MANUFACTURING PROCESSES
(MECH 2204)

Time Allotted : 3 hrs **Full Marks : 70**

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.

Candidates are required to give answer in their own words as far as practicable.

Group – A
(Multiple Choice Type Questions)

1. Choose the correct alternative for the following: **10 × 1 = 10**

(i) In which manufacturing process, the material wastage is minimum?
(a) Foundry process (b) Forming process
(c) Machining process (d) Welding.

(ii) Misrun is a casting defect which occurs due to
(a) very high pouring temperature of the metal
(b) insufficient fluidity of the molten metal
(c) absorption of gases by the liquid metal
(d) improper alignment of the mould flasks.

(iii) Which of the following methods of casting is best suited for casting of hollow pipes and tubes?
(a) Investment casting (b) Permanent mould casting
(c) Die casting (d) Centrifugal casting.

(iv) Which of the following type is not fillet weld?
(a) Butt joint (b) Lap joint
(c) T-joint (d) Corner joint.

(v) Heat is created by chemical reaction in
(a) resistance welding (b) tungsten arc welding
(c) thermit welding (d) friction welding.

(vi) Connecting rods are made by
(a) drop forging (b) upset forging
(c) press forging (d) roll forging.

(vii) Which one among the following welding processes uses non-consumable electrode?
(a) Gas Metal Arc Welding (b) Submerged Arc Welding
(c) Manual Metal Arc Welding (d) Gas Tungsten Arc welding.

(viii) Aluminium foils are produced by
(a) hot rolling (b) hot forging
(c) cold rolling (d) cold forging.

(ix) Process of forming metal powder by directing molten metal through an orifice after which it is break into small particle using high pressure fluid is known as
(a) atomization (b) reduction
(c) crushing (d) electrolysis.

(x) Which of the following die can perform multiple operations such as blanking, punching, notching etc.?
(a) Simple dies (b) Progressive dies
(c) Compound die (d) All of the mentioned.

Group – B

2. (a) Name any one pattern allowances provided on the pattern for a sand-casting and state the reasons why they are provided with proper example. State the advantages of Die casting process over sand casting process.

(b) What are chaplets and state its function? A gray cast iron block of final dimension 200 × 100 × 10 mm^3 is to be prepared by green sand casting. Shrinkage allowance for pattern making is 4%. Find the ratio of volume of pattern to that of the casting. (Considering Shrinkage Allowance only)

(4 + 2) + (2 + 4) = 12

3. (a) What are the specific advantages of the parting gate and step gate? What are the essential conditions that are to be kept in mind while designing risers?

(b) A 200 mm long down sprue has an area of cross section of 650 mm^2 where the pouring basin meets the down sprue (i.e. at the beginning of the down sprue) as shown in the fig.1. A constant head of molten metal is maintained by the pouring basin. The molten metal flow rate is 6.5 × 10^5 mm^3/s. Considering the end of down sprue to be open to atmosphere, find the area of the down sprue in mm^2 at its end (Avoid aspiration effect).

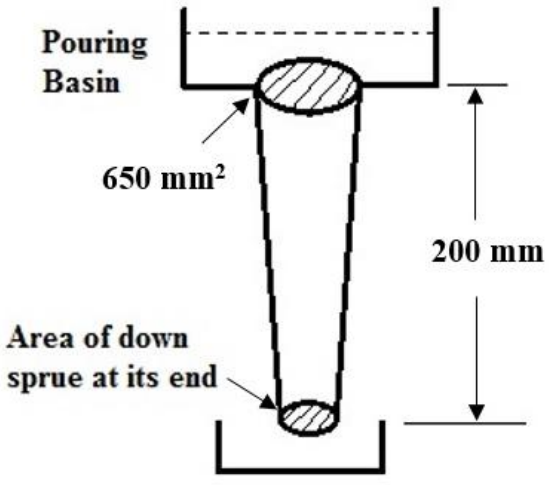

Fig.1

(3 + 3) + 6 = 12

Group – C

4. (a) State the principle of an oxy-fuel gas welding process. Describe the types of flames obtained in an oxy-acetylene gas welding process giving the applications of each of them.

   (b) How is an arc obtained in arc welding? State the important functions of flux coatings of electrodes used in Manual Metal Arc Welding process.

(2 + 4) + (2 + 4) = 12

5. (a) What are the shielding gases that are most commonly used in the inert gas shielded arc welding process? What are the parameters to be controlled in the resistance welding process?

   (b) State any two common welding defects and give their causes and remedies.

(3 + 3) + 6 = 12

Group – D

6. (a) Discuss with the help of Stress-Strain diagram of Steel, the range of stress and strain within which metal forming is carried out. Discuss on the different operations performed in Smith forging.

   (b) Explain the process of forward and backward extrusion by schematic sketches.

(3 + 3) + 6 = 12

7. (a) What is an Anvil and its purpose of use? Name different forging defects.

   (b) Briefly explain the principle of rolling. Explain 2 Hi, 3 Hi, 4 Hi Rolling stand (give sketches) mentioning their purpose of use.

(3 + 3) + (2 + 4) = 12

Group – E

8. (a) Explain giving a neat sketch of a press tool (die and punch) along with its accessories for carrying out blanking operation.

   (b) Discuss briefly on the following processes:
   (i) embossing (ii) coining.

6 + (3 + 3) = 12

9. (a) What are the advantages of powder metallurgy process? Explain sintering process in connection with powder metallurgy.

   (b) What are the two types of polymerization methods used in plastics? State the differences between them.

(2 + 4) + (2 + 4) = 12

Department & Section	Submission Link
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