

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

CLASS: MSC./IMSC./PRE-PHD  
BRANCH: CHEMISTRY

SEMESTER : I/IX/NA  
SESSION : MO/18

SUBJECT: SAC3003 INDUSTRIAL CHEMISTRY

TIME: 03:00

FULL MARKS: 60

INSTRUCTIONS:

1. The question paper contains 7 questions each of 12 marks and total 84 marks.
  2. Candidates may attempt any 5 questions maximum of 60 marks.
  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.
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- Q.1(a) Compare and contrast *fire tube* and *water tube* boiler. Which one is more suitable for modern power plants? [6]
- Q.1(b) Describe the working of a 3 way catalytic converter. What are its advantages over a 2 way catalytic converter? Explain with relevant chemical equations. [6]
- Q.2(a) What is proximate analysis of coal? Describe in details. [6]
- Q.2(b) What is cracking of petroleum? What are the advantages of catalytic cracking over thermal cracking? [6]
- Q.3(a) What is metallurgical coke? How is it manufactured? Describe its properties. [6]
- Q.3(b) What are ARAMIDES? Describe their special properties. [6]
- Q.4(a) What are the troubles commonly found in boiler feed water? Discuss the methods used for removal of these troubles. [6]
- Q.4(b) An exhausted zeolite softener was regenerated by passing 150 litres of NaCl solution, having a strength of 150 gm/l of NaCl. Find the total volume of water that can be softened by this zeolite softener, if the hardness of water is 500 ppm. [6]
- Q.5(a) With the help of schematic diagram give the manufacture of phosphoric acid and discuss its industrial applications. [6]
- Q.5(b) With the help of a flow diagram discuss the extraction of iron. [6]
- Q.6(a) Discuss the methods commonly used for control of the following pollutants: Carbon monoxide, SO<sub>x</sub> and NO<sub>x</sub>. [6]
- Q.6(b) Discuss the general properties of catalysts. Discuss the distinctive features of homo-catalysts and hetero-catalysts giving suitable examples. [6]
- Q.7(a) What is lindane? How is it manufactured from BHC? [6]
- Q.7(b) Discuss the mechanism of action of organophosphate pesticides. Name an antidote for this class of compounds. Discuss briefly the mechanism of action of the antidote. [6]

\*\*\*\*\*30.11.18\*\*\*\*\*M