



Q.P. Code :17155

[Time: Two Hours]

[Marks:60]

Please check whether you have got the right question paper.

- N.B: 1. Question.No.1 is compulsory.
 2. Answer any three questions from the remaining five.
 3. All questions carry equal marks
 4. Atomic Weights: Ca=40, Mg=24, H=1, C=12, O=16, Cl=35.5, Na=23, S=32.

- Q. 1 **Answer any five of following :** 15
- Which buffer solution is added during determination of hardness of water by EDTA titration and why?
 - Give the preparation, properties and uses of Kevlar.
 - Why does graphite act as a good lubricant on the surface of the moon?
 - Define component with example.
 - What is concrete? What are its uses?
 - Explain role of plasticizer in compounding of plastic.
 - Calculate temporary and total hardness of a sample of water containing following impurities;
 $\text{Ca}(\text{HCO}_3)_2=162 \text{ mg/L}$, $\text{MgCl}_2=95 \text{ mg/L}$, $\text{NaCl}=58.5 \text{ mg/L}$, $\text{Mg}(\text{HCO}_3)_2=73 \text{ mg/L}$, $\text{CaSO}_4=136 \text{ mg/L}$.
- Q. 2 a) The analysis of water is as follows: 6
 $\text{CaCl}_2 = 30\text{ppm}$, $\text{MgSO}_4=15\text{ppm}$, $\text{NaHCO}_3=24.4\text{ppm}$, $\text{CO}_2 = 60\text{ppm}$, $\text{H}_2\text{SO}_4 = 65\text{ppm}$. Calculate the amount of lime (80% pure) and soda (90% pure) required to soften one million liters of water.
- Explain behavior of water with respect to temperature and pressure as one component system with phase diagram. 5
 - Discuss chemical vapour deposition method for CNT synthesis. 4
- Q. 3 a) Explain following properties of lubricant with their significance 6
- Emulsification
 - Flash point and Fire point
 - Saponification Value
- Give reason: 5
 - PVC is soft whereas Bakelite is hard
 - Natural rubber need vulcanization
 - Calculate number of phases present in the following systems: 4
 - $\text{MgCO}_3(\text{s}) \rightleftharpoons \text{MgO}(\text{s}) + \text{CO}_2(\text{g})$
 - $\text{NH}_4\text{Cl}(\text{s}) \rightleftharpoons \text{NH}_3(\text{g}) + \text{HCl}(\text{g})$
 - Rhombic Sulphur (s) \rightleftharpoons Monoclinic Sulphur (s)
 - $\text{Ice}(\text{s}) \rightleftharpoons \text{Water}(\text{l}) \rightleftharpoons \text{Vapour}(\text{g})$
- Q.4 a) What is fabrication of plastic? Explain the injection moulding process with a neat diagram. 6
- Explain following 5
 - Explain role of bleaching powder in disinfection of water
 - Define BOD and give its significance

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- c) Find the Acid value of given oil whose 20ml required 2.8 ml of N/10 KOH during titration (Density of oil=0.86gm/ml). From acid value state whether the oil is useful for lubrication or not. 4
- Q 5 a) Write a note on (any two) 6
- i. RCC
 - ii. Silica bricks
 - iii. Setting and hardening of cement
- b) Write a note on conducting polymer. 5
- c) The hardness of 100,000 liters of a sample of water was completely removed by passing it through a zeolite softener. The softener then required 400 liters of sodium chloride solution containing 100 gm/liter of NaCl for regeneration. Calculate the hardness of the water sample. 4
- Q. 6 a) Explain following 6
- i. Explain principle involved in Ion exchange process
 - ii. Electrodialysis
- b) Give preparation and uses of 5
- i. Perlon U (or Isocyanate Rubber)
 - ii. Polymethyl methacrylate (PMMA)
- c) Define lubrication. Explain Boundary film lubrication 4
