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PRESIDENCY UNIVERSITY BENGALURU

SCHOOL OF ENGINEERING

SUMMER TERM, END TERM EXAMINATION AUGUST 2024

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| **Semester : IV** | **Date : 06/08/2024** |
| **Course Code : MEC3012** | **Time : 9.30 AM -12.30 PM** |
| **Course Name : Materials and Characterization Techniques** | **Max Marks :100** |
| **Program : B.Tech.** | **Weightage : 50 %** |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Question paper consists of 3 parts.*
3. *Scientific and non-programmable calculator are permitted.*
4. *Do not write any information on the question paper other than Roll Number.*

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| **PART A** |
|  **ANSWER ANY 5 QUESTIONS 5Q X 2M=10M** |
| 1 | What is the Need of Materials Characterization? | (CO 1) | [Knowledge] |
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| 2 | List the various Characterization Techniques. | (CO 2) | [Knowledge] |
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| 3 | What do you mean by Microscope?  | (CO 2) | [Knowledge] |
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| 4 | List the various Applications of the Microscope.  | (CO 1) | [Knowledge] |
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| 5 | Write full forms of XRD, SEM and TEM. | (CO 2) | [Knowledge] |
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| 6 | Mention 3 common crystal structures present in the periodic table. | (CO 2) | [Knowledge] |
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| **PART B** |
|  **ANSWER ANY 5 QUESTIONS 5Q X 10M=50M** |
| 7 | Write steps involve for preparation of TEM Sample? | (CO 2) | [Comprehension] |
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| 8 | Explain the term microscopic resolution. | (CO 3) | [Comprehension] |
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| 9 | Explain properties of lights in characterization. | (CO 2) | [Comprehension] |
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| 10 | Explain how hypereutectoid steel transforms from liquid phase to solid phase. Draw microstructure for at least 4 points every step. | (CO 2) | [Comprehension] |
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| 11 | Calculate the amount of pearlite and ferrite formed on cooling the steel containing 0.5 % C. for calculation refer to the iron-carbon phase diagram. | (CO 2) | [Comprehension] |
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| 12 | Explain defects present in the crystal. Classify them. | (CO 3) | [Comprehension] |
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| **PART C** |
|  **ANSWER ANY 2 QUESTIONS 2Q X 20M=40M** |
| 13 | Draw a Fe-FeC3 phase diagram (Temperature vs composition). Label all the phases and mark invariant points. | (CO 4) | [Application] |
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| 14 | Explain the steps involved in constructing the Time-Temperature-Transformation curve (T- T-T) for iron and steel. Draw a TTT curve for steel. | (CO 4) | [Application] |
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| 15 | Draw a Cu-Ag eutectic phase diagram. Mark all the phases. Explain how hypo eutectoid alloy will transform from liquid to solid phase using microstructure.  | (CO 4) | [Application] |
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