

M.E. PRODUCTION ENGINEERING FIRST YEAR FIRST SEMESTER - 2018

INDUSTRIAL ERGONOMICS

Time: Three hours

Full Marks: 100

Use separate Answer-script for each part.

PART I (40 Marks)

Answer any TWO questions.

- 6.(a) Differentiate between the qualitative display and quantitative display.
(b) Describe the physiological requirements of artificial lighting, arrangement and overall distribution of light for fine work and for VDT offices.
(c) Discuss ergonomics as applied to design and control of instruments and display units.

(5+8+7)

- 7.(a) What are the sources of noise? Illustrate the effects of noise on health and performance of a worker.
(b) Discuss the effect of vibrations on Human health.

((5+10)+5)

- 8.(a) Define the man-machine system and explain how it works. What are its components?-Discuss.
(b) As an ergonomist recommend for comfort indoor, air and ventilation and guidelines for working in very hot conditions.

(10+10)

[Turn over

M.PROD. E. EXAM. 1-ST YEAR, 2018

(1-st Sem.)

INDUSTRIAL ERGONOMICS (PT)

Time: 3 Hrs.

Full Marks:100

Use separate Answer script for each part.

PART –II(60 Marks)

Ans. any 3 Q-s.

1. A) What is the limit of inter abdominal pressure for lifting loads? Discuss the ways of carrying a burden. 1+2
- B) Discuss muscle power in relation to "age" & "sex". Outline the maximum hand power, maximum foot pressure while sitting & bending strength. 4+3+3+1
- C) Discuss the following terms: (i) New "syntop" chair design, (ii) Seat profiles for a multipurpose chair & for an easy chair. 2+4
2. A) Discuss the sources of energy for the mechanical working of a muscle, with special emphasis on the role of glucose, fat & O₂. 5
- B) Discuss the importance of anthropometry in workplace design. 5
- C) What is metabolism, explain with neat sketches. 5
- D) How does the disc trouble start due to wrong ways of lifting load? 5
3. A) Discuss the ill effects of static loads. Outline the bad effects of standing at one place. 7+7
- B) Define Ergonomics. Discuss the importance & scope of Ergonomics. 3
- C) Discuss the function of nerves. 3
4. A) Discuss heart rate during physical activity. Define the following terms in this regard: Resting pulse, Working pulse, Workpulse, Total workpulse & Total recovery pulse. 2+5
- B) Write short notes on:
- (i) Innervation of a muscle, (ii) Sodium-potassium pump 5+3
- C) Discuss physiological principles regarding heavy work. 5

5. A) What is learning? When is the learning complete? With a suitable example show the stages in learning an activity (say writing). 3+3+4

B) Discuss why the workplaces are not designed for an average person? What factors affect the anthropometric variations between individuals? 1+3

C) Discuss with neat sketches the working heights for: (i) Precision work, (ii) Light work, (iii) Heavier work. 6