



11. Which of the following is not the application of electrolytic process? (A) Electro plating (B) Electro facing (C) Electro dynamo (D) Electro metallization	1	1	3
12. The ability of electrolyte to produce the even irregular surfaces is (A) Throwing power (B) Polarisation (C) Pickling (D) Energy efficiency	1	2	3
13. The disadvantage of I.C engine drive used in traction is (A) High initial investment (B) Speed control is complex (C) Complex braking system (D) Limited overload capacity	1	1	4
14. _____ is not used in railway electrification system presently. (A) 600 V DC system (B) 3.3 kV at 16 (2/3)Hz (C) 15 kV at 25 Hz (D) 700V AC system	1	2	4
15. The DC series motor has _____ compared to AC series motor. (A) Higher starting torque (B) Lower running torque (C) Higher interference with communication lines (D) Many speeds	1	1	4
16. The crest speed is defined as (A) The maximum speed attained by the train during the run (B) The distance covered between two stops divided by the actual time of run. (C) The ratio of distance covered between two stops and the total time of run (D) The ratio of distance covered between two stops and the total time of run including time of stop	1	1	4
17. The vehicle speed developed by traction motor is (A) Proportional to motor torque (B) Proportional to gear ratio of transmission (C) Proportional to gear ratio of final drive (D) Inversely proportional to radius of the drive wheels	1	2	5
18. Gear ratio of the transmission defined as (A) Input rotating speed/Output rotating speed (B) Output rotating speed/input rotating speed (C) Torque on the driven wheels/Output rotating speed (D) Output rotating speed /Torque on the driven wheels	1	1	5
19. Hybrid cars normally have _____ range in only electric mode. (A) 10-20 km (B) 30-70 km (C) 100-150 km (D) No limit	1	2	5
20. _____ is not a common component in electric vehicle and hybrid electric vehicle. (A) Battery (B) Electric vehicle control unit (ECU) (C) Generator (D) Internal combustion engine	1	2	5

**PART - B (5 × 4 = 20 Marks)**  
Answer any 5 Questions

	Marks	BL	CO
21. Write a short note on electrodes used in the arc furnaces.	4	2	1
22. What are the modern trends in electric heating?	4	2	1
23. State and Explain Laws of Illumination.	4	1	2
24. What is Stroboscopic Effect?	4	1	2

25. Explain the terms "Current efficiency" and "Energy efficiency" used in electrolytic process.	4	1	3
26. List the disadvantages of conventional traction over modern days drive.	4	1	4
27. Why do we need to consider the adoption of smart buildings?	4	3	5

**PART - C (5 × 12 = 60 Marks)**

Answer all Questions

Marks BL CO

28. (a) Explain the different methods of electric welding and their relative advantages.	12	3	1
(OR)			
(b) A 4.5 kW, 200 V, single phase resistance oven is to have nichrome wire heating elements. If the wire temperature is to be 1000°C and that of the charge 500°C. Estimate the diameter and length of the wire. The resistivity of the chrome alloy is 42.5 μΩ-m. Assume the radiating efficiency and the emissivity of the elements as 1.0 and 0.9 respectively.			
29. (a) State the laws of illumination. Explain these laws with the help of suitable diagrams and derive an equation of the same.	12	3	2
(OR)			
(b) i) Write short notes on polar curves and explain the Rousseau's construction for calculating MSCP of lamp [6 marks] ii) Briefly explain the requirement of good lighting scheme [6 marks]			
30. (a) How is the Nernst equation useful in determining the cell potential under various non-standard conditions. Derive it	12	3	3
(OR)			
(b) i. Discuss various factors affecting electro deposition process [6 marks] ii. Compare electroplating, electroforming and electrolysis [6 marks]			
31. (a) Calculate the specific energy consumption of train for a maximum speed of 12.20 m/s for 1525 meters with an acceleration of 0.366 m/s <sup>2</sup> . Assume train resistance during acceleration is 52.6 newton/1000 kg and during coasting, it is 6.12 newton/1000 kg. 10% being allowable for rotational inertia. The efficiency of equipment during the acceleration period is 50 %. Assume a quadrilateral speed-time curve.	12	3	4
(OR)			
(b) Explain the system of track generally employed for the following services. Justify your answer and mention the voltages adopted in each case. 1. Electric sub-urban railway services 2. Main line services 3. Tramway service in a busy town area			
32. (a) Explain in detail about the factors to be considered for designing the lighting scheme of smart buildings.	12	2	5
(OR)			
(b) Discuss the different braking methods available for utilization in electric cars.			

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