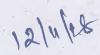
| | A 4 4 4 4 1 | | | | | | | |
|--------|---------------------------|--------------|--|----------|-----------------|----------|---|-------|
| | | | a la | | | | 180 32 | |
| | | | | | | | | |
| | The state of the state of | X 2 4 5 7 | | | | | | |
| | | | and the same of | | | | | |
| | | | | | 100 | | | |
| | | | 11 6 8 11 | | | | | |
| | | | | 3 10 1 1 | | A 18 3 | | |
| | | | | | | | | |
| | | | | Van S | | | | |
| | | | | | The said of the | | | |
| 5 × 10 | | | | | | | * | |
| | | | | | The same of | The last | | |
| | | The state of | | | | | | |
| , | | | | | | | V 1 | |
| 77 | | | | | | | | |
| | | | | | | | 4-11 | |
| | | | 1. 160 | - 10 | | 17 | | |
| | MARINE TO THE | | | | | | 7, 2 | 11.0/ |
| | | ar P c i | | | | NE - 1 | | |
| | 1 1 1 1 1 | B-YF | | | | | | 1-9 |
| | | | | | 10 M | | | ģ I |
| | | | | 2 80 1 | | | - * 2 | |
| | | | | | 7 1 80 1 3 | | | |
| | 1. 477 | | | | | | | |
| | | | | 1 1 | | | | |
| | | | | | | | | |
| | 11 44 43 | | | | | | 1 4 4 | |
| | | | | | - | | | |
| 40 | | - X | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | 198 1 4 4 | | | | | | | |
| | | | | A Minney | | | V. 7 "2" | |
| 100 | B 1 1 | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | 0 O | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |



| Reg. No.: | | | | | | | | |
|-----------|--|--|--|--|--|--|--|--|

Question Paper Code: 20815

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Fourth/Fifth Semester

Mechanical Engineering

ME 6504 — METROLOGY AND MEASUREMENTS

(Common to: Materials Science and Engineering/Mechatronics Engineering)

(Regulations 2013)

(Also common to : PTME 6504 – Metrology and Measurements for B.E. (Part-Time) Fourth Semester – Mechanical Engineering – Regulations – 2014)

Time: Three hours

Maximum: 100 marks

Answer ALL questions.

PART A — $(10 \times 2 = 20 \text{ marks})$

- 1. What are the important elements of measurement?
- 2. Define sensitivity.
- 3. How do you find the least count of a micrometer?
- 4. What are the limitations of sine bar?
- 5. Name the types of laser.
- 6. How are CMM classified on the basis of configuration?
- 7. What is 'best wire size' in screw thread measurement?
- 8. Name any four elements of gear which are checked for accuracy
- 9. What are torque meters?
- 10. State the various types of commercially available thermocouples.

PART B — $(5 \times 13 = 65 \text{ marks})$

| 11. | (a) | (i) | Describe the types of measurement. | - |
|-----|-----|------|---|--------------|
| | | (ii) | Differentiate between Precision and accuracy. | (7 + 6) |
| | | | Or | |
| | (b) | (i) | What are the sources of errors? How are they classified? | |
| | | (ii) | Write short notes on types of standards. | (7 + 6) |
| 12. | (a) | | cuss the construction, working principle, and applications of ular displacement measuring instrument. | any one (13) |
| | | | Or | |
| | (b) | Des | cribe the working principle of Auto Collimeter with neat diagr | am. (13) |
| 13. | (a) | (i) | With the aid of sketches describe the laser telemetry system | ì. |
| | | (ii) | Briefly explain principle of laser triangulation sensor. | (7 + 6) |
| | | | Or | |
| | (b) | (i) | Discuss the construction and working of bridge type CMM. | P |
| | | (ii) | Enumerate the role of computers in Metrology. | (7 + 6) |
| 14. | (a) | (i) | Illustrate with neat sketch the functioning of surface measurement system. | finish |
| | | (ii) | Discuss the various elements of surface roughness. | (7 + 6) |
| | | | Or | |
| | (b) | | ne the methods of measuring gear tooth thickness and expl in detail. | ain any (13) |
| 15. | (a) | (i) | Describe the force measurement using hydraulic load cell. | 1 - 1 |
| | | (ii) | Summarize the relative merits of Venturi, Flow Nozzle and O | Orifice. |
| | | | | (7 + 6) |
| | | | Or | |
| | (b) | (i) | Sketch and describe the elementary thermocouple circuit. | |
| | | (ii) | What is rotameter? Discuss its significance. | (7 + 6) |
| | | | | |

PART C — $(1 \times 15 = 15 \text{ marks})$

- 16. (a) Design the general type GO and NO-GO gauge for the components having 20H7f8 fit. Given:
 - (i) 'i' (micron) = 0.45 (D)^{1/3} + 0.001 D
 - (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 = 25i
 - (vi) Wear allowance 10% of gauge tolerance.

(b) Select a suitable autocollimator for checking angular indexing and for small linear displacements and illustrate its working with schematic diagram. (15)

Or

(15)