315369

12526

3 Hours / 70 Marks Seat No. | | | | | | | | |

Instructions – (1) All Questions are *Compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Use of Non-programmable Electronic Pocket Calculator is permissible.

(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Attempt any FIVE of the following : **10**

a) State the drawback of the machining process.

b) List any four essential properties of cutting tool materials.

c) State the importance of die clearance.

d) State the function of back up plate in press tool.

e) Define the term "bend allowance".

f) Define "Fixture".

g) List any four types of jigs used in manufacturing.

P.T.O.

Marks

2. Attempt any THREE of the following : **12**

a) Draw a neat sketch of Jack pin and also state its application.

b) Compare V and U bending on following aspects

i) Punch and Die Shape

ii) Bending Force Required

iii) Applications

iv) Operation Complexity

c) Explain with neat sketch 3-2-1 principle of location.

d) Explain the requirements of modular fixture with emphasis on following aspects.

i) Interchangeability of Components

ii) Rigidity and Stability

iii) Setup time

iv) Flexibility in Design

3. Attempt any THREE of the following : **12**

a) List any two support pins and also state its application.

b) Explain with neat sketch the role of staggered punches in minimizing cutting forces in a press tool.

c) Draw open type jig and also label following components.

i) Drill plate

ii) Bush

iii) Clamp

iv) Work piece

Marks

d) Differentiate between orthogonal and oblique cutting on the following aspects.

i) Cutting edge orientation

ii) Force analysis

iii) Application

iv) Chip flow

4. Attempt any THREE of the following : **12**

a) Describe the function of a stripper and draw a fixed stripper, labeling following components.

i) Punch

ii) Stripper

iii) Die

iv) Stock guide

b) Justify the use of a negative rake angle in carbide cutting tools.

c) Differentiate between Jigs and fixture on the following aspects.

i) Definition

ii) Mounting on Machine

iii) Weight

iv) Complexity in construction

d) Draw Hook bolt clamp also state its advantages.

e) Explain the term springback in bending operations and also describe methods to compensate it.

Marks

5. Attempt any TWO of the following : **12**

a) Draw a general assembly diagram of a progressive die, clearly indicating all components and also state its applications.

b) In an orthogonal cutting operation, the following data have been observed.

Uncut chip thickness = 0.127 mm,

Width of cut = 6.35mm

Cutting speed = 2 m/sec

Rake angle = 10°

Cutting force = 567 N

Thrust force = 227 N

Chip thickness = 0.228 mm

Coefficient of friction = 0.64

Calculate:

i) Shear angle

ii) Friction Angle

iii) Shear force

iv) Chip velocity

v) Cutting power

vi) Shear strain

c) The symmetrical-cup work piece of 50 mm diameter, height of 50 mm and corner radius of 1.6 mm is to be made from cold rolled steel of 0.8 mm thickness.

Calculate:

i) Theoretical blank size

ii) Percentage reduction

iii) Number of draw

Marks

6. Attempt any TWO of the following : **12**

a) Explain the significance of the rake angle in cutting tool with emphasis on following aspects.

i) effect on shear angle

ii) effect on cutting force

iii) effect tool strength

b) Select the appropriate jigs for the given applications. State the reasoning for the selection.

i) For drilling holes in more than one planes of work piece.

ii) For drilling thin and ductile jobs.

iii) For drilling oil holes in IC engine connecting rod.

c) A Washer of 5 cm outside diameter and 2.4 cm inside diameter is to be produced from material of 4 mm thickness, having shear strength of 360 $\frac{N}{mm^2}$.

(Assume clearance as 10% of stock thickness)

Calculate:

i) Blanking pressure

ii) Piercing pressure

iii) Piercing punch diameter

iv) Piercing die diameter

v) Blanking push diameter

vi) Blanking die diameter

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