

Name:	
Enrolment No:	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2019

Course: Utilization & Industrial electronics	Semester: VII
Programme: B.tech. – Electrical	Time: 03 hrs.
Course code: ELEG 406	Max. Marks: 100
Instructions: All questions are compulsory	

SECTION A

S. No.		Marks	CO
Q 1	Give the application of high frequency eddy current heating.	4	CO1
Q.2	Define Dead weight, Accelerating weight, Adhesive weight.	4	CO2
Q.3	What are the requirement of good heating element? Discuss the causes of its failure.	4	CO4
Q.4	Give the statement of Frescher’s law of illumination.	4	CO5
Q.5	Differentiate between projection welding and spot welding.	4	CO4

SECTION B

Q.6	<p>Discuss the third rail concept for railway electrification and its limitation in context of Indian scenario.</p> <p style="text-align: center;">OR</p> <p>Compare DC and AC system of railway electrification from the point of main line and sub urban main line railway service</p>	10	CO1,2
Q.7	Discuss inverse square law & cosine law of Illumination.	10	CO5
Q.8	Define the term tractive effort. Derive the condition for tractive effort required to give acceleration, to overcome train resistance and to balance the gravitational pull.	10	CO3
Q.9	<p>A low frequency induction furnace operating at 10 V in the secondary circuit takes 500 kw at 0.5 P.F., when the hearth is full. If the secondary voltage be maintained at 10 V, estimate the power absorbed and the p.f. when the hearth is half full. Assume the resistance of the secondary circuit to be thereby halved and reactance to remain the same.</p> <p style="text-align: center;">OR</p> <p>Two similar lamps having uniform intensity of 500 candle power in all directions below the horizontal are mounted at a height of 4 meters. What must be the maximum spacing between the lamps so that the illumination on the ground midway between the lamps shall be at least one-half the illuminations directly under the lamps?</p>	10	CO5

SECTION-C

Q.10	Describe the electric arc welding and electric resistance welding. Also discuss the methods to obtain different level of current using a transformer.	20	CO4
------	---	----	-----

	OR		
	Derive an expression for specific energy consumption of a train including derivation of power of traction motor.		
Q.11	<p>An electric train weighing 300 tonnes runs 10% up gradient with following time curve:</p> <ul style="list-style-type: none"> (i) Uniform acceleration of 1.5 kmphs for 30 seconds (ii) Constant speed for 40 seconds. (iii) Coasting for 30 seconds. (iv) Braking at 2.5 kmphs to rest. <p>Calculate the specific energy consumption if tractive resistance is 45 N/tonne, overall efficiency of transmission and motor 75%.</p>	20	CO2,3