C14–M–**403**

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BOARD DIPLOMA EXAMINATION, (C–14)
MARCH/APRIL—2016
DME—FOURTH SEMESTER EXAMINATION

INDUSTRIAL ENGINEERING

Time : 3 hours]　　　　　　　　　　　　　[*Total Marks* : 80

PART—A　　　　　　　3×10=30

Instructions : (1) Answer **all** questions.

(2) Each question carries **three** marks.

(3) Answers should be brief and straight to the point and shall not exceed *five* simple sentences.

(4) SQC tables are permitted.

1. What is an operational process chart? List four process chart symbols. 　　　　　2+1

2. Define micro motion study. List two applications. 　　　2+1

3. Define work measurement. List two important objectives of work measurement. 　　　　　2+1

4. Define an allowance. List four allowances of estimating the standard time. 　　　　　1+2

5. What is meant by job specification? 　　　　　3

6. List advantages of merit rating. 　　　　　3

7. List six important methods of wage payments. 3

8. Classify various types of incentive plans with one example each. 3

9. Define the term quality. List four quality characteristics. 1+2

10. Define sampling inspection. List two advantages of sampling inspection over 100% inspections. 2+1

PART—B 10×5=50

Instructions : (1) Answer *any* **five** questions.

(2) Each question carries **ten** marks.

(3) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11. Define method study. Explain the step-by-step procedure of conducting method study for improving productivity in an industry. 2+8

12. Explain the following with examples : 5+5

(a) Flow diagram

(b) String diagram

13. *(a)* In a work sampling, conducted on a welder shows that he was idle for 20% of the total working time of 8 hours. The performance rating of the worker in the duty time is 125%. Assume that 10% of normal time is taken as allowances. Calculate the standard time to complete the operation. 4

(b) Explain the procedure for calculating sample size by work sampling method. 6

14. *(a)* Explain clearly the procedure of job evaluation. 4

(b) Explain *(i)* classification method and *(ii)* checklist methods of job evaluation and merit rating. 6

15. *(a)* Explain Rowan incentive plan. List two advantages of the plan. 4

(b) In an industry, there are six workers manufacturing electrical switches. The standard day rate is ₹ 60 per worker and the standard output is 50 switches. Calculate their daily earnings by Emerson's Efficiency Plan if they are manufacturing 15, 25, 35, 45, 50 and 60 switches respectively. 6

16. *(a)* State advantages and disadvantages of PMTS. 5

(b) Explain five types of wages applicable to the workers in an industry. 5

17. The following data was recorded for variable control charts :

Sample Number	1	2	3	4	5	6	7	8	9	10
Mean $\overline{X}$	7	7·5	8	10	9·5	11	11·5	4	3·5	4
Range R	2	3	2	2	3	4	3	2	3	2

(a) Calculate upper and lower control limits.

(b) Calculate construct mean and range charts.

(c) Comment on the process. 4+4+2=10

18. *(a)* Draw and explain the main characteristics of an OC curve. 4

(b) In an acceptance sampling plan under ABC-STD-105, a single sampling plan is to be used under inspection level III with lot size 2000 and AQL of 2·5%. What is an acceptance criterion under *(i)* normal inspection and *(ii)* tightened inspection? 6

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