

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION)**

CLASS: BE
BRANCH: MECH/PROD

SEMESTER: III
SESSION : MO/2018

SUBJECT : PE3001 METALLURGY

TIME: 1.5 HOURS

FULL MARKS: 25

INSTRUCTIONS:

1. The total marks of the questions are 30.
2. Candidates may attempt for all 30 marks.
3. In those cases where the marks obtained exceed 25 marks, the excess will be ignored.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. The missing data, if any, may be assumed suitably.

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- Q1 (a) What do you mean by metallurgy? Describe briefly about the scope of metallurgy. [2]
(b) Differentiate between engg. materials and composite materials give the full form of the following composite materials. [3]
i) FRP ii) RCC iii) CRR iv) ACSR
- Q2 (a) Write in short about the principle of Iron-making and steel making process. what are one the functions of a blast furnace. [2]
(b) Mention the sequence of reduction of iron one. how can you control Sulphur in iron at the iron making stage? [3]
- Q3 (a) What are the requirements of the metallurgical coke for the blast furnace operation? what are the steps taken to reduce the coke rate in the blast furnace in Indian condition. [2]
(b) An iron one contains 63% Fe in it determine. [3]
i) % Fe₂O₃ and % Impurities in the one.
ii) Amount of ones of this grade required for the production of 1-ton iron.
- Q4 (a) What is SAIL? list the in legated steel plants under SAIL. [2]
(b) Differentiate between O. H and basic oxygen steel making process? what is duplexing? [3]
- Q5 (a) What is solid solution? differentiate between substitution solid solution and intestinal solid solution. [2]
(b) In the partial eutectic alloy system A-B, the composition of three conjugate phases of the eutectic are [3]
 $\alpha = 15\%B$, $L = 75\%B$ and $B = 95\%B$
Assuming equilibrium freezing of an alloy composed of equal parts of A and B to a temperature just below the eutectic point calculate
i) the amount of proeutectic α
ii) the amount of eutectic α
- Q6 (a) Draw an fe-c equilibrium diagram and explain the significances of various lines and regions enclosed by them. [2]
(b) A steel contains 8% cementite determine [3]
Determine i) carbon content
ii) tensile strength and hardness based on its micro-structure.

::: 10/09/2018 :::