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Reg. No. : .....

Name : .....

Combined First and Second Semester B.Tech. Degree Examination, March 2018
(2013 Scheme)
13.103 : ENGINEERING CHEMISTRY (ABCEFHMNPRSTU)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **2** marks. **(10×2=20 Marks)**

1. Explain the role of plasticizers in moulding.
2. State and explain Beer-Lambert's law.
3. What is Helmholtz electrical double layer ?
4. What are corrosion inhibitors ? Give one example.
5. Define Pilling-Bedworth rule.
6. What are the major causes behind boiler corrosion ?
7. What is meant by sewage ? Write any two characteristics of sewage.
8. Which is greater BOD or COD ? Why ?
9. Distinguish between octane number and cetane number.
10. Write a brief note on Biodiesel.

PART – B

Answer **any one full** question from **each** Module. **Each** question carries **20** marks. **(20×4=80 Marks)**

Module I

11. a) Describe the principle, instrumentation and applications of TGA.

    b) Discuss the structure of natural rubber. Explain why natural rubber needs vulcanization. How vulcanization is carried out ? **(10+10)**

OR

P.T.O.

12. a) Describe the principle, instrumentation and applications of electronic spectroscopy.

    b) Write note on NMR spectroscopy. How will you distinguish between 1-bromo propane and 2-bromo propane using ^{1}H-NMR spectroscopy ? **(10+10)**

Module II

13. a) Discuss the working of a glass electrode with a neat sketch. How will you determine the pH of a solution experimentally using glass electrode ?

    b) Describe the metallic and non metallic coating for corrosion prevention. **(10+10)**

OR

14. a) Illustrate the construction, working and application of concentration cell.

    b) Explain the mechanism of rusting of iron under different environmental conditions. Give details of corrosion control through cathodic protection. **(10+10)**

Module III

15. a) Calculate the temporary and total hardness of a sample of water containing $Mg(HCO_3)$ = 73 mg/L; $Ca(HCO_3)_2$ = 162 mg/L; $MgCl_2$ = 95 mg/L and $CaSO_4$ = 136 mg/L. (At. mass : Mg = 24, Ca = 40, C = 12, O = 16, Cl = 35.5, S = 32)

    b) What are the effects of air pollution on environment ? Discuss the methods employed to control air pollution. **(8+12)**

OR

16. a) What are the various steps involved in the purification of water for domestic use ?

    b) i) Discuss the cause and consequence of photochemical smog.

    ii) Write note on causes and consequences of ozone depletion. **(10+5+5)**

Module IV

17. a) Discuss the classification, preparation and applications of nanomaterials.

    b) Describe the method of determination of calorific value of a solid fuel by bomb calorimeter. **(10+10)**

OR

18. a) Describe the mechanism involved in the setting and hardening of cement.

    b) i) Write note on dimensional stability and porosity of refractories.

    ii) Describe the manufacture of carborundum. **(10+5+5)**
