

INDUSTRIAL ENGINEERING OPERATIONS RESEARCH – MEL 221

MAJOR TEST : INDUSTRIAL ENGINEERING PART

ANSWER ON SEPARATE SHEET

Q 1. a) What are the objectives of work measurement? How would you estimate the number of observations to be taken in a work sampling study?

b) What is the role of **function phase** and its techniques in value engineering job plan?

6 marks

Q 2 The management is considering whether or not to replace an existing machine with a new design. The existing machine has no market value. The new machine costs \$10,000 initially and has an eight years projected economic life with no terminal salvage value. The company is in 50% tax bracket and 20% is considered as the minimum rate of return. Allowed depreciation term is 10 years, straight line. Determine if the company should install the new machine. Assume the remaining life of the old machine as 8 years.

Comparative operating costs	old m/c	new m/c
Direct labour	\$9500/yr	\$4000/yr
Wasted material	\$500/yr	\$400/yr
Power cost	\$1000/yr	\$900/yr

4 marks

Q 3 Prepare a man-machine chart with minimum cycle time for the following milling operation, if the operator is serving two identical machines:

- a. Operator picks up the job, places in position and clamps. 60 secs
- b. He advances the machine table and starts the machine. 30 secs
- c. Milling operation takes place. 120 secs
- d. He stops the machine and brings back the table. 30 secs
- e. Unclamps the job and removes it and cleans the machine table. 40 secs

The machine must be stopped after it has run for 120 secs to avoid overrun. Milling operation of duration 120 secs is automatic in the sense that operator's attention is not required during this period.

4 marks