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III Sem B E Examination

**MECHANICAL MEASUREMENTS & METROLOGY**

[ Common to ME / IP / IM / AU / MA ]

**MODEL QUESTION PAPER**

Time: 3 Hrs.]

[Max. Marks: 100

(Answer any **FIVE** questions selecting at least **two** from each part)**PART - A**

- 1(a) Compare Line Standard and End Standard. (8)
- (b) Three 100 mm gauges are measured on level comparator by first wringing them together and then comparing them with 300.0025 mm and the three gauges together have a combination length of 3000.0035 mm. Gauge A is 0.0020 mm longer than gauge B but shorter than Gauge C by 0.0010 mm. Determine the corrected length of each gauge. (6)
- (c) What is wringing? Explain the procedure for wringing of slip gauges. (6)
- 2(a) Explain the principles of interchangeability and selective assembly. (8)
- (b) Design the general type of GO and NOGO gauges for components having 20H7f8 Fit. Given:
- (i)  $i = 0.45 (D)^{1/3} + 0.001D$
- (ii) Upper deviation of 'f' shaft =  $-5.5 D^{0.41}$
- (iii) 20 mm fall in the diameter step of 18 mm to 30 mm.
- (iv) IT7=16i
- (v) IT8=25 i
- (vi) Wear allowance 10 % of gauge tolerance. (12)
- 3(a) What are the required characteristics of comparators? (6)
- (b) With neat sketch explain working of sigma comparator (8)
- (c) Using angle gauges build up the following angles.
- (i)  $26^{\circ} 50' 30''$  (ii)  $35^{\circ} 16' 42''$

- 4(a) Sketch the fringe Pattern for the following Surface defects
- (i) Scratch at the center.
- (ii) Beveled at the corner. (6)
- (b) Derive the expression for the "best size wire" (6)
- (c) With neat sketch explain the principle of working of auto-collimator. (8)

**Part-B**

- 5(a) What is measurement? Explain with block diagram the generalized measurement systems. 08
- (b) List the different types of errors and explain the causes. (6)
- (c) Give the complete classification of transducers (6)
- 6(a) What are the inherent problems with mechanical systems (6)
- (b) Explain ballast Circuit and derive the expression for its sensitivity (8)
- (c) Explain a general type of telemetering system with neat block diagram (6)
- 7(a) Describe with a neat sketch the working of proving ring. (6)
- (b) Discuss the working of Macleod Gauge with neat Sketch. (8)
- (c) With a neat sketch explain the working of prony brake dynamometer. (6)
- 8(a) What is a thermocouple? State and explain the Laws of Thermocouple (6)
- (b) Discuss the construction and working of Optical Pyrometer (8)
- (c) What is a Strain gauge? Write a note on mounting of strain gauges. (6)