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Paper Code : PC-ME302 Manufacturing Processes

UPID : 003492

Time Allotted : 3 Hours

Full Marks : 70

*The Figures in the margin indicate full marks.**Candidate are required to give their answers in their own words as far as practicable***Group-A (Very Short Answer Type Question)**

1. Answer any ten of the following :

[1 x 10 = 10]

- (i) Write down the Taylor's tool life equation.
- (ii) State the function of flux in arc welding.
- (iii) Name the machine used for mixing different ingredients of molding sand.
- (iv) Name the forging operation used to increase the thickness (or diameter) of a bar and to reduce its length.
- (v) Which is the hardest cutting tool material?
- (vi) Projection welding is a type of _____ welding.
- (vii) Welding process used to repair cracks in railway tracks is called _____.
- (viii) Name the allowances given in pattern.
- (ix) In which type of extrusion, frictional force is high?
- (x) Give an example of a two point cutting tool.
- (xi) Define machinability.
- (xii) Name the devices used for holding a workpiece on lathe.

Group-B (Short Answer Type Question)

Answer any three of the following :

[5 x 3 = 15]

2. Differentiate between piercing, punching and blanking operations. [5]
3. Make a neat sketch of a single point turning tool (SPTT) and show on it the tool signature parameters in ORS. [5]
4. Explain the desirable properties of a cutting tool material. [5]
5. Explain the different types of flames produced in gas welding stating their applications. [5]
6. What are the causes of heat generation in machining? [5]

Group-C (Long Answer Type Question)

Answer any three of the following :

[15 x 3 = 45]

7. (a) Describe the complete step by step procedure of investment casting. What are the main advantages of investment casting? [5]
- (b) Explain with necessary figure the steps of shell mould casting process. [5]
- (c) Discuss briefly the remedies of any two casting defects. [5]
8. (a) What is pattern? State any three types of patterns with their applications. [5]
- (b) What are the various pattern materials in use? Explain their relative advantages, limitations and applications. [5]
- (c) Explain the desirable properties of molding sand. [5]
9. (a) Determine the die and punch sizes for blanking and piercing a circular disc of 20 mm diameter from a C20 steel sheet whose thickness is 1.5 mm. Also determine the amount of punching force and stripping force associated with the process. Assume shear strength of annealed C20 steel as 294 MPa. [5]
- (b) Discuss on drop forging method with necessary figure. [5]
- (c) What do you mean by spring-back effect in sheet metal operation? [5]
10. (a) Three components are being cast out of a non-ferrous alloy. These components are designed in such a manner that all have the same volume but their shapes are different: one is a cube, second is a sphere and the third one is a cylinder with the diameter same as the length. Determine the order in which these three components will solidify. Assume $n=2$ in Chvorinov's rule. [8]

- 1.
- (b) What are the different risers used in casting? Explain with suitable figures. [7]
11. (a) Explain the dependency of tool life on different machining parameters. [5]
- (b) What is machinability and how it is assessed? [4]
- (c) In turning operation, a tool life of 80 minutes is obtained at the cutting speed of 30 m/min and 8 minutes at the speed of 60 m/min. Determine i) Tool life equation, b) Cutting speed for 4 minutes tool life. [6]
- 0.3.

*** END OF PAPER ***

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