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

PAPER ID : 4042 Roll No. | | | | | | | | | | |

B.Tech.

FOURTH SEMESTER EXAMINATION, 2004-2005

MANUFACTURING SCIENCE-I

Time : 3 Hours *Total Marks : 100*

Note : *(i) Answer **ALL** six questions. There may be choices within.*

(ii) Marks are indicated therein.

(iii) In case of numerical problems assume data wherever not provided.

1. Briefly explain ***any four*** of the following : **(5x4=20)**

(a) Friction (in metal forming)

(b) Welding of plastics

(c) Runner versus Riser (for casting)

(d) Solidification of casting

(e) Cupola furnace

(f) Rolling

(g) Spring-back (in Bending)

2. Answer ***any two*** of the following : **(8x2=16)**

(a) Describe theories of plastic-deformation (failure).

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(b) Derive the following expression for pressure distribution in forging of a rectangular block of size b × h × w under "sticking friction". Conditon.

$$\frac{p}{2k} = 1 - \frac{1}{h}\left(x - \frac{b}{2}\right)$$

p = pressure at a distance x from centre
k = shear yield strength
h = height of block
b = breath of block

(c) Enlist various Hot working and Cold working processes. Compare hot working and cold working processes indicating advantages and disadvantages of each.

3. Answer *any two* of the following : **(8x2=16)**

(a) Write short note on any one :
  (i) Punch and Die assembly
  (ii) Flat face v/s Inclined face punch

(b) Describe common defects of rolling and extrusion processes. Also indicate remedial measures.

(c) Derive following expression for drawing stress σ_{xa} for wire drawing operation.

$$\frac{\sigma_{xa}}{2k} = \frac{1+B}{B}\left(1 - \left(\frac{D_a}{D_b}\right)^{2B}\right)$$

Where
B = μ.cot α
μ = coefficient of friction
α = semi-die angle
k = shear strength of wire
D_a = Diameter of wire at exit of die
D_b = Diameter of wire at entry of die

4. Answer *any two* of the following : **(8x2=16)**

(a) Describe in detail the explosive forming process. What will happen if no liquid medium is used in this process ?

(b) How powder metallurgy is different than other manufacturing processes ? Give two examples of the products manufactured by powder metallurgy process. Also give advantages of this process.

(c) Describe Injection moulding process indicating its principle and working.

5. Answer *any two* of the following : **(8x2=16)**

(a) What are the common methods of locating circular surfaces ? What is V angle for locating circular surface. Also give shortcoming of v location.

(b) What are the economic aspects of the use of jigs and fixtures ? Differentiate between drill jig and a fixture.

(c) Describe the process for making a washer with the help of progressive and compound dies.

6. Write short notes on any two : **(8x2=16)**

(a) Future of plastics.

(b) Desirable properties of moulding sand

(c) Casting design considerations

(d) Centrifugal casting

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