Name: **Enrolment No:**	UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2018

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

SECTION A

S. No.		Marks	CO
Q 1	"If a high degree of speed control is required, d.c. is preferable to a.c. for an electric drive" -Justify.	**4**	**CO1**
Q.2	Define Dead weight, Accelerating weight, Adhesive weight.	**4**	**CO2**
Q.3	List out the properties of heating element.	**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	A piece of insulating material is to be heated by dielectric heating. The size of the piece is 100 sq.cm area and 2.5cm thick. A frequency of 25 mega cycles is used and the power absorbed is 350W. Calculate the voltage necessary for heating and the current that flows in the material. The material has relative permittivity of 5 and a p.f. of 0.05.	**10**	**CO4**
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 balance the gravitational pull.	**10**	**CO3**
Q.9	Explain in detail the general consideration in selecting motor power ratings.	**10**	**CO1,2**
	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**
Q.11	(a) A 200 tonne electric train with scheduled speed of 40 kmph runs between two stations 2 km apart with an acceleration of 2 kmphps and braking retardation of 3kmphps. The train resistance is 50 Nw-m / tonne, effect of rotational inertia 10%,overall efficiency 70% and station stop 10 sec. calculate. i) The maximum power output from the wheels ii) The specific energy consumption. (b) Why tungsten is selected as filament material and on what factors its life depend?	**15** **5**	**CO2,3** **CO5**

Name: **Enrolment No:**		UPES	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2018

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

SECTION A

S. No.		Marks	CO
Q 1	Outline which type of electric supply is suitable for electric arc welding?	**4**	**CO4**
Q.2	Mention advantages of electric drives over other drives.	**4**	**CO1**
Q.3	State the advantage of submerged electric arc welding.	**4**	**CO4**
Q.4	Describe why electric heating is preferred over other methods of heating.	**4**	**CO4**
Q.5	List the type of motors which find application in traction work.	**4**	**CO1,3**
	SECTION B		
Q.6	Explain the "silhouette" principle on which modern street lighting depends?	**10**	**CO5**
Q.7	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 ?	**10**	**CO5**
Q.8	Explain with suitable example that what are the factors govern the selection of a motor for particular drive application.	**10**	**CO1,2**
Q.9	How load equalization curve defines the stable operation of a drive? Justify your answer with suitable example.	**10**	**CO1**
	SECTION-C		
Q.10	(a) A series motor working on 500 V d.c supply runs at a speed of 1000 r.p.m. When The load current is 120 amp. The resistance of the motor 0.15 ohm, of which 0.04 ohm is the resistance of the field. Calculate the speed of the motor when the torque is half of the full load torque and the field winding is connected in parallel with a diverter of resistance 0.08 ohm, assuming an unsaturated magnetic circuit. (b) For a trapezoidal speed-time curve of an electric train, derive expression for maximum speed and distance between stops.	**10** **10**	**CO2** **CO3**
Q.11	(a)The scheduled speed of a trolley service is to be 53km/hr. The distance between stops is 2.8km. The track is level and each stop is of 30 sec duration. Using simplified speed-time curve, calculate the maximum speed, assuming the acceleration to be 2km/hr/sec, retardation 3.2km/hr/sec, the dead weight of the car as	**10**	**CO2,3**

	16 tonnes, rotational inertia as 10% of the dead weight and track resistance as 40 newtons/tonne. If the overall efficiency is 80%, calculate (i) the maximum power output from the driving axles (ii) the specific energy consumption in watt-hr/tonne-km. (b) Explain Electric resistance welding and its different classification.	**10**	**CO4**