

GANPAT UNIVERSITY

B.TECH SEM. VI - MECHATRONICS ENGINEERING

REGULAR EXAMINATION April /June-2015

2MC601 METAL FORMING & FABRICATION

Time: 3 Hours

Total Marks: 70

Instructions: 1) All questions are **compulsory**.2) Figures to the **right** indicate full marks.3) Answers of the **section-I** and **section-II** must be written in **separate** answer books.4) Use **HB pencil** only to draw figures and give proper notations.SECTION – I

- Que:-1**
- (a) Discuss the merits and demerits of A.C. and D.C. power sources. Explain straight and reverse polarity. [04]
- (b) Differentiate between transferred and non-transferred methods used in PAW. [04]
- (c) Explain Electroslag Welding with its advantages, disadvantages and application. [04]

OR

- Que:-1**
- (a) What is difference between nozzles of Oxy-acetylene gas welding process and Oxy-acetylene gas cutting process? Why? Explain with help of neat sketches. [04]
- (b) What is under water welding process? Explain it. [04]
- (c) Spot welding of two 1mm thick sheets of steel is carried out successfully by passing a certain amount of current for 0.1 sec through the electrodes. The resultant weld nugget formed is 5mm in diameter and 1.5 mm thick. If the latent heat of the fusion of steel is 1400 KJ/kg and the effective resistance in the welding operation is $200\mu\Omega$. Find the current passing through the electrode. (Steel density = 8000 kg/m³). [04]

- Que:-2**
- (a) Explain the TIG and MIG arc welding. Give the application of each. [06]
- (b) With the help of a neat sketch describe operation of CO₂-MIG welding process in the light of working principle, electrode & consumables used, arc initiation & maintenance method and type of current and type of power source used, process variables and their effect. [05]

OR

- Que:-2**
- (a) Write a short note on Electron beam Welding. [06]
- (b) Explain with neat sketch resistance spot welding process along with advantages and limitations. [05]

Que:-3 Attempt any three.

[12]

- (a) List the various defects occurred in welding. Explain any three of them.
- (b) Explain the blow-moulding process. Give its applications.
- (c) Write a short note on diffusion welding.
- (d) In which welding process Exothermic Reaction takes place? Explain it.

SECTION – II

- Que:-4 (a) Write a short note on “Impact Extrusion” with a neat sketch. [04]
- (b) A 4 mm thick sheet is rolled with 300mm diameter rolls reduce thickness without any change in its width. The friction coefficient at the work – roll interface is 0.1. What will be the minimum possible thickness of the sheet that can be produced in single pass? [04]
- (c) Enlist the assumption in analysis of rolling process and also derive the equation for the roll bite angle. [04]

OR

- Que:-4 (a) A strip with cross section of 200 mm X 6 mm is being rolled with 20 % reduction of area, using 400 mm diameter steel rolls. Calculate the angle subtended by the deformation zone at the roll centre in radian. [04]
- (b) Explain the term ‘Recovery’, ‘Recrystallization’ and Grain growth. Give the difference between recovery and recrystallization. [04]
- (c) What is hot spinning? Give the comparison between spinning and drawing. State pros and cons of spinning process. [04]

- Que:-5 (a) Explain the following processes: [06]
- (i) Swaging (ii) Bending (iii) Stretch forming
(v) Creep forming (vi) Blanking (vi) Deep drawing
- (b) What is die set? Give the classification of dies. Explain progressive die and compound die with neat sketch. [05]

OR

- Que:-5 (a) What is upset forging? Write advantages and limitations. Differentiate between open die forging and closed die forging. [06]
- (b) Explain briefly various “Sheet metal operations”. [05]

Que:-6 Attempt all questions.

[12]

- (a) Describe tube drawing with neat sketch.
- (b) Explain coining and embossing processes with neat sketch.
- (c) Explain Ring rolling process with suitable diagram. State advantages and disadvantages.

END OF PAPER