Registration No : | | | | | | | | | | |

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

PME4I104

4th Semester Regular / Back Examination 2018-19

MECHANICAL MEASUREMENT, METALLURGY & RELIABILITY

BRANCH : MECH

Max Marks : 100

Time : 3 Hours

Q.CODE : F689

Answer Question No.1 (Part-1) which is compulsory, any EIGHT from Part-II and any TWO from Part-III.

The figures in the right hand margin indicate marks.

Part- I

Q1 **Only Short Answer Type Questions (Answer All-10)** **(2 x 10)**

a) Classify the measuring instruments.

b) Briefly explain the different types of errors.

c) Distinguish between the active and passive transducers

d) Compare the different temperature scales.

e) Distinguish between precision and accuracy.

f) What is Peltier effect?

g) What is Load Cell?

h) What is thermocouples?

i) Define Reliability?

j) What is interchangeability?

Part- II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** **(6 x 8)**

a) Explain the ballast circuit, used for strain measurement.

b) Differentiate among line, end & optical Standards standards.

c) Differentiate the Variable-reluctance transducers and Capacitive transducers

d) Explain the bath-tub-curve.

e) How temperature compensation is done in strain measurement?

f) What is Stroboscope? How it works?

g) Explain the working principle of Mc Leod gauge.

h) Describe the flow measurement using venturimeter.

i) Explain the working principle of a torsion-bar dynamometer.

j) What are the limit, fit and tolerances?

k) Explain the following methods of quantifying surface roughness: (a) Ra value (b) RMS value.

l) Explain the seismic instruments like Vibrometers and accelerometers.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 Explain the WSB circuit used for strain measurement, and derive the expression for the gage factor and sensitivity. **(16)**

Q4 Explain the optical pyrometer and its constructional features. **(16)**

Q5 What is meant by variable-area meter? Describe its working principle. What are the merits and limitations of it? **(16)**

Q6 Calculate the limits, tolerances, and allowances on a 25 mm shaft and hole pair designated H7/g6 to get a precision fit. The fundamental tolerance is calculated by the following equation: **(16)**

$i = 0.453\sqrt[3]{D} + 0.001D$

The following data is given:

a) Upper deviation of shaft = $-2.5D^{0.34}$

b) 25 mm falls in the diameter step of 18–30 mm

c) IT7 = $16i$

d) IT6 = $10i$

e) Wear allowance = 10% of gauge tolerance.

In addition, determine the maximum and minimum clearance.