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Question Paper Code : 30046

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2026.

Second Semester

Aeronautical Engineering

CY25C03 — APPLIED CHEMISTRY (ME)-II

(Common to : Aerospace Engineering/Automobile Engineering/Industrial Engineering and Management/Manufacturing Engineering/Marine Engineering/Mechanical Engineering/ Mechanical Engineering (Specialised in Automobile)/Mechanical Engineering (Specialised in Smart Manufacturing)/ Mechanical and Automation Engineering/Mechatronics Engineering/Robotics and Automation)

(Regulations 2025)

Time : 3 hours

Maximum : 100 marks

CO – Course Outcomes

CO1	Explain the major concepts of chemistry with regard to applications in mechanical systems.
CO2	Apply the chemistry principles and evaluate the engineering materials in mechanical systems.
CO3	Analyse and evaluate the performance and efficiency of mechanical systems.
CO4	Propose innovative solutions for real-world applications and challenges.

BL – Bloom's Taxonomy Levels

(L1-Remember, L2-Understand, L3-Apply, L4-Analyze, L5-Evaluate, L6-Create)

Answer ALL questions.

PART – A (Total Marks = 40)

[Q. No. 1 to Q. No. 10 ; $10 \times 1 = 10$ Marks (Multiple Choice Questions)]

Q. No. 11 to Q. No. 20; $10 \times 3 = 30$ Marks]

Q.No.	Questions	Marks	CO	BL
1.	Which one of the following is NOT a functional material? (A) Electronic (B) Magnetic (C) Biomaterial (D) Redox materials	1	1	1

2.	Which one of the following is a sustainable energy material? (A) Bamboo (B) Jute (C) Coir (D) Cement	1	2	1
3.	An example for a liquid fuel is (A) Phenol (B) Acetone (C) Petrol (D) Formaldehyde	1	1	2
4.	Natural gas is chemically (A) Acetylene (B) Methane (C) Ethylene (D) Carbon dioxide	1	1	1
5.	Which one is used as a matrix in a composite? (A) Lubricant (B) Adhesive (C) Polymer (D) Diamond	1	3	3
6.	An example for solid lubricant is (A) Graphite (B) Diamond (C) Ruby (D) Talc	1	1	1
7.	Which one of the following is NOT a lubricating property? (A) Cloud point (B) Pour point (C) Flash point (D) Melting point	1	1	3
8.	Which one of the following is NOT a synthetic adhesive? (A) Urea - formaldehyde (B) Cellulose Nitrate (C) Phenol - formaldehyde (D) Calcium Carbonate	1	1	2

9.	Knocking agent used is (A) Tetraethyl Lead (B) Sodium bicarbonate (C) Sodium carbonate (D) Gypsum	1	1	1
10.	Flue gas analysis is done to calculate the amount of (A) Oxygen (B) Nitrogen (C) Fluorine (D) Helium	1	2	2
11.	Define sustainable energy materials.	3	1	1
12.	Classify the fuel with an example for each.	3	1	1
13.	Differentiate between Gross and Net Calorific value of a fuel.	3	2	2
14.	State the function of reinforcing material with an example.	3	1	2
15.	Define Hybrid composite.	3	1	1
16.	What are emerging lubricants?	3	1	1
17.	List out the characteristics of a lubricant.	3	2	2
18.	Write a note on viscosity index.	3	1	1
19.	Differentiate between thermoplastic and thermosetting adhesives.	3	3	2
20.	How adhesive is classified?	3	2	2

PART – B (5 × 12 = 60 marks)

Q.No.		Questions	Marks	CO	BL
21.	(a)	Classify the types of functional materials and highlight their applications	12	4	4
		OR			
	(b)	What are alternate fuels? Discuss the advantages and disadvantage of various alternate fuels.	12	3	4

22.	(a)	Discuss the preparation, properties and uses of Fibre reinforced plastics.	12	3	4
	OR				
	(b)	Highlight the applications of composite materials in the field of automobile and aerospace.	12	4	5
23.	(a)	Explain the flue gas analysis by Orsat apparatus with a neat diagram.	12	3	4
	OR				
	(b)	Taking an example, calculate the fuel and air ratio for combustion of a fuel.	12	3	5
24.	(a)	Identify the key properties of a lubricant. Explain any three properties of a lubricant and state their significance.	12	2	2
	OR				
	(b)	Explain the lubricating mechanism of solid lubricant with a neat diagram.	12	2	2
25.	(a)	Explain the adhesive mechanism in terms of mechanical interlocking and chemical bonding.	12	3	2
	OR				
	(b)	Discuss in detail the properties and uses of any two synthetic adhesives.	12	3	2