KUMARAGURU
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Register Number:…………..….

M.E DEGREE EXAMINATIONS: JAN 2015

(Regulation 2014)

First Semester

INDUSTRIAL ENGINEERING

P14IET104: Work Design

Time: Three Hours   **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Materials flows continuously in an unbroken line (without back tracking) in: [K_3]

    a) Process layout   b) Product layout

    c) Static layout   d) Combination layout

2. The following items consist of two statements, one labeled as the "Assertion (A)" and the   [K_4]
    other as "Reason (R). You are to examine the two statements carefully and select the answers
    to the items using the codes given below:

    Assertion (A) :   In job order production, general purpose machines are employed

    Reason (R)   :   Each job order is separate and is not likely to be repeated and the
                              general purpose machines can handle many varieties of jobs when
                              operated by skilled operators.

    a) both A and R are individually true and   b) both A and R are individually true but R is
        R is the correct explanation of A   not the correct explanation of A

    c) A is true but R is false   d) A is false but R is true

3. Consider the following statements :   [K_2]

    1.   Work study deals with things like "how a job should be done?" and "how much time a
          job should take for completion?"

    2.   Method study deals with "how a job should be done?"

    3.   Work study involves both method study and time study.

    4.   Work study aims at standardization and improvement of the working process
          Which of these statements are correct?

    a) 1,2,3,4   b) 1,2,3

    c) 2,4   d) 1,3,4

4. Consider the following steps in solving problems in method study: [K_2]

1. Record

2. Consider

3. Define

4. Examine

Which is the correct sequence to solve the problem using method study?

a) 1-2-4-3   b) 2-3-1-4

c) 1-2-3-4   d) 3-1-4-2

5. Following are steps in method study process.   [K₂]

   1. Break the operations of the job

   2. Question each detail of the job

   3. Develop a new method

   4. Install and maintain the new method.

   Which is the correct sequence of steps?

   a) 1-3-4-2   b) 1-2-3-4

   c) 4-2-1-3   d) 3-2-1-4

6. From the numbers of dots recorded on a chrono cycle graph, the speed and direction of   [K₃]
   movement at any point along the path can be calculated if the following is known:

   a) Brightness of the light source in ansi-   b) Brightness of the light source in lumens
      lumens

   c) Frequency of interruption of the light   d) Current used for lighting the light source
      source   for the period of use

7. Performance rating is given by   [K₂]

   a) (observed performance / normal   b) (observed performance - normal
      performance) × 100   performance) × 100

   c) (observed performance + normal   d) (observed performance × normal
      performance) × 100   performance) × 100

8. Consider the following statements.   [K₂]

   1. Ergonomics is also called as "Human factors".

   2. Ergonomics is a scientific discipline.

   3. Ergonomics is an inherent aspect of products.

   4. Ergonomics is just "common sense".

   Which of the statements are correct.

   a) 1,2,3,4   b) 1,2,3

   c) 1,2   d) 1,3

9. With reference to ergonomics considerations, match list I with list II using the codes given.   [K₄]

List I	List II
A. Physical factors	1. Job design
B. biological factors	2. Body capabilities
C. Work factors	3. Management regimes
D. Organizational factors	4. Ambient conditions

a) A B C D
    1 2 3 4

b) A B C D
    4 3 2 1

c) A B C D
    3 4 1 2

d) A B C D
    4 2 1 3

10. The following allowance has to be given when a worker is attending more than one machine and one or more machines may stop while the worker is attending another machine. [K_3]

   a) fatigue allowance   b) personal allowance

   c) interference allowance   d) contingency allowance

PART B (10 x 2 = 20 Marks)

11. Distinguish between productivity and production. [K_4]

12. List two objectives of work design. [K_2]

13. Draw a two handed process chart for assembling a nut and a bolt. [K_3]

14. State the manner in which rating factor is calculated in Westinghouse System of Rating. [K_2]

15. State the need for developing standard data. [K_2]

16. Explain the method of arriving at the time for the basic element 'Reach' in MTM. [K_2]

17. Compare work sampling with time study. [K_4]

18. What does 'Organization and methods (Q&M)' stand for under work study? [K_2]

19. State the usefulness of ergonomics to work-study. [K_3]

20. Define the term 'anthropometry' with a suitable example. [K_3]

PART C (10 x 5 = 50 Marks)

21. With a block diagram, show the dynamics of productivity change and how it brings about chain reaction throughout the society. [K_4]

22. Justify the statement "Work study is a valuable tool for productivity improvement". [K_4]

23. "Hand movements should be confined to the lowest classification with which it is possible to perform the work satisfactorily" – Explain this statement with reference to the principles of motion economy. [K_4]

24. With a suitable graph, explain the effect of practice of a person on the cycle time of an operation. [K2]

25. Bring out the relevance of the terms 'Qualified worker, normal pace and specific job' with reference to the term work measurement. [K4]

26. "In time study the task to be studied is broken into small details called elements". Why is it done so and what are the rules that govern such a break-up? [K4]

27. List the requirements of a good form design. [K2]

28. Explain Taylor's wage incentive plan. [K2]

29. List two examples for displays and controls and explain them. [K3]

30. How are the principles of ergonomics applied for work place layout? [K3]

PART D (2 x 10 = 20 Marks)

31. The elemental times (in minutes) for four cycles of an operation using a stop watch are presented below. [K3]

Elements	Cycle time in minutes			
	1	2	3	4
1	1.3	1.4	1.5	1.5
2	2.7	2.6	2.5	2.4
3	3.4	3.3	3.5	3.3
4	1.1	1.3	1.2	1.1
5	1.5	1.5	1.4	1.4

Calculate standard time for the operation if: elements 1 and 3 are machine elements -- for other elements, the operator is rated at 115% -- total allowances are 10% of the normal time.

32. List the factors that affect human performance in physical work and explain them with examples. [K4]

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