

GUJARAT TECHNOLOGICAL UNIVERSITY**M.E –IIst SEMESTER–EXAMINATION – JULY- 2012****Subject code: 1720711****Date: 14/07/2012****Subject Name: Electrical Power Utilization****Time: 10:30 am – 13:00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1 (a)** Explain different methods of induction heating. Give some applications of induction heating. **07**
- (b)** What is resistance welding? Explain butt welding with necessary diagrams. **07**
- Q.2 (a)** Explain the working of a fluorescent tube with the help of the circuit diagram giving the function of various parts. How stroboscopic effect is eliminated in fluorescent tube lighting? **07**
- (b)** A Hall 30 meters long and 15 meters wide with a ceiling height of 5 meters is to be provided with a general illumination of 120 lumens/m². Taking coefficient of utilization of 0.5, and depreciation factor of 1.4 . Determine the number of fluorescent tubes required, their spacing, mounting height, and total wattage. Take luminous efficiency of fluorescent tube as 40 lumens per watt for 80 tubes. **07**
- OR**
- (b)** Estimate the efficiency of a high frequency induction furnace which takes 10 minutes to melt 1.8 kg of aluminum. The input to the furnace being 5KW and initial temperature 15 degree Celsius to melt 1.8 kg of aluminum. **07**
- Given: Specific heat of aluminum = 880J/kg/°C
Melting point of aluminum = 660 °C
Latent heat of fusion of aluminum= 32KJ/Kg ;
1J= 2.78 * 10⁻⁷kwh.
- Q.3 (a)** State and explain laws of illumination **07**
- (b)** Explain general principles that are generally employed in designing street lighting? **07**
- OR**
- Q.3 (a)** What is flood lighting? Explain how it is provided and its design consideration. **07**
- (b)** Explain with a neat diagram the principle and operation of a sodium vapour lamp. **07**
- Q.4 (a)** What do you understand by refrigerator? Draw and explain the electric circuit used in a refrigerator. **07**
- (b)** Define air conditioning. On what factors does the air conditioning depend? Explain in detail. **07**
- OR**
- Q.4 (a)** What is the principle of electro deposition? State and explain the factors on which the quality of electro deposition depends. **07**
- (b)** What are the various applications of electrolysis? Explain extraction of metals. **07**
- Q.5 (a)** Draw typical speed time curve for main line service and explain following terms in speed curve of main line service. **07**
- (1) Acceleration (2) free run (3) coasting (4) Retardation or Braking period
- (b)** (B) The speed time curve of a train consists of : **07**
- (i) Uniform acceleration of 6 Km/h/s for 25 s.
(ii) Free running for 10 minutes.
(iii) Uniform deceleration of 6 km/h/s to stop the train.
(iv) A stop of 5 minutes.
- Find the distance between the stations, the average speed and the schedule speed
- OR**
- Q.5 (a)** Explain construction and working principle of washing machine. **07**
- (b)** Write a short note of Working and construction of Microwave oven in detail. **07**
