

2022/23

Q.P. Code :09795

[Time: 2 Hours]

[Marks:60]

Please check whether you have got the right question paper.

- N.B:**
1. Question No. 1 is compulsory.
 2. Attempt any three questions from the remaining questions.
 3. All questions carry equal marks
 4. Atomic weights:

[Ca= 40, C=12, O=16, H=1, Mg= 24, S=32, Cl= 35.5]

- Q.1** Attempt any five of the following:- 15
- a. What are cation and anion exchangers?
 - b. Give the preparation, properties and uses of polymethyl methacrylate polymer
 - c. A 10ml of sample of waste water was refluxed with 20ml of potassium dichromate solution and after refluxing the excess unreacted dichromate required 36.2 ml of 0.1M FAS solution. 10ml of distilled water on refluxing with 20ml of dichromate solution required 46ml of 0.1M FAS solution. Calculate the COD Value of the waste water.
 - d. Define
 - (i) Flash point
 - (ii) Oiliness
 - (iii) Pour point
 - e. What is Reduced phase rule?
 - f. What are the drawbacks of natural Rubber?
 - g. Explain CVD (chemical vapour deposition) method for production of CNT'S (carbon nano tubes)
- Q.2** a. Calculate the amount of lime (80% pure) and soda (90%) required for softening of 50,000 litres of hard water whose chemical analysis results are given below: 06
- Ca (HCO₃)₂ = 40.5 mg/L, Mg (HCO₃)₂ = 73.0mg/L, MgSO₄ = 60.0 mg/L, CaSO₄ = 34.0 mg/L, CaCl₂ = 27.5 mg/L and NaCl= 20.0 mg/L
- (i) Write a brief note on conducting polymers 3
 - (ii) Mention the conditions under which semi-solid lubricants can be used 2
 - c. Explain with the help of chemical reactions 'setting and hardening' process of cement. 4
- Q.3** a. Write a short note on: 6
- (i) Injection moulding method for plastics.
 - (ii) Polymer in medicine and surgery.
- (i) Draw and explain the important features of phase diagram of water system. 3
 - (ii) Mention the Raw materials of Portland cement along with their percentage composition 2
 - c. Ten thousand litres of hard water was made soft with zeolite. The exhausted zeolite required a total amount of 8 litres of NaCl solution containing 150 gm per litre for regeneration. Calculate the hardness of water. 4

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- Q.4** a. Explain Ion-Exchange process for softening of hard water. What are its advantages and disadvantages. **6**
 b. (i) 9ml of oil is taken from machine and it requires 1.5 ml of 0.04 N KOH. Find acid value. **3**
 (density of oil = 0.81g/ml)
 (ii) Write a note on Decay of concrete. **2**
 c. What are the additives mixed with plastics for its compounding? Explain their functions. **4**
- Q.5** a. (i) Distinguish between Thermo-plastic and Thermosetting plastic. **6**
 (ii) Write a note on Visco-elastic state.
 b. (i) Write a note on Ultra-filtration method for purification of water **3**
 (ii) Give the important functions of Lubricant. **2**
 c. What is the mathematical form of the Gibb's phase rule equation? Explain the meaning of each one of the terms involved in it. **4**
- Q.6** a. What is Lubrication? Explain the mechanism of fluid film Lubrication **6**
 b. (i) What is meant by Triple point? Apply phase rule and find degree of freedom for Triple point. **3**
 (ii) Distinguish between temporary and permanent hardness of water. **2**
 c. Describe the wet process for manufacture of Portland cement. **4**

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