

[Total No. of Questions - 17] [Total No. of Printed Pages - 3]  
(2064)

14623

**B. Tech 4th Semester Examination**  
**Metrology and Interchangeability (N.S.)**  
**ME-221**

**Time : 3 Hours**

**Max. Marks : 100**

*The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.*

**SECTION - A**

1. What is the working principle of optical measurement instrument? Explain in details different type of optical systems.
2. Distinguish between primary, secondary and working standards. Explain what do you mean by subdivision of standard.  
(10×2=20)

OR

3. What is a compound gearing method of measurement? How it is different from helical strip method?
4. What are the different type of error found in the measuring instrument? Explain how these are removed? (10×2=20)

**SECTION - B**

5. Explain with neat sketch the working mechanism of mechanical comparator. Also discuss its application in industries.
6. Define the term with sketches
  - (i) Limit
  - (ii) Tolerance

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(iii) Allowances

(iv) Fit

(10×2=20)

OR

7. What is a gauge? Provide the suitable definition and explain how a workshop gauge differs from an inspection gauge?
8. Distinguish between slip gauge and angular slip gauge with sketch. (10×2=20)

**SECTION - C**

9. Explain the working and construction of thread calliper gauges.
10. How do the angle and pitch errors of a screw thread affect its virtual effective diameter? Discuss. (10×2=20)

OR

11. Name and explain with neat sketch the various methods of measuring the minor diameter of the thread.
12. What are the different elements of the external and internal threads? (10×2=20)

**SECTION - D**

13. Discuss the types of errors in spur gear. Enumerate the different method of inspecting spur gear.
14. With the help of neat sketch describe the construction and working of the Tomlinson recorder and profilometer. (10×2=20)

OR

15. Explain the working of two dial gauges method for pitch measurement with neat sketch.

16. Define surface roughness (Ra, Rq and Rz). Explain how the surface texture is controlled. (10×2=20)

**SECTION - E**

17. (1) Differentiate the working principle of lever and vernier method.
- (2) What is difference between tolerance and fit?
- (3) What do you mean by limit gauge?
- (4) Explain the working of taper gauge.
- (5) Define following terms in spur gear  
I. Backlash II. Lead
- (6) Explain the purpose of design standardisation.
- (7) What is wavelength standard?
- (8) Write short note on optical system.
- (9) What are applications of auto collimator?
- (10) Define run out in spur gear. (2×10=20)