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Total No. of Pages : 02

Total No. of Questions : 08

**M.Tech.(PE) (E-IV) (Sem.-3)**  
**METHODS ENGINEERING AND ERGONOMICS**  
Subject Code : PE-523  
Paper ID : [E0460]

Time : 3 Hrs.

Max. Marks : 100

**INSTRUCTION TO CANDIDATES :**

1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carries TWENTY marks.

- Q1 a) How does work study improve the productivity in an organization?  
b) Explain principles of motion economy.
- Q2 a) Explain the objectives, inputs and outputs of method study. Explain the detailed procedure for conducting method study.  
b) Explain the procedure for evaluation of standard time for a job using various allowances.
- Q3 a) Write short note on **any one** of the following :  
i) Work sampling  
ii) Job analysis & Merit rating  
b) What do you understand by ergonomics? Discuss the applications of ergonomics. Why ergonomics is referred to as '*Human Factors Engineering*'?
- Q4 a) Explain human anthropometry and its applications in workplace layout.  
b) In a man-machine system, explain the term '*fit between man and machine*'. Describe the characteristics of an ergonomically designed man-machine system.
- Q5 a) Describe briefly the ergonomic considerations for design and location of hand controls and foot controls.  
b) What are various types of controls used in the industrial equipment? Explain the criteria for ergonomic design of controls.

- Q6 a) Discuss the steps for carrying out an assessment of physical work load and mental work load at work place.
- b) What is the procedure for calculating work duration and rest pauses for repetitive and inspection work.
- Q7 a) Give brief account of body heat balance and zones of discomfort for human body.
- b) Discuss the effect of heat on body and work performance.
- Q8 a) Explain the physiological effects of noise on humans. How does noise affect performance at work?
- b) Discuss the methods of reducing vibrations at workplace.

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