CBCS SCHEME

	7	STAC	a arm		~
SUSN			*	N. S.	15EE742
Sev	enth Semes	ster B.E. De	gree Exa	mination, Jan	./Feb. 2021
CMR /S	// Uti	lization o	f Elect	rical Power	0-
Time: 3 hrs.			O Y		Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- a. Explain with a neat diagram the working of "Direct arc furnace". Mention its applications.

 (08 Marks)
 - b. Explain:
 - i) Direct resistance heating
 - ii) Indirect resistance heating.

(08 Marks)

OR

2 a. Explain first and second laws of Faraday of electrolysis.

(08 Marks)

b. Calculate the ampere hours required to deposit a coating of silver 0.05 mm thick on a sphere of radius of 5cms electrochemical equivalent of silver is 0.001118 and density of silver is 10.5 gms per cubic centimeter. (08 Marks)

Module-2

3 a. State and explain the two laws of illumination.

(08 Marks)

b. Deduce the relation to find illumination at any point on the surface due to a light source suspended at a height "h" above the surface. (08 Marks)

OR

- 4 a. Mention and Briefly explain the factors to be considered in the design of lighting schemes.
 - b. A small assembly shop 16m long, 10m wide and 3m up to trusses is to be illuminated to a level of 200 Lux. The utilisation and maintenance factors are 0.74 and 0.8 respectively. Calculate the number of lamps required to illuminate the whole area/if the lumen output of the lamp selected is 3000 lumens. (08 Marks)

Module-3

- 5 a. Sketch and explain typical speed –time curves for:
 - i) Main line service
 - ii) Suburban service
 - iii) Urban service in traction services.

(08 Marks)

b. An electric train has an average speed of 42Kmph on a level track between stops 1400m apart. It is accelerated @ 1.7kmph ps and is braked at 3.3kmph ps. Draw the speed time curve for the train. (08 Marks)

OR

- 6 a. Explain the operating characteristics of DC series motors. Discuss the advantages and disadvantage of using DC series motor for traction duty. (08 Marks)
 - b. Write a note on starting and speed control of DC traction motors explaining Rheostatic control and series parallel control in detail. (08 Marks)

Module-4

7 a. What are the different types of mechanical braking of electric trains?

(08 Marks)

b. What are the advantages and disadvantages of regenerative braking?

(08 Marks)

OR

8 a. Explain Bow Collector and pantograph collectors used as current collectors in over head systems with suitable sketches. (08 Marks)

b. A train weighing 500tormes is going down a gradient of 1 in 50. It is desired to keep train speed at 40Kmph by regenerative braking. Calculate the power fed into the line. Tractive resistance is 40N/tone. Rotational inertia: 10% and efficiency of conversion: 75%.

(08 Marks)

Module-5

9 a. Compare electric vehicles with conventional IC engine vehicles.

(06 Marks)

b. Discuss the concepts and configuration of modern electric drives in detail with suitable sketches. (10 Marks)

OR

10 a. Explain the concept and working principle of hybrid electric drive trains. With its architecture with suitable sketches. (08 Marks)

b. Write a note on the performance of electric vehicles.

(08 Marks)