BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: BE **SEMESTER : V**
BRANCH: PROD./MECH **SESSION : MO/18**

SUBJECT: PE5001-MANUFACTURING PROCESSES II

TIME: 03:00 HRS. **FULL MARKS: 60**

INSTRUCTIONS:
1. The question paper contains 7 questions each of 12 marks and total 84 marks.
2. Candidates may attempt any 5 questions maximum of 60 marks.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

Q.1(a) How pattern material is selected? Why wood is ideal for pattern? [2]
(b) What are the various types of pattern allowances? Explain clearly with suitable sketches. [4]
(c) What are the objectives and components of gating system? Discuss top and bottom gating systems with suitable figures. [6]

Q.2(a) Differentiate between permanent mold and temporary mold. [2]
(b) What are the different types of die casting processes? Suppose you have to manufacture an automobile part made of zinc with high dimensional accuracy in huge amount, which process will you select and why? [4]
(c) A vertical, true centrifugal casting process is used to cast brass tubing that is 15.0 inches long and whose outside diameter = 8.0 inches. If the speed of rotation during solidification is 1000 rev/min, determine the inside diameters at the top and bottom of the tubing if the total weight of the final casting = 75.0 lbs. Density of brass 0.313 lb/in^3 [6]

Q.3(a) How shot blasting and sand blasting helps in cleaning of castings? [2]
(b) What are the causes and remedies of the casting defects: hot tears, rat tails, dross and elephant skin? [4]
(c) Write short notes on: liquid penetrant test and magnetic particle inspection related to casting. [6]

Q.4(a) Compare reverse polarity with straight polarity in the context of arc welding. [2]
(b) Explain three types of flames in oxy-acetylene welding with sketches and applications. [4]
(c) The arc length voltage characteristics is given by the expression V = 24 +4l (l = arc length in mm). The volt ampere characteristic of a power source can be approximated by a straight line with open circuit voltage of 80V and short circuit current is 600A. Determine optimum arc length for maximum power. [6]

Q.5(a) How solid state welding is different from arc welding? [2]
(b) How pilot arc is initiated? Differentiate between transferable and non-transferable arc in PAW? [4]
(c) Explain different types of metal transfer mechanism in MIG welding. Which mode is preferred for overhead welding in MIG? [6]

Q.6(a) Explain weld cycle of resistance spot welding with sketch. [2]
(b) For spot welding of two steel sheets (base metal) each of 3 mm thickness, welding current of 10000 A is applied for 0.2 seconds. The heat dissipated from the base metal to surrounding is 1000 J. Assuming that the heat required for melting 1 mm^3 volume of steel is 20 J and interfacial contact resistance between sheets is 0.0002 Ω, calculate the volume (in mm^3) of weld nugget. [4]
(c) Differentiate between: [6]
a) Seam and Projection welding with sketch
b) Soldering and Brazing

Q.7(a) When newer method is preferred over conventional machining processes? [2]
(b) In electrochemical machining of pure iron a material removal rate of 600 mm^3 /min is required. Estimate current requirement. [4]
(c) Explain working principle of EDM process with neat sketch and role of dielectric fluid. [6]

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