Hall Ticket Number:

Code No. : 21802

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

M.E. (Mech. Engg.: CBCS) I-Semester Main Examinations, January-2018

(Advanced Design & Manufacturing)

Metal Cutting and Forming

Time: **3** hours Max. Marks: **60**

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

Part-A (10 × 2 = 20 Marks)

1. Analyze the influence of rake angle on the coefficient of tool face friction.
2. What are the advantages of powder coatings on cutting tools?
3. How do you estimate power in grinding?
4. List the factors influencing the average chip-tool interface temperature.
5. Explain the chemical wear observed in metal cutting.
6. What is the effect of direction of fluid flow in metal cutting process?
7. Decide the factors effecting rolling process.
8. Discuss plasticity cycle.
9. List the merits of high velocity forming.
10. What is the principle of wheel on forming technique?

Part-B (5 × 8 = 40 Marks)
(All sub-questions carry equal marks)

11. a) Explain Merchant's force diagram with proper sketches and equations.
    b) During an orthogonal machining operation on mild steel, the results obtained are: uncut chip thickness = 0.25mm, chip thickness = 0.75mm, width of the cut = 2.5mm, rake angle = 0^0, horizontal cutting force = 900N, thrust force = 400N. Compute the coefficient of friction between the tool and chip interface. Determine also the ultimate shear stress of the work material.
12. a) Explain the use of electric transducers for force measurement in lathe.
    b) What is the basic principle of cutting temperature measurement using photographic method?
13. a) What do you understand by the term 'Tool life'? What factors influence the life of a cutting tool?
    b) What are the requirements of high speed machining?
14. a) Differentiate among hot, cold and warm working processes.
    b) Explain factors effecting plastic deformation.
15. a) With the help of a neat sketch explain electromagnetic forming process.
    b) What are the specific advantages of electro-hydraulic forming? Explain in detail.
16. a) Differentiate between apparent and real area of contact in metal cutting.
    b) Explain the temperature distribution in the shear plane of a typical metal cutting process.
17. Write short notes on any ***two*** of the following:
    a) Economics of machining.
    b) Strain hardening in mechanical working of metals.
    c) Application of pneumatic-mechanical systems in metal forming.