

Total No. of Questions: 6

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Enrollment No.....



Faculty of Engineering  
End Sem (Even) Examination May-2018  
ME3CO07 Manufacturing Processes and Machines

Programme: B.Tech.

Branch/Specialisation: ME

Duration: 3 Hrs.

Maximum Marks: 60

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

- Q.1 i. Cutting power consumption in turning can be significantly reduced by increasing.....of the tool. **1**  
(a) Rack angles (b) Cutting angles  
(c) Clearance angle (d) Nose radius
- ii. Taylor's tool life equation is **1**  
(a)  $VT^n = C$  (b)  $VT^n = C$  (c)  $V^nT = C$  (d) None of these
- iii. It is required to cut screw threads of 2 mm pitch on a lathe. The lead screw has a pitch of 6 mm. If the spindle speed is 60 rpm, then the speed of the lead screw will be **1**  
(a) 10 rpm (b) 20 rpm (c) 60 rpm (d) 120 rpm
- iv. Enlarging an existing circular hole with a rotating single point cutting tool is called **1**  
(a) Boring (b) Drilling (c) Reaming (d) Broaching
- v. A milling cutter having 8 teeth is rotating at 150 rpm. If the feed per tooth is 0.1 mm, the feed of table in mm/min is **1**  
(a) 75 (b) 120 (c) 125 (d) 150
- vi. In "down milling process" the work piece is fed.....the cutter's tangential velocity. **1**  
(a) In the same direction of (b) In the opposite direction of  
(c) Perpendicular to (d) Any one
- vii. Grinding wheel of 150 mm diameter is rotating at 3000 rpm. The grinding speed is **1**  
(a)  $7.5 \pi$  m/s (b)  $15 \pi$  m/s (c)  $45 \pi$  m/s (d)  $90 \pi$  m/s

P.T.O.

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- viii. For mass production to produce finish holes, the most economical and appropriate process is **1**  
(a) Drilling (b) Boring (c) Reaming (d) Broaching
- ix. In ECM process, the electrolyte used is **1**  
(a) Brine solution (b) Kerosene  
(c) Water (d) None of these
- x. In EDM process, the work piece is connected to **1**  
(a) Cathode (b) Anode (c) Earth (d) Any of these
- Q.2 i. What do you mean by 'Tool Signature' of a single point cutting tool? Explain briefly. **3**  
ii. How is 'Tool life' defined? State the factors which affect tool life. **7**
- OR iii. Explain the term 'Numerical Control'. Explain with neat diagram the main components of a 'Numerical Control Machine Tool'. **7**
- Q.3 i. How is the size of lathe specified? **3**  
ii. What are common operations which can be carried out on a lathe; describe any seven with the help of neat sketches. **7**
- OR iii. List different methods of thread cutting on lathe and compare them with suitable sketches. Also state the role of 'thread template'. **7**
- Q.4 i. Describe the terms cutting speed, feed and depth of cut as applied to milling operation. **3**  
ii. A plain surface 300 mm (long) x 100 mm (wide) is to be face milled on a vertical milling machine. The cutter has 18 teeth and feed per tooth is 0.20 mm. The spindle speed is 120 r.p.m. Diameter of cutter is 150 mm. The overtravel distance is 4 mm. Calculate the machining time. **7**

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- OR iii. For an orthogonal cutting process, using following data, chip thickness ratio 0.26, tool rake angle  $12^\circ$ , feed force 900 N and cutting force 1800 N. Determine **7**  
(a) Resultant cutting force  
(b) Coefficient of friction of the chip on tool face  
(c) Compression and Shear force
- Q.5 i. Define the term "Drilling" and "Drill". **3**  
ii. How grinding wheels are specified? Describe each notation in brief. **7**
- OR iii. Explain main element of a broaching tool with the help of neat sketch only. Also mention any three advantages and three limitations of broaching process. **7**
- Q.6 i. List various commercial methods employed in producing gears. **3**  
ii. Draw neat diagram of set up for a gear shaper for producing gears. State advantages and limitations of Gear shaper processes. **7**
- OR iii. Explain with a neat sketch the principle, working and applications of Electrical Discharge Machining (EDM). **7**

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## Marking Scheme

### ME3CO07 Manufacturing Processes and Machines

Q.1	i.	Cutting power consumption in turning can be significantly reduced by increasing.....of the tool. (a) Rack angles	1
	ii.	Taylor's tool life equation is (b) $VT^n = C$	1
	iii.	It is required to cut screw threads of 2 mm pitch on a lathe. The lead screw has a pitch of 6 mm. If the spindle speed is 60 rpm, then the speed of the lead screw will be (b) 20 rpm	1
	iv.	Enlarging an existing circular hole with a rotating single point cutting tool is called (a) Boring	1
	v.	A milling cutter having 8 teeth is rotating at 150 rpm. If the feed per tooth is 0.1 mm, the feed of table in mm/min is (b) 120	1
	vi.	In "down milling process" the work piece is fed.....the cutter's tangential velocity. (a) In the same direction of	1
	vii.	Grinding wheel of 150 mm diameter is rotating at 3000 rpm. The grinding speed is (a) $7.5 \pi$ m/s	1
	viii.	For mass production to produce finish holes, the most economical and appropriate process is (d) Broaching	1
	ix.	In ECM process, the electrolyte used is (a) Brine solution	1
	x.	In EDM process, the work piece is connected to (b) Anode	1
Q.2	i.	'Tool Signature' – Seven notations in sequence	3
	ii.	' Tool life' definition Factors affects tool life 1 mark each	2 marks 7 (Max 5 marks)
OR	iii.	'Numerical Control' meaning Neat labelled diagram	2 marks 7 5 marks

Q.3	i.	Lathe specifications.(0.5 marks for each)	Max. 03 marks	3
	ii.	Lathe operations with sketch (1 mark each)	Max 7 marks	7
OR	iii.	Methods of thread cutting Comparison (1 mark each) Sketches (1 mark each) Role of template	1 mark Max 3 marks Max 2 Marks 1 mark	7
Q.4	i.	Define- cutting speed, feed and depth of cut	1 mark for each	3
	ii.	Given Formulas Calculation Answer	2 mark 2 marks 2 marks 1 mark	7
OR	iii.	Given Resultant cutting force(Formula+ Calculations) Coefficient of friction (Formula+ Calculations) Compression force (Formula+ Calculations) Shear force (Formula+ Calculations)	1 mark 1 mark 2 marks 1.5 marks 1.5 marks	7
Q.5	i.	Define the term "Drilling" and "Drill"	1.5 marks each (1.5 marks *2)	3
	ii.	Grinding wheels specification 6 notations Brief description -6 notations	2 marks 5 marks	7
OR	iii.	Nomenclature with labelled diagram Advantages 3 points and limitations 3 points 0.5 marks each (0.5 mark * 6)	4 marks 3 points 3 marks	7
Q.6	i.	Methods	0.5 mark each (max 3marks)	3
	ii.	Labelled diagram of set up Advantages 2 points and limitations 2 points	5 marks 2 marks	7
OR	iii.	EDM- Principle Working with labelled sketch Applications (minimum two)	2 marks 4 marks 1 mark	7

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