MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL

Paper Code : PC-EE 801 Utilization of Electric Power

UPID : 008387

Time Allotted : 3 Hours *Full Marks :70*

The Figures in the margin indicate full marks.
Candidate are required to give their answers in their own words as far as practicable

Group-A (Very Short Answer Type Question)

1. Answer *any ten* of the following : [1 x 10 = 10]

(I) What is the fundamental difference between electric arc welding and resistance welding?

(II) Current efficiency in electrolytic process is.....

(III) How is specific energy consumption affected by variation in distance between stops?

(IV) Lux is the unit of .....

(V) ..... has the highest value of thermal conductivity.

(VI) Why alternating current is found most suitable for resistance welding?

(VII) What is the voltage range and current density for gold plating?

(VIII) The resistors employed for control of traction motors are designed for short-time rating. Why?

(IX) The flux emitted by a lamp in all directions is 1000 lumens. Calculate its MSCP.

(X) Name the types of electrodes used in arc furnaces.

(XI) Which of the following uses consumable electrodes?
a) TIG
b) MIG
c) Laser
d) None of the above

(XII) The voltage required to pass the necessary current through an electrolytic cell is of the order of ..... Volt.

Group-B (Short Answer Type Question)

Answer *any three* of the following : [5 x 3 = 15]

2. Draw & explain speed-time curve for train movement of sub urban service. [5]
3. Explain in brief the Inverse Square law of illumination with proper diagram and necessary equations. [5]
4. Explain in brief different types of arc furnaces and their applications. [5]
5. Explain the factors upon which the welding operation mainly depends. [5]
6. Calculate the energy used in producing chemical action developed in an electrolytic cell in 15minutes. When a current of 100Amp at a potential difference of 15V is passed. The resistance of the solution is 0.05Ω. [5]

Group-C (Long Answer Type Question)

Answer *any three* of the following : [15 x 3 = 45]

7. (a) Explain in brief : Different current collectors that are used in Electric Traction. [6]
   (b) Derive the expression for maximum speed for main line service. [9]
8. (a) Write with a neat sketch construction and operating principle of Halogen Lamps. [10]
   (b) What is the stroboscopic effect? [5]
9. (a) Explain in brief construction and operating principle of Vertical core type induction furnace (Ajax-Wyatt). [7]
   (b) What are basic factors upon which the heat developed in the disc of an induction furnace depends? [3]
   (c) Explain the operating principle and applications of infrared heating. [5]
10. (a) Explain in brief the construction and operating principle of Atomic hydrogen arc welding. [7]
    (b) Write about different types of arc welding electrodes. [4]
    (c) Compare between resistance and arc welding [4]

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11. (a) The distance between two stops is 1.2 km. A schedule speed of 40 kmph is required to cover that distance. The stop is of 18-s duration. The values of the acceleration and retardation are 2 kmphp and 3 kmphp, respectively. Then, determine the maximum speed over the run. Assume a simplified trapezoidal speed–time curve. [8]

(b) State the requirements of an ideal electric traction system. [4]

(c) What are the features of electric traction? [3]

*** END OF PAPER ***