

B.E. (Mech) Part -III 6th Semester Final Examination, 2010

Subject: Manufacturing Technology (ME-604)

Full Marks: 75

Time : 3 Hrs.

Use separate Answer script for each half
Attempt any three questions from each half
All the questions carry equal marks

First Half

1. (a) Describe the grinding process with its purpose. What are the major differences of grinding operation with other conventional machining operations?
(b) What are the different abrasive grains used in grinding wheels? Discuss about them.
(c) Discuss how grain size influences the stock removal rate and the generated surface finish?
2. (a) What are the different bond materials used in grinding wheels? Discuss about these.
(b) What are Grade and Structure of grinding wheel? How they are classified?
(c) Discuss, with example, about the marking system for grinding wheels.
3. (a) Explain how the cutting parameters influence the grinding operation.
(b) Write a short note on truing and dressing of grinding wheels
(c) What safety precautions should be followed during grinding operations?
4. (a) How grinding machines are classified? Detail out the classifications.
(b) With neat labeled sketch explain the working principle of centreless internal cylindrical grinding operation.
(c) Draw neat sketches showing different motions of the surface grinding operations.
5. (a) Draw a neat labeled sketch of a typical internal broach.
(b) What are the advantages of broaching operation?
(c) Write a short note on broach material.

SECOND HALF

- 6.(a) What is the function of the universal dividing head as a milling machine attachment? Explain with a neat sketch how could you use it for differential indexing? Obtain the indexing for 137 divisions by differential indexing method.
- (b) How with the help of a helical fluted slab milling cutter and with the proper selection of the geometry of the cutter, an almost steady force throughout the cutting could be achieved? Explain with a schematic diagram.
- 7.(a) For a given milling operation it was decided to use carbide cutters in place of high speed steel cutters. The data for these two types of cutters is as follows:

	HSS	Carbide cutters
Diameter	125 mm	150 mm
Feed	0.4 mm/tooth	0.45 mm/tooth
No. of teeth	10	12
Cutting speed	30 m/min	100 m/min

Calculate the following for each cutter:

- (i) rpm of cutter, (ii) feed in mm/min, (iii) time required to mill a length of 200 mm (consider approach length) and percentage saving in time by using carbide cutters.
- (b) What is arc blow? Explain with neat sketch the causes of arc blow, its effects on welding and methods of reducing the arc blow problem. How is the arc blow problem in AC welding taken care of?
- (c) If the maximum output current from a welding power source of 100 % duty cycle is 350 A, determine the rated current at 75 % duty cycle?
- 8.(a) Describe the importance of a static volt-ampere characteristic of a welding power source in its selection for a particular welding process (manual and automatic)?
- (b) Determine the change in welding current if the arc length changes from 4 mm to 5 mm for the power source with the following static volt-ampere characteristic: $I^2 = -400(V-100)$. Assume that the arc length (l) and arc voltage (V) are related by the expression: $V = 20+4l$.
- (c) What are the typical electrode materials used in TIG welding? Why AC arc welding is preferred than DCEP in welding of Al by TIG process?
- (d) What are the differences between TIG and MIG welding process?
- 9.(a) Describe briefly with a neat sketch the technique of welding in SAW process.
- (b) What are the advantages that are gained by adding metal powders in SAW process?
- (c) Explain the process of metal transfer in GMAW process with neat sketch.
- (d) Explain how the welding quality in SAW is affected by some of the welding parameters?