

Name:

Enrolment No:



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, April/May 2018

Course: Mechanical Measurements & Metrology

Semester: IV

Program: B. TECH Mech, ME-MD, ME-PRO, ME-Sz-MSNANO, ME-TH

Time: 03 hrs.

Max. Marks: 100

SECTION A

S. No.		Marks	CO
Q 1	Differentiate between unbonded & bonded strain gauges.	4	CO2
Q 2	Explain the significance of 'best size' wire in the measurement of effective diameter of a screw thread? Estimate the same for thread designated as M10*1.	1+3	CO5
Q 3	State the working principle of bimetallic strip for temperature measurement.	4	CO2
Q 4	Sketch the fringe pattern when the surface is i) convex ii) concave iii) Flat along its length iv) Flat at one end & becomes increasingly convex	4	CO4
Q 5	Name the different types of error occurring during measurements.	4	CO1

SECTION B

Q 6	. Sketch & explain the procedure of checking of unknown angles using sine bar. OR With the help of a neat sketch, explain the working principle of autocollimator.	10	CO4
Q 7	Prove that how inclining the limb of a single column manometer increases its sensitivity.	10	CO2
Q 8	State the Taylor's principle of Gauge design. Design a ring gauge for inspecting a shaft of dimensions $100^{\pm 0.1}$ mm.	4+6	CO3
Q 9	In the measurement of surface roughness, the height of 10 successive peaks & valleys over a datum line for a sampling length of 8 mm were found to be: Peaks: 45, 42,40,35,35 μm . Valleys: 30, 25,25,24,18 μm . Determine the CLA, RMS & Ten point average value of the surface.	10	CO5

SECTION C

Q 10	With the help of a neat sketch, explain the procedure to measure the effective diameter of a screw thread.	20	CO5
Q 11	a) What do you understand by temperature compensation in strain gauges? Explain with the help of examples, how the same can be achieved. b) With the help of sketch, explain the method of measurement of very high pressures.	10 10	CO2
Q 11	OR Explain i) 3 wire method of temperature measurement using RTD in one arm of the Wheatstone bridge. ii) Mueller Bridge	10+10	