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10ME/AU45

Fourth Semester B.E. Degree Examination, Dec.2016/Jan.2017
Manufacturing Process – II

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting
at least TWO questions from each part.**

PART – A

1.
 - a. With neat sketches, explain the different types of chips produced during metal cutting. (06 Marks)
 - b. Draw Merchant's circle diagram and derive the Ernst-Merchant's solution, $2\phi + \beta - \alpha = \pi/2$ where ϕ = shear plane angle, β = friction angle, α = rake angle. (10 Marks)
 - c. While turning a mild steel rod with a HSS tool, a tool life of 15min was obtained at the cutting speed of 400m/min. When the cutting speed was reduced to 200m/min, tool life obtained was 90min. Determine the constants in the tool life equation. (04 Marks)
2.
 - a. Explain the properties that are to be considered during the selection of a cutting tool material. (08 Marks)
 - b. Briefly explain the different types of cutting fluids. (06 Marks)
 - c. With a neat sketch, explain the zones of heat generation in metal cutting (06 Marks)
3.
 - a. With a neat sketch, explain the constructional feature of a turret lathe. (10 Marks)
 - b. With a neat sketch, explain open and cross belt drive mechanism of a planer. (10 Marks)
4.
 - a. With a neat sketch, explain the constructional features of a radial drilling machine tool. (08 Marks)
 - b. With neat sketches explain any four operations performed on a drilling machine tool. (08 Marks)
 - c. Differentiate between absolute coordinate system and incremental coordinate system. (04 Marks)

PART – B

5.
 - a. With a neat sketch, explain the constructional features of a horizontal spindle column and knee milling machine tool. (10 Marks)
 - b. Show the calculations to index 51 divisions by compound indexing method on a universal dividing head. Consider a index plate with circles of holes – 15, 16, 17, 18, 19, 20. (10 Marks)
6.
 - a. Write a note on grade and structure of grinding wheel. (05 Marks)
 - b. With a neat sketch, explain the constructional features of a centreless grinding machine. (09 Marks)
 - c. Explain the factors to be considered while selecting a grinding wheel. (06 Marks)
7.
 - a. With a neat sketch, explain the constructional features of a continuous surface broaching machine. (08 Marks)
 - b. With a neat sketch, explain the principle of lapping. (06 Marks)
 - c. With a neat sketch, explain the principle of honing. (06 Marks)
8.
 - a. With a neat sketch, explain the working principle of ultrasonic machining process and state its advantages. (10 Marks)
 - b. With a neat sketch, explain the working principle of electron beam machining process and state its advantages. (10 Marks)

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Important Note: 1. On completing your answers, immediately draw diagonal lines from the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 42+8 = 50, will be treated as malpractice.