

**BACHELOR OF ENGINEERING IN PRODUCTION
ENGINEERING EXAMINATION, 2019**

(4th Year, 1st Semester)

PLANT & MAINTENANCE ENGINEERING

Time : Three hours

Full Marks : 100

Answer *any five* questions :

1. a) Enunciate the factors to be considered for selection of the following plants :
 - i) Automobile
 - ii) Cement
 - iii) Missile launching station
 - iv) Sugar 16
- b) Also expound the limitation of your thoughts in each of above cases. 4
2. a) What is Total Productive Maintenance (TPM)? Elucidate its major principles through examples known to you? 15
- b) What is marginal reliability? State its significance. 5
3. a) Show that the minimum average cumulative cost (excluding running costs) is given by

$$[\bar{C}_C]_{\min} = \frac{AK}{(K-1)} \left[\frac{B(K-1)}{A} \right]^{\frac{1}{K}}$$

[Turn over

[2]

where

A = Cost of acquisition of equipment

B & K = constants (The value of K generally increases with the complexity of equipment)

Also exhibit graphs related to it. 12

- b) Explain the importance of knowing “3-parameter Weibull distribution ?” 8
4. a) Carry out SWOT analysis among the different depreciation calculating methods. 12
- b) What is partially redundant system ? Explain. 8
5. Establish the relationship between overall equipment effectiveness (OEE) with ten technology through an example. 20
6. A) Draw reliability block diagram (RBD) for the following items:
- i) Single slider crank chain
 - ii) Simple gear train
 - iii) Cam with roller follower
 - iv) Wheel and axle
- Put forward your justification. 16

[3]

- B) What is meant by system reliability? 4
7. Write short notes on **any two** : 10×2=20
- a) Relationship between cut set and path set
 - b) Fishbone diagram
 - c) Association of reliability, availability and maintainability
 - d) Six Sigma and plant maintenance.