Printed Pages : 3 TME-504

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 4077 Roll No.

B. Tech.

(SEM. V) EXAMINATION, 2008-09

MANUFACTURING SCIENCE - II

Time : 3 Hours] *[Total Marks : 100*

Note : *Answer all questions carrying* ***equal*** *marks.*

1 Answer any **four** parts of the following : 4×5=20

(a) What is free cutting steel ? What types of chips are formed during machining such steel ? - Explain.

(b) Discuss the importance of shear angle from the standpoint of metal cutting performance. What factors affect its value ?

(c) What are methods available for measuring cutting tool temperature ? Explain their applications and limitations ?

(d) What are the factors that control surface finish in turning ? How do you select the cutting process for good finish turning ?

(e) How does the cutting process parameters affect the cutting tool wear in single point tool ?

(f) Derive Merchent's shear angle relationship as $\phi = 45 - (\beta - \alpha)/2$, where ϕ is the shear angle, β is the friction angle and α is the rake angle.

2 Answer any **four** parts of the following : 4×5=20

(a) Which factors are considered for the manufacture of support structures in a lathe ? Discuss briefly.

(b) What are the various methods available for taper turning in a lathe ? Explain their specific advantages and limitations.

(c) What is a slotting machine ? Describe with neat sketches and illustrate its use.

(d) Explain the characteristics that distinguish a milling process from other machining processes.

(e) Describe the set-up that can be used for milling cams in a milling machine with the help of neat sketches.

(f) Explain the different types of holes and the processes used for making holes.

3 Answer any **four** parts of the following : 4×5=20

(a) Define flaw, roughness and waviness to characterize surfaces. Show surface profile for a rough, lapped and finished object.

(b) Why surface finish is important for many applications ? Ilustrate your answer.

(c) Explain 'Dressing' and 'Truing' of grinding wheel.

(d) What are the parameters that control the grinding process ? Explain their effect on grinding process.

(e) What is difference between honing and lapping operations ? Give their applications.

(f) Give the significance of dimensional tolerance control during various machining processes.

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4 Answer any **four** parts of the following : 4×5=20

(a) Give a classification of welding processes.

(b) What is the principle of arc welding ? What is the role of electrode in such welding process ?

(c) What are the factors which decide the weld quality ?

(d) What is the difference between brazing and soldering ? Give their uses.

(e) What is the difference between submerged arc and electroslag welding ?

(f) Why sometimes weld joins fail during use ? Give precautions to enhance life of weld joints.

5 Answer any **four** parts of the following : 4×5=20

(a) Compare the unconventional machining processes in terms of material removal rate and applications.

(b) What are the principal features of an ECM process ? What is role of electrolyte in ECM process ?

(c) Describe the working method of USM ? Give the function of a transducer and tool cone in USM.

(d) Compare between Plasma Arc Machining (PAM) and Ion Beam Machining (IBM)

(e) Write short notes on any two of the following :

(i) Spot welding

(ii) Explosive welding

(iii) Diffusion welding.

(f) Write a short note on any one of the following giving their uses and limitations :

(i) Abrasive Jet Machining (AJM)

(ii) Laser Beam Machining (LBM).