

01552

DIPLOMA IN MECHANICAL ENGINEERING**Term-End Examination****December, 2011****BME-062 : METROLOGY AND
INSTRUMENTATION***Time : 2 hours**Maximum Marks : 70*

Note : Attempt any ten questions. All questions carry equal marks. Use of calculator is permitted.

1. Describe some sources of errors in precision measurement. 7
2. What is the relationship between sensitivity and range ? What is the disadvantage of very sensitive instruments ? 7
3. A physical quantity P is related to Five parameters a, b, c, d, and e as follows : 7

$$P = \frac{a^4 b^3 c^2}{d^{1/2} e^{3/2}}$$

The percentage error of measurement in a, b, c, d, and e are 1%, 2%, 3%, 4% and 2% respectively.

What is the percentage error in the quantity P ?

4. What is the difference between standard gauges and limit gauges ? 7
5. Mention the name of the gauge that can be used for checking each of the following : 7
- (a) Shaft
 - (b) Wire
 - (c) Wheels
 - (d) Bolt
 - (e) Hole
 - (f) Nut
 - (g) A spherical ball.
6. By means of simple diagrams representing the hole and shaft, show the essential conditions for 7
- (a) a clearance fit
 - (b) an interference fit.
- Give a practical example of each.
7. What is a coordinate measuring machine ? What advantages does it offer in measuring various manufactured parts ? 7
8. When inspecting cylindrical work a ring gauge or a gap gauge may be employed ? Explain the advantages of using both types. 7
9. What are the important characteristics of dial indicator ? Enumerate its uses. 7

10. Describe the precautions that should be taken to prevent corrosion of highly finished surfaces. 7
 11. Define the pitch of a screw thread. Draw an illustrative line diagram of a pitch measuring machine and describe its working. 7
 12. The divisions on the main scale of Vernier calipers are 0.5 mm apart. The Vernier has 100 divisions equal to 98 main scale division. To what accuracy can the instrument read ? 7
 13. Explain the construction, working and uses of the universal Bevel Vernier Protractor. 7
 14. Describe in detail the adverse effects of poor surface finish. 7
 15. List the advantages and disadvantages of a micrometer and vernier calipers. 7
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