to be replaced at the end of year '3', year '6'and year '9' = Rs.1,10,000/- each, Expected salvage value = Rs.5,20,000/- Useful life = 10 years. Company-2 Tractor: Initial purchase cost = Rs.22,00,000/- Annual operating cost including labor and maintenance = Rs.27,000/- Cost of new set of tires to be replaced at the end of year '4' and year '8' = Rs.1,20,000/- each, Expected salvage value = Rs.7,00,000/- Useful life = 10 years. Determine which company tractor should be selected on the basis of equivalent uniform annual worth at the interest rate of 12% per year.	*CO1* *CO2*	*PO1* *PO2*	**10**

			UNIT - III			
	4	a)	The initial cost of a piece of construction equipment is Rs.35,00,000/-. It has useful life of 10 years. The estimated salvage value of the equipment at the end of useful life is Rs.5,00,000/-. Calculate the annual depreciation and book value of the construction equipment using straight-line method, double-declining balance method. Assume k=2/n	*CO1* *CO2*	*PO1* *PO2*	**10**
		b)	Two years ago, a machine was purchased at a cost of Rs. 2,00,000/- to be useful for eight years. Its salvage value at the end of its life is Rs. 25,000/-. The annual maintenance cost is Rs. 25,000. The market value of the present machine is Rs. 1,20,000/-. Now, a new machine to cater to the need of the present machine is available at Rs. 1,50,000/- to be useful for six years. Its annual maintenance cost is Rs. 14,000/-. The salvage value of the new machine is Rs. 20,000/-. Using an interest rate of 12%, find whether it is worth replacing the present machine with the new machine.	*CO1* *CO2*	*PO1* *PO2*	**10**
			OR			
	5	a)	Discuss on the indexes used to measure Inflation	*CO1*		**05**
		b)	Discuss the causes of inflation	*CO1*		**05**
		c)	A firm is considering replacement of an equipment, whose first cost is Rs. 4,000 and the scrap value is negligible at the end of any year. Based on experience, it was found that the maintenance cost is zero during the first year and it increases by Rs. 200 every year thereafter.When should the equipment be replaced if i = 0%?	*CO3* *CO4*	*PO1* *PO2*	**10**
			UNIT- IV			
	6	a)	Contrast between single and double entry system of book keeping	*CO1*		**04**
		b)	Explain 3 different types of accounts each with an example.	*CO1*		**06**
		c)	Journalize the following transactions in the books of Mr. Z. 1.1.23, Mr. Z commenced the business with cash Rs.50, 000/- 3.1.23, paid into bank Rs.4000/- 5.1.23, bought office furniture for cash Rs.5000/- 6.1.23, sold goods for cash Rs.6000/- 8.1.23, sold goods to Murthy on credit Rs.4000/- 10.1.23, paid rent to landlord Rs.3000/- 12.1.23, paid salary to manager Rs.1000/- 15.1.23, sold office furniture for cash Rs.2000/- 16.1.23, received commission from Suresh Rs.200/- 18.1.23, bought goods for Rs.4000/-	*CO2* *PO3*	*PO1* *PO2*	**10**

			UNIT - V			
	7	a)	What is ratio analysis? Discuss the advantages & disadvantages of ratio analysis	*CO1*		**05**
		b)	From the following Trading and Profit and Loss Account of Ramesh & Co. for the year 31st Dec. 2003 :	*CO3* *CO4*	*PO1* *PO2*	**15**

	Rs.		*Rs.*
To Opening Stock	60,000	By Sales	4,00,000
To Purchase	2,75,000	By Closing Stock	75,000
To Wages	25,000		
To Gross Profit c/d	1,15,000		
	4,75,000		4,75,000
To Administrative Expenses	45,000	By Gross Profit b/d	1,15,000
To Selling and Distribution Expenses	10,000	By Interest on Investment	10,000
To Office Expenses	5,000		
To Non Operating Expenses	15,000		
To Net Profit	50,000		
	1,25,000		1,25,000

Calculate: (1) Gross Profit Ratio. (2) Operating Ratio. (3) Operating Profit Ratio. (4) Net Profit Ratio.

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