B.E.(Mechanical Engineering) Seventh Semester (C.B.S.)

Industrial Engineering

Time: Three Hours

Max. Marks: 80

TKN/KS/16/7554

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Notes: 1. All questions carry marks as indicated.

P. Pages: 2

- 2. Solve Ouestion 1 OR Ouestions No. 2.
- 3. Solve Question 3 OR Questions No. 4.
- 4. Solve Question 5 OR Questions No. 6.
- 5. Solve Question 7 OR Questions No. 8.
- 6. Solve Question 9 OR Questions No. 10.
- 7. Solve Question 11 OR Questions No. 12.
- 8. Due credit will be given to neatness and adequate dimensions.
- 9. Use of non programmable calculator is permitted.
- 10. Use of design data book is permitted.
- 1. a) Define Productivity. State the objectives and types of productivity.
 - b) Define method study. Describe the objectives of conducting method study.

OR

- **2.** a) Define Motion Study and explain different tools and methods for conducting micro motion study.
 - b) Draw the flow process chart for welding of two metal pieces in workshop. Assume suitable data.
- **3.** a) Define predetermined motion time system and Explain types of PMT's.
 - b) Explain display of design and design of controls for workplace.

OR

- **4.** a) Define Ergonomics. State its objectives. Also explain importance of human factors in Engineering.
 - b) An industrial operation consists of Five elements with following observed times and the performance ratings.

Elements	Observed Time (min)	Performance Rating (%)				
1	0.15	80				
2	0.20	85				
3	0.10	90				
4	0.12	75				
5	0.25	80				

Assuming rest and personal allowances as 12% and contingency allowance as 4% of the basic time, Calculate standard time per piece.

- **5.** a) Define Forecasting. Explain its need in Modern Industry.
 - b) The sales particular of a company for 13 years of operation is furnished below.

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	Year	1	2	3	4	5	6	7	8	9	10	11	12	13		
	Sales	96	116	119	127	146	145	153	158	160	165	177	190	205		

- a) Fit a sample regression for the above data.
- b) Fore cast the sales for the 14th year of operation.
- c) Find trend value.

OR

6.	a)	Explain the qualitat	tive techi	niques o	of fore c	asting v	vith sui	table ex	ample.			6
	b)	Estimate the sales forecast for the year 1992. Using exponential smoothing take $\alpha = 0.3$.										8
		Year	1984	1985	1986	1987	1988	1989	1990	1991		
		Sales Rs. (x100)	180	168	159	170	188	205	190	210		
		Take the sales fore	•	year 19	84 as R	ls. 16,0	00. Plo	t the ac	tual sale	es and f	forecasted	d
		values on a suitable	e grapn.									
7.	a)	Explain various types of maintenance with suitable examples.										
	b)	Explain bath tub curve with its application in Manufacturing. OR										
8.	a)	Explain MTBF, MTTR, MTTF.										
	b)	Determine the reliability of a communication system having two transmitters in parallel connected to a receiver & encoder in series. Reliability of transmitter is 85%, that of receiver is 99% and of encoder is 94%.										
9.	a)	An analyst takes 20 samples of size 200 each from the output of a final assembly line. The items in each sample are inspected and the number of defectives in each sample are recorded. The results are given below.										
		Sample No. 1	2	3	4	5	6	7	8	9	10	
		Defectives 9	7	14	15	8	7	9	11	16	12	
		Sample No. 11	12	13	14	15	16	17	18	19	20	
		Defectives 26	18	11	8	10	10	15	13	9	12	
	Calculate average fraction defectives and the control limits for appropriate control cha											
	b)	Explain the follow acceptance sampling i) AQL iv) Consumer's ris	ig. Also s ii)	show dit	fferent 1 QL PD.	regions	in curv	_		c curve	e used ir	n (
10.	a)	What is the significance of quality of design & quality of conformance? Describe the factor's controlling both.										
	b)	A component with specification limit is given as 17.5 ± 0.23 where inspection. The										
		components were taken subgroup of 4 items. After 20 sub groups, the values of \overline{X} and R										
		were found to be $\Sigma \overline{X} = 350$ and $\Sigma R = 8.5$. Assuming the process in control what conclusion would you draw about the ability of process to produce the item within specified limits. (Assume $d_2 = 2.059$, $D_3 = 0$, $D_4 = 2.28$)										
11.	a)	Explain the Quality Audit. Also explain its types and objectives in detail.										7
	b)	Write a detailed note on: i) ISO 9000 ii) SQC OR										7
12.	a)	Describe Quality assurance. Which activities are covered under it.									5	
	b)	Write short note on any three. i) T.Q.M. ii) Vendor Quality Rating. iii) Quality Planning. iv) Six Sigma. ************************************								Ì		