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BME-003

B.Tech. MECHANICAL ENGINEERING (COMPUTER INTEGRATED MANUFACTURING)

00882

BTCLEVI/BTMEVI/BTELVI/BTCSVI/BTECVI

Term-End Examination

December, 2016

BME-003 : MANUFACTURING TECHNOLOGY

Time : 3 hours *Maximum Marks : 70*

Note : *Question no. 1 is* ***compulsory****. Answer any* ***four*** *from questions no. 2 to 7. Use of calculator is allowed. Assume any suitable data, if missing.*

1. (a) In an orthogonal cutting process, the following observations were made :

Depth of cut = 0·25 mm, chip thickness ratio = 0·45, width of cut = 4 mm, cutting velocity = 40 m/min, cutting force component parallel to cutting velocity vector = 1150 N, Feed force = 140 N, rake angle of the tool = 18°.

Determine the resultant cutting force, power of cutting, shear angle, friction angle and force component parallel to shear plane. 7

(b) Estimate the blanking force to cut a blank 25 mm wide and 30 mm long from a 1·5 mm thick metal strip, if the ultimate shear stress of the material is 450 N/mm^2. Also determine the work done, if the percentage penetration is 25% of material thickness. 7

2. (a) Compare Cold-chamber and Hot-chamber methods of die casting. 7

(b) List the types of furnaces used in casting. Discuss the various types of ladles used in a foundry. 7

3. (a) Explain the function of a pattern in the casting process. Discuss the difference between loose piece pattern and split pattern. 7

(b) Give the composition of a typical green moulding sand. Discuss the various binders used in moulding sand. 7

4. (a) List the essential characteristics of a cutting fluid. Which coolants would you suggest for turning of the following metals with HSS tools ? 7

(i) Cast iron

(ii) Bronze

(iii) Alloy steels

(b) Why were cutting tool inserts developed ? Discuss the two methods of attaching inserts to tool shanks. 7

5. (a) With the help of neat sketches, explain the following welding methods : 7

(i) Upset butt welding

(ii) Flash butt welding

(b) Describe in brief the 'oxy-acetylene flame cutting'. How does the cutting flame tip differ from a welding flame tip ? 7

6. (a) Differentiate between hot and cold working of metals. Write the advantages and disadvantages of these techniques. 7

(b) Discuss the various types of chips produced during metal machining. What is the use of a Chip Breaker ? 7

7. Write short notes on any ***four*** of the following : $4 \times 3\frac{1}{2} = 14$

(a) Pressurised and Unpressurised Gating Systems

(b) Welding Defects

(c) Tool Signature

(d) Crater and Flank Wear

(e) Bending Methods

(f) Punch and Die Wear in Drawing Operation