

R09**Code: 9A03603**

B.Tech III Year II Semester (R09) Supplementary Examinations December/January 2015/2016

METROLOGY

(Mechanical Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

- 1 What do you mean by unilateral and bilateral methods of tolerancing? Explain with diagrams why unilateral method is preferred.
- 2 (a) What are gauges for checking tapers? Sketch a taper plug gauge and taper ring gauge and explain their features briefly.
(b) Write a note on the plug and ring gauges for self holding tapers.
- 3 In order to test the straightness of an inverted Vee of a guide way in a horizontal plan of a machine tool an autocollimator and a reflector block of 127 mm base length tested are used. The reflector block is stamped '30 sec = 0.018 mm'. The readings of the autocollimator at 10 consecutive positions of a 1.5 m long guide way are recorded as:

Position	A	B	C	D	E
Reading	1'30"	1'36"	1'40"	1'48"	1'52"
Position	F	G	H	I	J
Reading	1'54"	1'58"	2'0"	2'4"	2'8"

- (i) Draw a simple sketch of the reflector block indicating the base length and order of flatness of the reflector.
(ii) Draw the graphical representation of the straightness of the guide way. What is the maximum value of out of straightness?
- 4 What is the principle of a Profilograph? Explain it's working with neat sketches.
- 5 (a) Distinguish between simple and virtual effective diameter of a screw thread.
(b) Using three wires of 2.5 mm diameter over the threads of M60 x 4 mm bolt, a micrometer reading of 61.4012 mm was obtained. Find the pitch error and hence the deviation in the included angle.
- 6 (a) Explain the parallelism of tailstock sleeve of a lathe machine to saddle movement
(b) Define and give reasons for the various types of alignment tests which are performed on milling machine tools.
- 7 (a) What are the elements of gears which are used for accuracy?
(b) A spur gear of 4 mm module has 45 teeth. Calculate the following proportions: (i) Pitch circle diameter. (ii) Addendum. (iii) Dedendum. (iv) Tooth working height. Assume the clearance to be 0.25 module. Compute the base pitch of the gear if the spur gear has a pressure angle of 20° .
- 8 (a) Explain hot dipping process.
(b) Explain advantages and disadvantages of galvanizing and tinning process.
