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Total Number of Pages : 02

B.Tech
PME6J001

6th Semester Regular / Back Examination 2018-19

PRODUCT DESIGN & PRODUCTION TOOLING

BRANCH : MECH

Max Marks : 100

Q.CODE : F647

Answer Question No.1 (Part-1) which is compulsory, any EIGHT from Part-II and any TWO from Part-III.

The figures in the right hand margin indicate marks.

Part- I

Q1 Short Answer Type Questions (Answer All-10) (2 x 10)

- Enumerate the different factors that are to be considered in the design of a new product?
- What do you by product development?
- What is the role of runner extension? Which cross section is suitable for runner and why?
- State the factors that are to be considered in the selection of processes in process planning ?
- State the difference between flash and gutter?
- What is the role of knockout?
- Why angular clearance is necessary? What determines the amount of angular clearance?
- What is the general rule for length of drill bushings?
- State the difference between jigs and fixtures?
- What do you mean by tool wear? Write down the Taylor's tool life equation?

Part- II

Q2 Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve) (6 x 8)

- What do you mena by product planning? State the role of computer in product design?
- Discuss the different types of forging allownaces and state their significance in forging die design?
- State the general considerations in the design of drill jigs?
- Describe in details the classification of drill jig bushing? What is the general rule for clearance between drill and the bushing hole?
- State the principles of location and clamping?
- What is meant by complete location? State one of the shortcomings of V location? Why shouls the tool designer select the locating methods that require standard readily purchasable locating devise?
- What are the four essential requirements of clamps and clamping devices? What are the basic rules for applying clamping forces?
- During orthogonal cutting of mild steel at 2m/s with rake angle 15° , the width of cut and depth of cut are 5mm and 0.18mm, respectively. The shear angle was measured to be 34° . If the cutting forces and the thrust force are 500N and 200N, respectively, calculate the percentage of the total energy that is dissipated in the shear plane during cutting?
- For orthogonal cutting of a component, the feed force was 750N and cutting force was 1500N. Find out the shear force and normal to shear force (Compressive force) on the shear plane and the coefficient of friction of the chip on the tool face. Assume chip thickness ratio as 0.28 and rake angle as 10° .
- Discuss the importance of blank holder pressure in deep drawing operation? Where do tears usually occur when balk holder pressure is too high and Why? What is meant by ironing when discussing drawing operation?

- k) Write a short note on Progressive die?
- l) Discuss the variation of cost elements with cutting speed in a single cut, single pass machining operation?

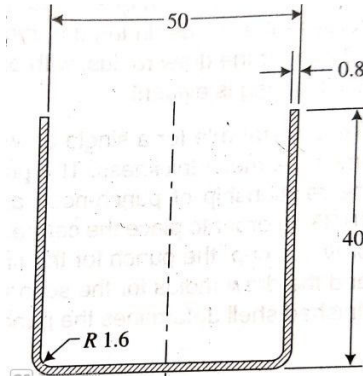
Part-III

Long Answer Type Questions (Answer Any Two out of Four)

Q3

The figure shows a symmetrical cup workpiece with shell height of 40mm and a shell diameter of 50mm the corner radius is 1.6mm. The workpiece material is 1020 cold rolled steel with ultimate strength 421N/mm^2 , and material thickness of 0.8mm. Make the necessary calculations for designing the die for this drawing operation (i) determine blank size (ii) Determine drawing ratio and percentage reduction (iii) Determine radius on punch and die (IV) Determine die clearance (V) Determine the drawing pressure (if friction constant $C=0.7$)

(16)



- Q4 a)** How chip breakers are provided in broach tool? **(8)**
- b)** Design an internal broach to increase the diameter from 55mm to 57 mm of a mild steel hub. Calculate the length of the broach and the motor power necessary for the above application? **(8)**

Q5 Design a single point cutting tool for rough machining of C 50. Cutting tool material is H. S. S. Back rake and side rake angles are 15° and 12° respectively. Assume any other suitable data. Draw the tool geometries in M.R.S. and O.R.S. system nomenclature respectively. **(16)**

- Q6 a)** Design a flat form tool for the job given. All the dimensions are in mm. Assume suitable data for the above design and sketch the form tool. **(8)**
- b)** State the advantages of form tool? **(8)**

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