Exam Date & Time: 21-Nov-2019 (09:00 AM - 12:00 PM)

MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
(A constituent unit of MAHE, Manipal)

THIRD SEMESTER B.TECH END SEMESTER EXAMINATIONS, NOV 2018

AEROSPACE MATERIALS AND MANUFACTURING TECHNOLOGY [AAE 2154]

Marks: 50 **Duration: 180 mins.**

A

Answer all the questions.

Instructions to Candidates: Answer ALL questions Missing data may be suitably assumed

1) Explain how fatigue failure occurs in metals? (3)

A)

B) Classify the non-traditional machining process. List and explain the process parameters which affect the performance of the Plasma arc machining process along with its merits and demerits compared to other types of the non-traditional machining process. (5)

C) Differentiate between lapping and honing operations. (2)

2) What is crystal imperfection? List four different types of crystal imperfection. With a neat sketch explain the interstitial imperfections. (3)

A)

B) Neatly sketch the Iron-Carbon equilibrium phase diagram and mark all the regions. Explain the reaction at 4.3% C and also draw the cooling curve for the same. (5)

C) Sketch the miller indices i. (1 0 1) ii. [0 2 1] (2)

3) Melting temperatures of Copper (Cu) and Silver (Ag) are 1080 degrees centigrade and 960-degree centigrade respectively. The metals Copper and Silver are mutually soluble in the liquid state and partly soluble in the solid-state. A liquid phase alloy containing 70%

A) Silver completely transforms into a mixture of two solid solutions at 780-degree centigrade. The maximum solubility of Ag in Cu and Cu in Ag are 10% and 12% respectively at 780-degree centigrade. The room temp. Solubility is negligible. Assuming the curves to be linear, draw phase diagram to scale and label the regions. For 45% of Ag alloy determine the following: (4)

a) The weight percentage of eutectic formed.

b) The temperature where equal proportions of liquid and solid phases exist.

B) List the objectives of welding technology. (3)

C) With a neat sketch explain cold isostatic and hot isostatic compaction process (3)

4) With a neat sketch explain the Gas metal arc welding (GMAW) or Metal inert gas arc welding (MIG). List its merits and demerits over the other types of the welding process (4)

A)

B) Write a slotting operation part program for the component shown in figure 1. Consider the depth of cut as 10mm and cut per pass as 1mm in each pass. (3)

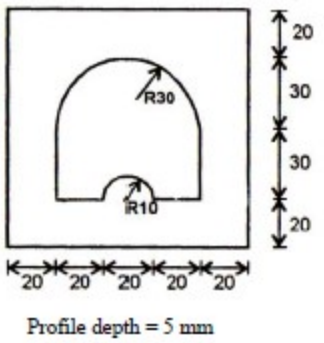

Fig:-1

C) With a neat sketches differentiate between the edge dislocation and screw dislocation. (3)

5) Write a part program for the component shown in figure 2.

A) (4)

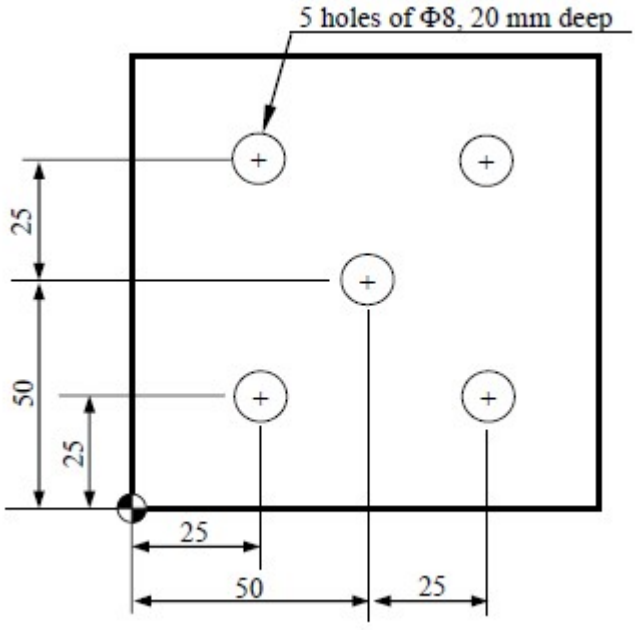

Fig:-2

B) With a neat sketch explain the working principle of the abrasive water jet machining process. (3)

C) Write the part program for the components shown in figure 3 (3)

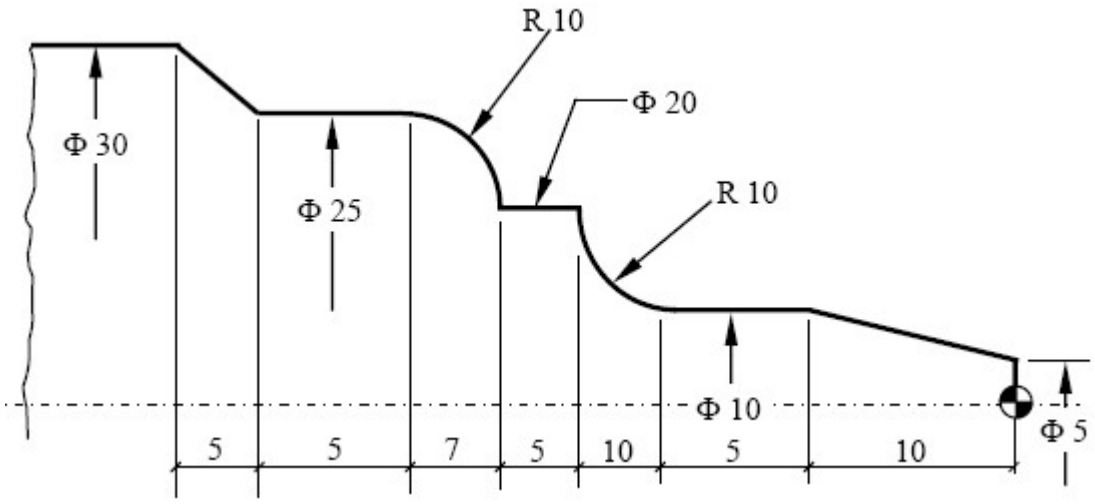

Fig:- 3

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