



RN-7465

B. E. - IV (Sem. VII) (Mech.) Examination

May / June - 2010

Production Technology - I

Time : 3 Hours]

[Total Marks :

Instructions :

(1)

नीचे दर्शाविए निशानीवाणी विगतो उत्तरवडी पर अवश्य कपवी.
Fillup strictly the details of signs on your answer book.

Name of the Examination :
B. E. - 4 (Sem. 7) (Mech.)

Name of the Subject :
Production Technology - 1

Subject Code No. : 7 4 6 5 Section No. (1, 2,.....): 1&2

Seat No. :
[] [] [] [] [] []

Student's Signature

- (2) Attempt all questions.
(3) Assume any data if necessary giving reasons.
(4) Figures to the right indicate full marks.
(5) Use of non-programmable calculator is permitted.

SECTION - I

- 1 (a) Answer the following in brief : 10
(i) Explain 'relief angle' and its use.
(ii) What are the characteristics of a good dynamometer?
(iii) Why hob shifting is required? Explain.
(iv) Name the various methods for the measurement of tool-chip interface temperature.
(v) List various types of chip breakers. Why they are used?
- (b) Select the correct option/fill in the blanks : 6
(i) The primary tool force used in calculating the total power consumption in machining is
(a) radial force
(b) tangential force
(c) axial force
(d) frictional force
(ii) In an orthogonal machining operation, the chip thickness and the uncut chip thickness are equal to 0.45 mm. If the tool rake angle is 0°, the shear plane angle would be
(a) 18° (b) 30°
(c) 45° (d) 90°

- (iii) In machining aluminium parts, the chips produced are in the form of
 - (a) fragments (b) Snarls
 - (c) helix (d) Closed spirals
- (iv) Continuous chips with BUE are obtained by machining _____ metals with high speed tools at ordinary cutting speeds
 - (a) brittle (b) hard
 - (c) ductile (d) tough
 - (e) soft
- (v) The angle between the shear plane and _____ is called shear angle.
- (vi) Which of the following metals have excellent machinability?
 - (a) Cast iron (b) Low carbon steel
 - (c) Bronze (d) high carbon steel

2 Answer any **three** : **12**

- (i) Describe with neat sketch, the ASA system for tool designation.
- (ii) What are the indications of tool wear? Explain.
- (iii) Give classification of tool wear with neat sketch.
- (iv) Explain with neat sketch, thread rolling process.

3 (a) Attempt any **three** : **18**

- (i) From the following data, calculate
 - (a) Shear angle
 - (b) Chip thickness
 - (c) Velocity of chip along tool face and
 - (d) Coefficient of friction.
 - Steel rod of diameter 45 mm
 - Tool rake angle 30°
 - Cutting speed 25 mpm
 - Cutting force 2250 N
 - Feed force 1000 N
 - Tool feed 0.15 mm/rev.
 - Length of chip in one revolution 75 mm
- (ii) Calculate the machining time for shaping a helical gear with following data :
Gear thickness : 40 mm

Module : 3 mm
 No. of teeth : 80
 No. of strokes/min = 600
 Helix angle : 20° (R.H)
 Feed rate : In feed : 0.03mm/stroke
 Pressure angle : 20°
 Radial feed : 0.25 mm/stroke
 No. of teeth on cutter : 40
 Approach + Over travel = 3mm
 No. of cuts : Single

- (iii) Derive the equation for the calculation of machining time for spur gear hobbing.
 (iv) Derive the equation for the optimum value of cutting speed for minimum production time.
 (b) Explain with neat sketch, hob locating process. 4

SECTION - II

- 4 (a) Answer the following in short : 1×10=10
 (i) Define wear ratio in EDM process.
 (ii) Plot the variation of MRR with abrasive flow rate in AJM process.
 (iii) What is the function of horn in USM?
 (iv) State Faraday's first law for electrolysis.
 (v) What is the mechanism of metal removal in EBM process?
 (vi) Write full form of E.L.S.
 (vii) Define overheads.
 (viii) Name any three electrolytes used in ECM process.
 (ix) Write full form for H.S.T.R.
 (x) Sketch symbols for hydraulic motor and hydraulic pump.
 (b) Discuss the chief factors in cost estimating. 5
 (c) Differentiate between fixed costs and variable costs. 5

- 5 (a) Attempt any two : 2×6=12
 (i) A drill is required to be made in 30 mm thick tungsten carbide sheet. The slurry is made of 1 part of 320 grit (20 micron radius) boron carbide mixed with $1\frac{1}{4}$ parts of water. The static stress is 1.4 kS/cm² and amplitude is of tool

