Registration no: | | | | | | | | | | |

Total Number of Pages: 02 **B.Tech**
PEME5405

7th Semester Regular / Back Examination 2016-17
METROLOGY, QUALITY CONTROL AND RELIABILITY
BRANCH: MECH
Time: 3 Hours
Max Marks: 70
Q.CODE: Y118

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1 **Answer the following questions:** **(2 x 10)**

a) Differentiate different working standards of length.
b) How accuracy differ from precision?
c) Explain briefly circularity.
d) Define discrete probability distribution.
e) What do you mean by quality circle?
f) Why lower control limit is needed on a P-chart?
g) How reliability of a system improves?
h) Explain briefly bath tub curve
i) What do you mean by maintainability?
j) What is AOQL?

Q2 Define line standard and end standard. Describe in detail the procedure to transfer from line standard to end standard with suitable example. **(10)**

Q3 **a)** Discuss different reasons for the occurrence of systematic error. **(4)**

b) A clearance fit has to be provided for a shaft and bearing assembly having a diameter of 40mm. Tolerance on hole and shaft are 0.006mm and 0.004mm respectively. The tolerances are disposed unilaterally. If an allowance of 0.002mm is provided, find the limits of size for hole and shaft when (a) hole basis system and (b) shaft basis system are used. **(6)**

Q4 **a)** Explain with suitable example assignable and random causes of variation. **(5)**

b) Define sampling plan and describe the operating characteristic of a sampling plan. **(5)**

Q5 **a)** Differentiate between interchangeability assembly and selective assembly. **(5)**

b) Describe the sequential acceptance sampling plan based on MTTF. **(5)**

Q6 **a)** Explain the methods of arranging the components in the system of reliability. **(5)**

b) Briefly explain the availability of single repairable system using Markov model. **(5)**

Q7 A process has a good control when controlled between 3-sigma control limits of 118 and 124. The sample size is 4. **(10)**

(i) What is the standard deviation of the process?

(ii) What are the control limits on an R-chart?

(iii) Can this process be used when the specification limits are 116 and 128?

Q8 **Write short answer on any TWO:** **(5 x 2)**

a) calibration

b) Stylus type instrument.

c) Taguchi's Loss function

d) Multiple sampling plan