

PRN No.

Total No. of
Questions: 09

QP Code:

Set A.

JSPM's

Rajarshi Shahu College of Engineering, Tathawade, Pune- 411033

(An autonomous institute affiliated to SavitribaiPhule Pune University)

Examination: End Semester Examinations (ESE)

Semester: II

Academic Year: 2024-25

Programme: -Computer/Electronics and Telecommunication /Electrical /Civil Engineering

Examination Class: F. Y. B. Tech.

Course Code: ES1207T Course Name and Pattern: Chemistry For Engineers (2023R Pattern)

Duration: 2 Hour

Max. Marks: 50 Marks

Instructions to the Candidates

1. Solve sections A, B, C.
2. Assume suitable and necessary data wherever required.
3. Use of log table, scientific calculator is allowed.

Q. No.		Section-A	BL	Marks	CO
1	Solve any two.				
	a State formula to calculate total, permanent and temporary hardness of water.	L1	2	CO1	
	b Draw neat labelled diagram of calomel electrode,	L1	2	CO1	
	c State any four applications of biodegradable polymer.	L1	2	CO1	
2	Solve any two.				
	a Which indicators are used for the determination of alkalinity of the water sample.	L1	2	CO1	
	b Name indicator electrode used in p^H metry and conductometry	L1	2	CO1	
	c Draw neat labelled diagram of zigzag and armchair single walled carbon nanotubes.	L1	2	CO1	
3	Solve any two.				
	a State the principle used for fractional distillation of crude oil with names of any two fractions.	L1	2	CO1	
	b Define electroplating with two suitable applications.	L1	2	CO1	
	c Define the terms with a suitable example	L1	2	CO1	
	i) Auxochrome				
	ii) Hypsochromic shift				
	Solve any two.				
4	a In ultimate analysis, %C and %H in coal sample is determined by passing CO_2 and H_2O gas is passed in preweighed and chemicals respectively.	L2	4	CO2	

b) Why anodic coating is preferable compared to cathodic coating.

L2 4 CO₂

c) Define the terms with suitable example

- iii) Chromophore
- iv) Bathochromic Shift

L2 4 CO₂

Section -B

5 Solve any two.

a) Describe instrumentation involved in single beam UV-Visible spectrophotometer.

L2 4 CO₂

b) Discuss factors affecting rate of corrosion related to nature of metal.

L2 4 CO₂

c) Explain the process with suitable reaction for the preparation of biodiesel from triglycerides along with its advantages.

L2 4 CO₂

6 Solve any two.

a) Explain cathodic protection method for corrosion protection of ship hull.

L2 4 CO₂

b) Discuss electronic transition for an organic molecule by absorbing UV-Visible radiation.

L2 4 CO₂

c) Explain method to determine Gross calorific value of gaseous fuels with a neat labelled diagram, working and formula.

L2 4 CO₂

Section-C

7 Solve any one

a) 2.4 gm coal sample was weighed in silica crucible After heating for one hour at 110°C, the residue weighed as 2.25 gm. The crucible was then covered with a vented lid and strongly heated for 7 minutes at 950°C. The residue weighed 1.42 gm. The crucible was further heated without lid until a constant was obtained. The last residue was found to be 0.22 gm. Calculate the % results of the above analysis. Predict quality of coal.

L2 6 CO₃

b) Calculate fundamental vibrational degrees of freedom for the following chemical compounds.

L2 6 CO₃

- i) SiO₂
- ii) NH₃
- iii) CO₂
- iv) C₂H₆
- v) CO
- vi) H₂O

8 Solve any one

a) Identify the types of electronic transition in the following example.

L3 6 CO₃

- i) R-OH
- ii) Ethane
- iii) C₆H₅NH₂
- iv) CH₂=CH-CH=CH₂
- v) C₆H₆
- vi) CH₃-CH₂-OH

b) Identify and write the mechanism for corrosion for the following situations with suitable reactions i) Industrial tank undergoing corrosion due to acidic waste dumped in it. ii) Steel plate lying on ground and exposed to neutral medium.

L3 6 CO₃

9

Solve any one

- a A sample of coal containing 5% hydrogen when allowed to undergo combustion in Bomb calorimeter, the following data is obtained, weight of coal =0.95gm, weight of water taken=700 gm, water equivalent of bomb calorimeter=2000gm, rise in temperature= 2.48°C , cooling correction= -0.02°C . Fuse wire correction 10 cal, acid correction= 60 cal. Calculate Gross calorific and net calorific value.
(Latent heat of condensation 587 cal/gm)
- b Identify the metals in following list given below which can undergoes corrosion in presence of oxygen gas using suitable reaction.
1)Fe2) Au 3) Cr 4) Sn 5) Na 6) Mg

L3 6 CO3

L3 6 CO3

*****BEST of LUCK*****