Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Engineering

End Sem (Even) Examination May-2019

EE3EL09 / EX3EL09 Utilization of Electrical Energy

Programme: B.Tech. Branch/Specialisation: EE/EX

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

Q.1 i. Candela is the unit of **1**

(a) Luminous flux (b) Luminous intensity

(c) Wavelength (d) None of these

ii. One lumen per square meter is the same as **1**

(a) One lux (b) One candela

(c) One foot candle (d) One lumen meter

iii. In electrical resistance welding material of electrode should have **1**

(a) Higher electrical conductivities.

(b) Higher thermal conductivities.

(c) Sufficient strength to sustain high pressure at elevated temperatures.

(d) All of these

iv. The efficiency of heating is more for **1**

(a) Solid fuels (b) Oil heating

(c) Gas heating (d) Electric heating

v. Method of speed control used on 25 kV, 50 Hz single phase traction is **1**

(a) Tap changing control of transformer

(b) Reduced current method

(c) Series parallel operation of motors

(d) Any of the above.

vi. To save energy during braking, _____ braking is used? **1**

(a) Dynamic (b) Plugging

(c) Regenerative (d) All of these

P.T.O.

vii. Which braking is not possible in series motor? **1**
(a) Regenerative braking (b) Dynamic braking
(c) Counter current braking (d) Rheostat braking

viii. The disadvantages of group drive electric machine is/are **1**
(a) Low efficiency
(b) Low overload capacity
(c) Can't be used for constant operation
(d) All of these

ix. In diesel electric traction, the torque required from traction work must be **1**
(a) Directly proportional to the speed
(b) Inversely proportional to the speed
(c) Independent of the speed
(d) Directly proportional to the square of the speed

x. Speed of locomotive is controlled by **1**
(a) Gear box
(b) Flywheel
(c) Regulating steam to engine
(d) Applying brakes

Q.2 i. Explain solid angle. **2**
ii. State and explain the laws of illumination. **3**
iii. Explain following term with formula and its unit. **5**
(a) Illumination (b) Luminious intensity
(c) Coefficient of utilization (d) Candle power
(e) Glare
OR iv. Explain the construction and operation of a fluorescent tube and compare it with tungusten lamp. **5**

Q.3 i. Explain the high frequency eddy current effect in brief. **2**
ii. State the advantage of electric heating over other types of heating. **3**
iii. Explain the basic principle of electrolysis. What is electroplating and what for it is done? **5**
OR iv Give the induction heating operating principle and the application and limitation of the above. **5**

Q.4 i. What are the special requirements of a traction motor. **2**
ii. What do you understand by speed time curves in traction system. **3**
iii. What are the various factor affecting the specific energy consumption. **5**
OR iv Explain the importance of adhesive weight and co-efficinent of adhesion. **5**

Q.5 i. What do you mean by electrical drives? **2**
ii. What do you understand by intermittent loading? **3**
iii. Explain the concept of regenerative braking with neat circuit diagram. **5**
OR iv What are the factor affecting the choice of electric drive. **5**

Q.6 Write short note on any two:
i. Configuration and performance of electrical vehicles **5**
ii. Tractive effort **5**
iii. Vehicle performance and energy consumption. **5**

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Marking Scheme

EE3EL09 / EX3EL09 Utilization of Electrical Energy

Q.1	i.	Candela is the unit of (b) Luminous intensity	**1**
	ii.	One lumen per square meter is the same as (a) One lux	**1**
	iii.	In electrical resistance welding material of electrode should have (d) All of these	**1**
	iv.	The efficiency of heating is more for (d) Electric heating	**1**
	v.	Method of speed control used on 25 kV, 50 Hz single phase traction is (a) Tap changing control of transformer	**1**
	vi.	To save energy during braking, _____ braking is used? (c) Regenerative	**1**
	vii.	Which braking is not possible in series motor? (a) Regenerative braking	**1**
	viii.	The disadvantages of group drive electric machine is/are (c) Can't be used for constant operation	**1**
	ix.	In diesel electric traction, the torque required from traction work must be (b) Inversely proportional to the speed	**1**
	x.	Speed of locomotive is controlled by (c) Regulating steam to engine	**1**

Q.2	i.	Solid angle.		**2**
		Definition	1 mark	
		Diagram	1 mark	
	ii.	Laws of illumination.		**3**
		Definition	2 marks	
		Diagram	1 mark	
	iii.	Explain following term with formula and its unit.		**5**
		1 mark for each	(1 mark * 5)	
OR	iv.	Fluorescent tube and compare it with tungusten lamp.		**5**
		Construction	1.5 marks	
		Operations	1.5 marks	
		Diagram	1 mark	
		Comparison	1 mark	

Q.3	i.	High frequency eddy current effect		**2**
	ii.	Advantage of electric heating over other types of heating.		**3**
		0.5 mark for each advantage	(0.5 mark * 6)	
	iii.	Basic principle of electrolysis	2 marks	**5**
		Electroplating	2 marks	
		Applications	1 mark	
OR	iv	Induction heating operating principle	3 marks	**5**
		Application and limitation	2 marks	

Q.4	i.	Special requirements of a traction motor.		**2**
		0.5 mark for each point	(0.5 mark * 4)	
	ii.	Speed time curves in traction system.		**3**
		Definition	1 mark	
		Curve explanation	2 marks	
	iii.	Factor affecting the specific energy consumption.		**5**
		1 mark for each factor	(1 mark * 5)	
OR	iv	Importance of adhesive weight	2.5 marks	**5**
		Importance of co-efficinent of adhesion.	2.5 marks	

Q.5	i.	Electrical drives definition with explantion		**2**
	ii.	Intermittent loading		**3**
		Explanation	1.5 marks	
		Graph	1.5 marks	
	iii.	Concept of regenerative braking		**5**
		Circuit diagram	2 marks	
		Explanation	2 marks	
		Graph	1 mark	
OR	iv	Factor affecting the choice of electric drive.		**5**
		1 mark for each factor	(1 mark * 5)	

Q.6		Write short note on any two:		
	i.	Configuration	2.5 marks	**5**
		Performance of electrical vehicles	2.5 marks	
	ii.	Tractive effort		**5**
	iii.	Vehicle performance	2.5 marks	**5**
		Energy consumption.	2.5 marks	

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