



UNIVERSITY  
OF  
JOHANNESBURG

[2019]

**PROGRAM** : BEngTech Industrial Engineering  
**SUBJECT** : **Mechanical Manufacturing Engineering 1B**  
**CODE** : **MANMIB1**  
**Supplementary Examination**  
**DATE** : 06 January 2020  
**DURATION** : **8:00 AM – 11:00 AM**  
**TOTAL MARKS** : 100

---

**ASSESSOR** : Prof. Kapil Gupta  
**MODERATOR** : Mr. Doctor Mukhawana  
**NUMBER OF PAGES** : 3 PAGES

---

**INSTRUCTIONS:**

A calculator of any kind/model is permitted

**REQUIREMENTS:**

NIL

**INSTRUCTIONS TO STUDENTS**

1. Read the questions carefully.
  2. All questions are compulsory.
  3. Show all calculations.
  4. Number your answers strictly according to the questions.
  5. Make use of sketches wherever required.
- 

**QUESTION 1**

**[20]**

- 1a.** Sketch any four weld joints. [4]
- 1b.** What is a polymer material? What are its various types? [4]
- 1c.** Define the following terms: [12]
- (i) Die and Punch
  - (ii) Riser
  - (iii) Flux
  - (iv) Forging
  - (v) Milling
  - (vi) Mould
- 

**QUESTION 2**

**[20]**

- 2a.** Classify casting processes. With the help of sketch explain the working principle of sand casting process. [10]
- 2b.** In the casting of steel under certain mold conditions, the mold constant in Chvorinov's rule is known to be  $4.0 \text{ min/cm}^2$ , based on previous experience. The casting is a flat plate whose length = 40 cm, width = 12 cm, and thickness = 2 cm. Determine how long it will take for the casting to solidify. [6]
- 2c.** What is the difference in gas welding and arc welding? [4]
- 

**QUESTION 3**

**[20]**

- 3a.** Write short notes on the following: [12]
- (i) Turning
  - (ii) Solid state welding
  - (iii) Bending
- 3b.** Briefly discuss the various parts of a cupola furnace with the help of sketch. [8]
-

**QUESTION 4**

**[20]**

- 4a.** What is a pattern in casting and moulding? What are various pattern materials? [3]
- 4b.** Differentiate between open-die forging and closed-die forging operations. [5]
- 4c.** Discuss various types of plant layouts with the help of examples and sketches. [8]
- 4d.** What are various arc welding positions? [4]
- 

**QUESTION 5**

**[20]**

- 5a.** What is die casting? What are its various applications? [5]
- 5b.** How pipes are joined by friction welding? [5]
- 5c.** Explain the powder metallurgy terms pressing and sintering. [6]
- 5d.** What are the limitations of powder metallurgy process? [4]

-----END-----