Registration no: ☐☐☐☐☐☐☐☐☐☐

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PDPE203

2nd Semester Back Examination – 2016-17
METROLOGY
BRANCH(S): PRODUCTION ENGG, PRODUCTION ENGG AND OPERATIONAL MGT
Time: 3 Hours
Max Marks: 70
Q.CODE: Z828

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) What is sine bar? How it is used for angle measurement?
   b) Explain the construction and uses of screw pitch gauge.
   c) Interpret the meanings of the following fit.
         (a) H7 v_5 (b) H_7 g_7
   d) Explain Tool Maker's Microscope.
   e) What are the advantages of fixed gauges in comparison to comparator type gauges?
   f) Differentiate between line standards and end standards with suitable example.
   g) Draw the sketch of "Hole basis System" and give reason for selecting them.
   h) What do u means by calibration? Write the steps in performing it?
   i) What is the difference between Unilateral and Bilateral tolerance?
   j) With the help of sketch describe a vernier type micrometer. How do you calculate its least count?

Q2 a) Draw a neat sketch of metric screw thread profile showing all the parameters.   (5)
    b) Draw the block diagram of a generalized measurement system and explain the various stages with an example.   (5)

Q3 a) Determine the actual dimensions to be provided for a shaft and hole of 90 mm size for H_8 e_9 type clearance fit, size 90 mm falls in diameter steps of 80 and 100. Fundamental tolerance unit: (10)

   $i = 0.45 \sqrt[3]{D} + 0.001D$

   Where ,D= diameter of geometry mean of steps in mm, and
   i= standard clearance in microns.
   The value of tolerance for IT 8 and IT 9 grades are 25 i and 40 i and the value of fundamental deviation for 'e' type shaft   -11 $D^{0.41}$ .Also design the 'GO' and 'NO GO' gauges as per the present British system where the same workshop and inspection gauges are used.

Q4   Explain with a suitable sketch the three wire method of measuring the effective diameter of a screw thread.   (10)

Q5   a) Define surface roughness. State its unit.   (5)
     b) Explain with the help of neat sketches the principle and construction of a   (5)
         Combination set.

Q6   a) Evaluate the importance of tool maker's microscope in current manufacturing   (5)
         methods. Also explain few applications that use TMM
     b) Explain the principle and application of optical flats.   (5)

Q7   a) In a hole and shaft combination of 25 mm nominal size,   (10)
         H7 hole limit are + 0.021 mm ,+ 0.000 mm
          e8 shaft limits are -0.040 mm, -0.073 mm
         State the vales of (i) maximum and minimum clearance obtained,
         (ii) allowance
         (iii) tolerance on the hole and the shaft
         (iv) type of fit.

Q8   **Write any two questions**   (5 x 2)
     a) Coordinate measuring machine
     b) Automatic measuring machines
     c) Gear inspection
     d) Interferometers