KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY
Department of Mechanical Engineering
B. Sc. Engineering 1st year Backlog Examination, 2016
ME 1107/ME 1207 (Old)
(Manufacturing Process)

Time: 3 Hours. Total Marks: 210

N.B. i) Answer any THREE questions from each section in separate scripts.
ii) Figures in the right margin indicate full marks.
iii) Assume reasonable data if any missing.

SECTION - A

1(a) What is meant by manufacturing process? Discuss the importance of manufacturing process. Also, explain the necessary steps in making sand molds with neat sketch. 10

1(b) What are the factors that affect the permeability and strength of molding sand? Explain the various pattern allowances with neat sketches. 08

1(c) What is precision casting? Explain various centrifugal casting processes with neat sketches and also show their comparison. 10

1(d) What is casting defects? Briefly clarify the various casting defects and its inspection methods. 07

2(a) Define die casting. Briefly explain the working principle of direct air pressure hot chamber die casting machine. Also, mention its merits and demerits. 12

2(b) With the help of diagrams, discuss the 'shell molding' method briefly. Why 'Lost Wax' method is so called? 10

2(c) Briefly explain the closed horizontal type continuous casting process with neat sketch. 08

2(d) Draw a sand mold and label it completely. 05

3(a) What is welding? Explain the MIG welding process. What are the differences between TIG and MIG welding process? 12

3(b) What are the different types of flames in Oxy-acetylene gas welding? Briefly describe them. 10

3(c) Write short notes on Submerged Arc Welding. 08

3(d) Differentiate between brazing and braze welding. 05

4(a) What is metal forming process? Explain the direct extrusion process with the help of neat sketch. 12

4(b) Illustrate the various roll arrangements used in rolling mills. Can thread rolling be a hot working process? Explain. 10

4(c) How does coining differ from embossing? What happens when a cup is drawn from sheet metal? 05

4(d) Write short notes on:
(i) Blanking (ii) Punching (iii) Piercing and (iv) Notching 08

SECTION – B

5(a) Draw the geometry of a single point cutting tool. 09

5(b) Describe the various forces that are encountered in metal cutting. 06

5(c) Define cutting fluid. Classify them. Also, mention the essential properties of cutting fluid. 08

5(d) During an orthogonal cutting operation the following data was observed: 12

Cutting force = 130 kg; Feed force = 40 kg; Rake angle = 10°; Feed = 0.3 mm/rev; Width of cut = 2.4 mm; Chip thickness = 0.4 mm; Cutting speed = 125 m/min. Determine the following:

(i) Chip thickness ratio, (ii) shear angle

6(a) Why lathe machine is said to be universal machine? Draw the layout of lathe machine with mentioning the lathe operations. 09

6(b) Describe the 'Quick Return Mechanism' of shaper machine. How does shaper differ from planner? 09

6(c) What machining operation can be done on a milling machine? Show with a neat sketch the different elements of a screw thread. 08

6(d) Define chip thickness ratio. Show that dynamic shear strain (e) is given by, 09

$$e = \frac{K^2 - 2K\sin\alpha + 1}{K\cos\alpha}$$

where, K is the chip reduction coefficient and α is the rake angle.

7(a) What are the purposes of honing, lapping and super finishing? 09

7(b) Differentiate between drilling, boring and reaming. Give the specification of a grinding wheel and explain it. 11

7(c) What are the different types of gears and screw threads? Mention different methods by which external and internal threads can be made. 08

7(d) Draw a spur gear and show its different elements. Mention some methods of making gear. 07

8(a) Why non-conventional methods of machining are very essential? Explain. Make a classification of it. 12

8(b) Describe the working principle of ECM. Also, write down its advantages and disadvantages. 13

8(c) Describe USM and LBM with figures. 10

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