Code No: 8112

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD
M.E. I Year (Mechanical) I-Semester (Make Up) Examinations, May-2015
(Advanced Design and Manufacturing)

Metal Cutting and Forming

Time: 3 hours Max. Marks: 70

*Note: Answer **ALL** questions in **Part-A** and any **FIVE** questions from **Part-B***

Part-A (10 X 2=20 Marks)

1. Give composition of conventional H.S.S and describe the functions of each element.
2. Sketch velocity diagram in orthogonal cutting, indicate all angles and velocities.
3. Name the types of electric transducers.
4. Define machinability. How metals are rated.
5. Explain the electromagnetic forming process.
6. Discuss principle and applications of a ring rolling.
7. State the functions and properties of cutting fluids.
8. Name the factors effecting plastic deformation of metals.
9. What do you understand by plasticity cycle?
10. State the advantages and limitations of rubber pad forming process.

Part-B (5 X 10=50 Marks)

11. a) In an orthogonal turning operation of a mild steel rod of 55 mm diameter, cutting speed was 25 m/min, rake angle of tool 30°, feed rate 0.12 mm/rev, cutting force 2900 N, feed force 1200 N, length of continuous chip in one revolution 95 mm. Determine (i) coefficient of friction, (ii) shear plane angle, velocity of chip along tool rake face and chip thickness. (6)
    b) Derive the relation between shear angle, rake angle and chip thickness ratio. (4)

12. a) Explain the temperature measurement by radiation pyrometer. (5)
    b) Explain the principle of lathe dynamometer with a neat sketch. (5)

13. a) Explain types of tool wears including chemical wear. (5)
    b) Explain any one of the rapid prototyping techniques with a neat sketch. (5)

14. a) A 50 mm thick and 100 mm wide M.S plate is cold rolled to a final thickness of 35 mm using 300 mm diameters rolls running at 250 rpm. Assuming the yield stress of M.S plate as 210 MPa and plane stress condition. Determine
    (i) Roll load, (ii) Roll torque and (iii) Power required for the operation. (6)
    b) Explain the recovery, recrystallization and grain growth. (4)

15. a) Explain the explosive forming process with a neat sketch and give its limitations. (5)
    b) Explain the electro-hydraulic forming with a neat sketch. (5)

16. a) Define hot working, cold working and warm working. State their advantages and disadvantages. (5)
    b) Differentiate between hot machining and high speed machining. (5)

17. Write short notes on any TWO of the following. (10)
    (a) Estimation of shear angle experimentally. (b) Rotary machining.
    (c) Merchant's theory. (d) Rubber pad forming.

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