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# B.M.S. College of Engineering, Bengaluru-560019

**Autonomous Institute Affiliated to VTU**

## June / July 2024 Semester End Make-Up Examinations

**Programme: B.E.** **Semester: III**
**Branch: Industrial Engineering and Management** **Duration: 3 hrs.**
**Course Code: 23IM3PCIME** **Max Marks: 100**
**Course: Industrial Metrology**

**Instructions**: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

**Important Note:** Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

| | | UNIT - I | CO | PO | Marks |
|---|---|---|---|---|---|
| 1 | a) | Explain briefly the different types of fit with examples. | CO3 | PO3 | **08** |
| | b) | Explain briefly the various subdivision of standards | CO1 | PO1 | **04** |
| | c) | Determine the tolerances on the hole and the shaft for a fit designated by 50 $H_7g_6$, given;<br>• 50 mm lies between 30-50 mm<br>• Fundamental deviation for g shaft =-2.5$D^{0.34}$<br>• IT7=16i and IT6=10i<br>State the actual maximum and minimum sizes of the hole and shaft and maximum and minimum clearances. | CO3 | PO3 | **08** |
| | | **UNIT - II** | | | |
| 2 | a) | Enumerate on the working of a floating carriage micrometer and explain how the minor and effective diameter of a screw thread can be measured. | CO4 | PO1<br>PO2<br>PO3<br>PO9<br>PO12 | **10** |
| | b) | Explain the constant cord method for measuring the gear tooth thickness | CO4 | PO1<br>PO2<br>PO3<br>PO9<br>PO12 | **10** |
| | | **OR** | | | |
| 3 | a) | Explain briefly the working of a Parkinson's Gear tester. List any two uses of it. | CO4 | PO1<br>PO2<br>PO3<br>PO9<br>PO12 | **10** |

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|---|---|---|---|---|---|---|
| | | b) | Explain briefly the working principle of a sine bar and with neat sketches, describe the uses of it. | *CO4* | *PO1*<br>*PO2*<br>*PO3*<br>*PO9*<br>*PO12* | **10** |
| | | | **UNIT - III** | | | |
| | 4 | a) | With the help of a neat sketch, explain the working principle of a Sigma mechanical comparator | *CO2* | *PO2* | **10** |
| | | b) | With the help of a neat sketch, explain the working principle of a Solex pneumatic gauge. Discuss the major applications of pneumatic gauges. | *CO2* | *PO2* | **10** |
| | | | **OR** | | | |
| | 5 | a) | Explain briefly an electrical comparator that works on the principle of Mutual induction. | *CO2* | *PO2* | **06** |
| | | b) | With the help of an illustration, explain the following terms: roughness, waviness, lay, and flaws. | *CO2* | *PO2* | **04** |
| | | c) | With the help of a neat sketch, explain the working principle of the Tomlinson surface meter | *CO2* | *PO2* | **10** |
| | | | **UNIT - IV** | | | |
| | 6 | a) | Enumerate on the generalized measurement system. Justify the answer with an example, neat sketches and block diagrams. | *CO1* | *PO1* | **10** |
| | | b) | Describe the construction and working principle of Optical Pyrometer | *CO2* | *PO2* | **10** |
| | | | **UNIT - V** | | | |
| | 7 | a) | Enumerate on the different types of Main structure of a Coordinate Measuring Machine with neat sketches, and list difference between inductive and optical probing system. | *CO2* | *PO2* | **10** |
| | | b) | Describe briefly the working of a Michelson Interferometer and list out its applications. | *CO2* | *PO2* | **10** |



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