Q.P. code - 9321

FE Sem - I | All branches | Date - 05/12/2025 | NOV - 2025

Time: 2 hours

Max. Marks 60

1/2

**N.B.**

1. **Question No.1 is compulsory**
2. Attempt any **Three** Questions from the remaining Five Questions
3. Figures to the right indicate full marks
4. Atomic weight: C = 12, H = 1, O = 16, N = 14, S= 32, Cl =35.5

**Q.1** **Answer any five from the following:** 15

a. Explain the Green chemistry principle- Prevention of waste.

b. Define knocking in fuel engine and antiknocking agents? Give two examples of oxygenates.

c. Give the difference between electrolytic cell and galvanic cell.

d. State the applications of fluorescence in medicine.

e. Write a note on differential aeration corrosion.

f. Define spectroscopy. What is an electromagnetic spectrum?

g. 2.5 g coal sample was kjeldahlised. Blank titration required 25 ml of 0.5 N NaOH solution. After absorption of liberated ammonia in 0.5N of sulphuric acid solution, back titration required 15 ml of 0.5N NaOH solution. Calculate percentage of nitrogen.

**Q.2** a) Explain Dry corrosion with the help of reactions and diagram. Also state the various metal oxides formed. 6

b) Explain conventional & green route of manufacturing of indigo. By this reaction which principle of green chemistry is shown? 5

c) Write cell reaction and calculate the standard emf of the following cell. 4
$Cd(s) \mid Cd^{+2}(aq)(1M) \parallel Ni^{2+}(aq)(1M) \mid Ni(s)$. If the standard potential of Cd electrode is - 0.40V and the standard potential of Ni electrode is - 0.25 V.

**Q.3** a) Calculate the minimum weight and volume of air required for the complete combustion of 1kg of fuel containing C= 80%, H=6%, O=8%, S=1.5%, $H_2O$= 1.0%, N=1.5% and ash= rest. (Molecular weight of air = 28.94gm) 6

b) Give construction and working of any one reference electrode with the help of diagram and reactions. 5

c) Calculate % atom economy for the following reaction with respect to epoxide: 4

$C_2H_4 + 0.5\ O_2 \rightarrow CH_2\text{-}O\text{-}CH_2$

Ethene Epoxide

RE Sem-II | All branches | Date - 05/12/2025 | Nov 25 Q.P. code - 93212

2/2

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|---|---|---|---|
| Q.4 | a) | What is Flame photometry? Explain it with respect to principle, working, diagram and applications. | 6 |
| | b) | Explain the synthesis of biodiesel by trans-esterification method. Mention the advantages of biodiesel. | 5 |
| | c) | Explain any two selection rules in spectroscopy. | 4 |
| Q.5 | a) | Explain the mechanism of corrosion in acidic medium with the help of diagram and reactions. | 6 |
| | b) | 1g of coal sample is placed in an oven maintained at 110°c for 1hr, after heating it was cooled and weighed 0.985 g. Then same coal sample was transferred to vented lid crucible and placed infurnace maintained at 950°C for exactly 7 minutes, on cooling which weighed 0.8 g. Finally, coal was heated in open crucible at 750°C until a constant weight of 0.1 g was obtained. Calculate the result of this proximate analysis. | 5 |
| | c) | Draw a well labelled Jablonski diagram. | 4 |
| Q.6 | a) | Name two methods of cathodic protection from corrosion of metals. Explain any one of it with its principle, suitable diagram and applications. | 6 |
| | b) | A sample of coal was found to contain C = 80%, H = 5%, O = 2%, S = 1, N = 2%, Ash=10%. Calculate HCV and LCV of the coal. | 5 |
| | c) | Differentiate between emission spectra and absorption spectra. | 4 |

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