

Name:
Enrolment No:



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2019

Course: Work Study & Ergonomics
Program: B.Tech Mechanical (Core & Specialization)
Course Code: IPEG311

Semester: VII
Time 03 hrs.
Max. Marks: 100

Instructions: All the questions are compulsory.

SECTION A

S. No.		Marks	CO
Q 1	What factors contribute towards the selection of a problem for method study?	5	CO1
Q 2	What are the various symbols used for making process charts?	5	CO1
Q 3	State the general characteristics, advantages and limitations of the two most common methods of wage payment?	5	CO3
Q 4	Define anthropometry and show its importance?	5	CO4

SECTION B

Q 5	Explain the various types of allowances used in the calculation of standard time?	10	CO2
Q 6	Discuss interrelationship between work study & Ergonomics?	10	CO4
Q 7	Describe the Man-machine system? Explain its characteristics.	10	CO1
Q 8	Explain wage along with the general characteristics, advantages and limitations of the two most common methods of wage payment. OR Explain wage along with the general characteristics, advantages and limitations of the two most common methods of wage payment.	10	CO3

SECTION-C

Q 9	A stop watch time study has been made of an operation which consist of four elements. The table below gives the continuous time readings (in centiminutes), ratings and allowances for the elements. Determine i. Basic time and standard time for each element. ii. Standard of operation. iii. Whether the number of operations are sufficient for each element if the desired confidence level is 90% and accuracy required is $\pm 5\%$.	20	CO2
-----	--	----	-----

Element →	1	2	3	4	
Observation	Continuous watch readings (centimin.)				
1	9	15	28	32	
2	40	46	59	62	
3	71	80	94	97	
4	106	13	27	30	
5	38	43	56	59	
6	67	72	84	88	
7	98	203	18	21	
8	28	33	46	49	
9	57	62	75	79	
10	88	93	306	09	
Avg. Rating (%)	105	110	100	90	
Allowances (%)	15	10	20	25	

Q 10

F8or a milling machine operation the elemental timing are given below. Determine the suitability of allocating one machine and two machines to an operator, and present the two situations on man –machine charts.

Element	Tim. (min.)
Pick up the part and load in fixture	.40
Start machine	.01
Advance table 5 cm and engage feed	.10
Mill one end (automatic)	.10
Stop machine	.01
Return table, 10 cm	.15
Loosen vice, reverse workpiece, and tighten vice	.15
Start machine	.01
Advance table and engage feed	.10
Mill other end (automatic)	.10
Loosen vice, remove and lay aside part	.10
Walk between two machines	.05

OR

A hotel manager wishes to find out the best way to toast three slices of bread. He has an old fashioned hand operated electric toaster. It can toast one side of two piece of bread at the same time, but it takes two hands to insert or remove each slice of bread.

20

CO1

	<p>To turn a slice of bread to toast the other side, the operator has to push the toaster door down and permit a spring to shut it back; this operation requires only one hand. Therefore two pieces of bread can be turned at the same time. The following are the elemental time needed to perform the operations:</p> <p>Toasting (One side) = .50 min, Turning of toast = .02 min, Toasting (other side) = .50 min, Insertion time = .05 min, Removing time = .05 min. Assume that both hands can perform their tasks with the same degree of efficiency; draw :</p> <p>(a) A man-machine chart of this operation.</p> <p>Another chart showing the improvement in the method suggested by you.</p>		
--	---	--	--