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Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Fourth semester B.Tech examinations (S), September 2020

Course Code: ME210

Course Name: METALLURGY AND MATERIALS ENGINEERING (MC)

Max. Marks: 100

Duration: 3 Hours

PART A

Answer any three questions, each carries 10 marks.

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|---|--|-------|
| 1 | Summarize the following | (10) |
| | (i) Crystallography | |
| | (ii) BCC | |
| | (iii) FCC | |
| | (iv) HCP | |
| 2 | Define unit cell and space lattice. What are the effects of crystalline and amorphous structure on mechanical properties | (10) |
| 3 | Show the different imperfections in crystal with detailed description. | (10) |
| 4 | a) Narrate the mechanism of crystallization. | (5) |
| | b) Demonstrate the effect of point defect on mechanical properties. | (5) |

PART B

Answer any three questions, each carries 10 marks.

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|---|--|------|
| 5 | What are the limitations of pure metals and clarify the need of alloying | (10) |
| 6 | Illustrate about the micro structure change during different heat treatment process. | (10) |
| 7 | Give a comparison between properties of Austenite and Martensite. | (10) |
| 8 | a) List out the properties nickel steels. | (5) |
| | b) How can we enhance steel properties? | (5) |

PART C

Answer any four questions, each carries 10 marks.

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| 9 | a) Write a short note on Griffith theory of fracture. | (4) |
| | b) Distinguish between ductile and brittle fracture. | (6) |
| 10 | a) How can we say that composite materials are important in aerospace industry? | (6) |
| | b) What properties make them suitable for the above? | (4) |
| 11 | a) Investigate the way to improve fatigue life. | (5) |
| | b) Demonstrate the effect of temperature on fatigue. | (5) |

- 12 a) What are the preventions against creep? (5)
b) List out the structural changes due to creep. (5)
- 13 Briefly explain the effect of plastic deformation on crack propagation. (10)
- 14 Elucidate about super plasticity. What are the needs and applications of super plasticity? (10)
