BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: BTECH **SEMESTER : III**
BRANCH: PROD. **SESSION : MO/19**

SUBJECT: PE201 METALLURGY

TIME: 3 HOURS **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

Q.1(a) Explain Electrometallurgy process in detail with the help of a suitable diagram. [5]

Q.1(b) What do you understand by concept of slip planes and slip directions? What effect they have on deformation properties of a material. Also, out of BCC, FCC and HCP which crystal structure have maximum number of slip systems. [5]

Q.2(a) If a given Fe-C alloy contains 6% cementite at critical temperature. Find the weight of pearlite in the given sample and the whether it is a hypo or hyper eutectoid steel. [5]

Q.2(b) Describe the effect of adding following elements on properties of steel: [5]
i) Copper ii) Sulphur iii) Molybdenum iv) Silicon v) Lead

Q.3(a) Describe the process of Bainitic formation on TTT curve. Also explain the heat treatment process used to increase the toughness of Martensite. [5]

Q.3(b) Define Normalizing process in detail with a diagram. How is it different from Annealing operation? [5]

Q.4(a) What is Gray Cast iron. What properties of Gray Cast iron make it desirable to be used in structural applications? [5]

Q.4(b) Explain the concept of precipitation hardening and age hardening in Aluminum alloys. [5]

Q.5(a) What do you understand by toughness, strength and stiffness of steel? Indicate them on stress strain curve of steel. Also explain how toughness and strength are different from each other. [5]

Q.5(b) Explain the XRD technique in detail along with the setup. What does the peak width and peak height indicate in the final graph? [5]

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