

Reg. No. :

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Question Paper Code : 11020

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

Fifth/Sixth/Seventh/Eighth Semester

Mechanical Engineering

CME 397 – SURFACE ENGINEERING

(Common to Manufacturing Engineering)

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the objective of learning “Surface Engineering”?
2. List the factors that influence friction between two surfaces.
3. Define abrasive wear.
4. Give two examples of metallic materials that exhibits good wear resistance.
5. What is pitting corrosion?
6. Define cathodic protection.
7. State two applications of PVD coatings.
8. Mention two objectives of surface metallurgy.
9. Define Bio-Tribology.
10. List the two applications of super alloys.

PART B — (5 × 13 = 65 marks)

11. (a) Compare different roughness parameters used in engineering measurements and also list the advantages and limitations of different surface measurement techniques.

Or

- (b) Classify the different types of friction and explain them with suitable examples.

12. (a) Explain the different methods used to measure the adhesive wear properties of materials with ASTM standards

Or

- (b) Explain different types of wear that takes place in engineering components with neat sketches.

13. (a) Explain the uniform corrosion, galvanic corrosion and crevice corrosion with suitable examples.

Or

- (b) Illustrate the following techniques used for corrosion protection of engineering materials :

(i) Protective coatings (7)

(ii) Sacrificial anodes (6)

14. (a) Discuss the principles and procedure of chemical vapour deposition (CVD) method in detail. List their advantages, limitations and applications.

Or

- (b) Explain the following coating processes with advantages and applications:

(i) DLC coating. (7)

(ii) Thermals spraying. (6)

15. (a) Explain the tribological properties and applications of any two titanium based alloys used for wear resistance applications.

Or

- (b) Discuss the role of polymers in reducing friction and wear in engineering application.

PART C — (1 × 15 = 15 marks)

16. (a) Design a coating suitable for gas turbine engine components made of Ni based super alloys, which are typically exposed to temperature around 1550 °C. Also explain the methodology in detail.

Or

- (b) Analyze and explain the wear mechanisms occurring in the following components:

(i) Automobile engine cylinder block (8)

(ii) Power plant turbines (7)