

**THE PAPUA NEW GUINEA UNIVERSITY OF TECHNOLOGY**

**MECHANICAL ENGINEERING – 3<sup>rd</sup> YEAR DEGREE**

**FIRST SEMESTER EXAMINATIONS – 2022**

**ME 314 – BASIC MANUFACTURING PROCESS**

**MONDAY, 30<sup>TH</sup> MAY 2022 – 8.20 AM**

**TIME ALLOWED: 2 HOURS**

**INFORMATION FOR CANDIDATES**

1. You have 10 minutes to read the paper. You **must not** begin writing during this time.
2. Answer **All** questions and you can do them in any order.
3. **Use only ink.** Do not use pencil for writing except for drawings and sketches.
4. Start each question on a new page and show all your calculations in the answer book provided. No other written material will be accepted.
5. Write your **NAME** and **NUMBER** clearly on the front page. **Do it now.**
6. Calculators are permitted in the examination room. Notes and textbooks are not allowed.

**MARKING SCHEME:**

Question Number 1	10
Question Number 2	10
Question Number 3	10
Question Number 4	10

### Answer All the Questions

<b>Question number 1</b>		
<b>Total marks 10 full marks for sub question (a) is 5 marks and that for (b) is 5 marks.</b>		
a)	A casting of size 100 cm × 100 cm × 25 cm was filled by top and bottom gates with manometric height in pouring basin to be 25 cm. Compare the time to fill the casting by different gates. The area of the gate is 5 cm <sup>2</sup>	[5]
b)	Discuss various casting defects. Also mention the causes of these and measures to be taken to avoid these defects	[5]
<b>Question number 2</b>		
<b>Total marks 10 full marks for sub question (a) is 5 marks and that for (b) is 5 marks.</b>		
a)	In a single pass rolling operation, a 20 mm thick plate width of 100 mm, is reduced to 18 mm. The roller radius is 250 mm and rotational speed is 10rpm. The average flow stress for the plate material is 300 MPa. What is the power required for the rolling operation in kW is closest to?	[5]
b)	Discuss various types of extrusion process with diagrams. Also mention their relative advantages and disadvantages	[5]
<b>Question number 3</b>		
<b>Total marks 10 full marks for sub question (a) is 6 marks and that for (b) is 4 marks.</b>		
a)	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 voltage(OCV) 80 V and short circuit current(SCC) is 600 A. Determine optimum arc length for maximum power.	[6]
b)	Differentiate between Straight Polarity and Reverse Polarity	[4]
<b>Question number 4</b>		
<b>Total marks 10 full marks for sub question (a) is 3 marks and that for (b) is 3marks and for (c) is 4 marks</b>		
a)	With a neat sketch explain resistance welding process. Also mention its advantages disadvantages and applications.	[4]
b)	Discuss various types of Patterns used in casting	[3]
c)	Differentiate between hot forming and cold forming	[3]