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**BME-003**

00935

# B.Tech. MECHANICAL ENGINEERING (COMPUTER INTEGRATED MANUFACTURING)

## BTCLEVI/BTMEVI/BTELVI/BTCSVI/BTECVI

## Term-End Examination

## June, 2015

## BME-003 : MANUFACTURING TECHNOLOGY

*Time : 3 hours* *Maximum Marks : 70*

***Note :*** *Attempt any **seven** questions. All questions carry equal marks. Use of calculator is allowed. Assume any suitable data, if found missing.*

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**1.** (a) Describe Investment casting process. Also discuss its advantages and disadvantages. *5*

(b) Briefly describe with neat sketches, the processes and applications of (i) Die casting (ii) Centrifugal casting . *5*

2. Calculate the size of a cylindrical riser with $\frac{d}{h}$ ratio 1, necessary to feed a steel slab casting $25 \times 25 \times 5$ cm$^3$. Assume the volume shrinkage on solidification is 3% for steel and that the volume of riser is three times that dictated by shrinkage consideration alone. *10*

3. (a) Describe the desirable properties of a mould sand and state what defects can arise due to absence/lack of these desirable properties. Also mention other casting defects possible. *5*

   (b) Sketch and briefly describe the working of Cupola furnace. *5*

4. (a) Discuss the various defects in deep drawing operation. Also list the various factors on which these defects depend. *5*

   (b) Briefly describe the process for bending a strip making allowance for its spring back. *5*

5. A symmetrical cup of circular cross-section with diameter 52 mm and height 52 mm, and a corner radius of 2 mm is to be obtained in C 20 steel of 0·8 mm thickness. Make the necessary calculation for designing the die for the above cup. *10*

6. (a) Discuss the welding characteristics of Grey Cast Iron. 5

(b) Explain the difficulties which may be encountered in the welding of high thermal conductivity materials. 5

7. (a) What are the various thermo-chemical welding processes ? Explain the working principle of thermit welding with the help of a neat sketch. 5

(b) What are the various radiant energy welding processes ? Explain the working principle of electron beam welding with the help of a neat diagram. 5

8. (a) What are the different welding defects obtained during welding ? Explain the various factors on which these welding defects are encountered. 5

(b) Write a short note on MIG welding. 5

9. (a) Explain Merchant's circle diagram and derive the expression for different cutting forces. 5

(b) Write a short note on Economics of machining. 5

**10.** In an orthogonal cutting test on a mild steel tube of size 150 mm diameter and 2·1 mm thickness, conducted at 90 metres per minute and 0·21 mm/rev. feed, the following data were recorded :

Cutting force = 1250 kgf

Feed force = 30 kgf

Chip thickness = 0·3 mm

Contact length = 0·75 mm

Net Horse power = 2 kW

Back rake = – 10°

Calculate shear, strain and strain energy per unit volume. *10*