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

Enrollment No.....

Faculty of Engineering

End Sem (Even) Examination May-2022

EE3EL13 / EX3EL13 EV Charging Infrastructure

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. The capacity of a battery is expressed in terms of- **1**

(a) Current rating (b) Voltage rating

(c) Ampere hour rating (d) None of these

ii. The storage battery generally used in electric power station is- **1**

(a) Nickel-cadmium battery (b) Zinc carbon battery

(c) Lead-acid battery (d) None of these

iii. In electric vehicle charging system the device which is responsible to convert AC to DC is- **1**

(a) Rectifier (b) Inverter (c) Chopper (d) None of these

iv. Which of the following things can a "smart" EV charger do that a "dumb" EV charger cannot? **1**

(a) Charge a car at speeds up to 9x faster than Level 1 chargers

(b) Schedule charging when the electricity on the grid is cheaper and cleaner

(c) Charge any EV on the market

(d) None of these

v. Which of the following charger is like plugging into a standard, 120-volt outlet and does not require special equipment or installation? This type of charging is also known as trickle charging. **1**

(a) Level 1 (b) Level 2 (c) Level 3 (d) None of these

vi. A 2300 mAh battery having a C rate of 0.5 C. Calculate the maximum discharging current of the battery. **1**

(a) 1.15 Amp (b) 69 Amp (c) 4.6 Amp (d) 100 Amp

P.T.O.

vii. By Using V2G technology is known as _____. **1**
(a) Smart grid (b) Conventional grid
(c) Both (a) and (b) (d) None of these

viii. The charging stations supplied by 32 Amp of the current and take time to charge the vehicle almost 3 to 4 hr. is known as _____. **1**
(a) Level 1 (b) Level 2 (c) Level 3 (d) None of these

ix. Battery charging equipment is generally installed- **1**
(a) In well ventilated location
(b) In clean and dry place
(c) As near as practical to the battery being charged
(d) In location having all above features

x. SAE J1772 is a ……... **1**
(a) Universal protocol for electric vehicle battery efficiency
(b) Universal standard for electric vehicle connectors
(c) The name of a robot in popular science fiction movie
(d) None of these

Q.2	i.	Explain Parameters and Properties of batteries used in electric vehicles.	**4**
	ii.	Define Battery management system. Which type of operation required in electric vehicles charging?	**6**
OR	iii.	Explain any two of the following: (a) Lead acid batteries (b) Ni based batteries (c) Lithium-ion batteries	**6**
Q.3	i.	Explain salient features of charging technologies of EV.	**4**
	ii.	Explain AC charging and DC charging technology of EV charging system.	**6**
OR	iii.	Give the advantage and disadvantage of following: (a) Inductive charging (b) Battery swapping	**6**
Q.4	i.	Explain any two classification of charging stations.	**4**
	ii.	Explain site section approach for public charging stations.	**6**
OR	iii.	Draw model layout for public charging facility.	**6**

Q.5	i.	Why central management centre is required for EV charging infrastructure?	**4**
	ii.	Explain different charging issues in charging infrastructure.	**6**
OR	iii.	Explain smart grid and smart mobility.	**6**
Q.6	i.	Write the impact of electric vehicle on grid.	**4**
	ii.	Write application of V2G technology and role in peck load and off load periods.	**6**
OR	iii.	Write a short note on Indian scenario for electric vehicle development by GoI.	**6**

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Marking Scheme
EE3EL13 / EX3EL13 EV Charging Infrastructure

Q.1	i.	The capacity of a battery is expressed in terms of- (c) Ampere hour rating		**1**
	ii.	The storage battery generally used in electric power station is- (c) Lead-acid battery		**1**
	iii.	In electric vehicle charging system the device which is responsible to convert AC to DC is- (a) Rectifier		**1**
	iv.	Which of the following things can a "smart" EV charger do that a "dumb" EV charger cannot? (b) Schedule charging when the electricity on the grid is cheaper and cleaner		**1**
	v.	Which of the following charger is like plugging into a standard, 120-volt outlet and does not require special equipment or installation? This type of charging is also known as trickle charging. (a) Level 1		**1**
	vi.	A 2300 mAh battery having a C rate of 0.5 C. Calculate the maximum discharging current of the battery. (a) 1.15 Amp		**1**
	vii.	By Using V2G technology is known as _____. (a) Smart grid		**1**
	viii.	The charging stations supplied by 32 Amp of the current and take time to charge the vehicle almost 3 to 4 hr. is known as _____. (b) Level 2		**1**
	ix.	Battery charging equipment is generally installed- (d) In location having all above features		**1**
	x.	SAE J1772 is a ……... (b) Universal standard for electric vehicle connectors		**1**
Q.2	i.	Parameters and Properties of batteries used in electric vehicles. 1 mark for each	(1 mark * 4)	**4**
	ii.	Definition of Battery management system Type of operation required	2 marks 4 marks	**6**
OR	iii.	3 marks for each (a) Lead acid batteries (b) Ni based batteries (c) Lithium-ion batteries	(3 marks * 2)	**6**
Q.3	i.	Salient features of charging technologies of EV 1 mark for each	(1 mark * 4)	**4**
	ii.	AC charging technology of EV charging system DC charging technology of EV charging system	3 marks 3 marks	**6**
OR	iii.	Give the advantage and disadvantage of following: (a) Inductive charging (b) Battery swapping	3 marks 3 marks	**6**
Q.4	i.	Any two classification of charging stations. 2 marks for each	(2 marks * 2)	**4**
	ii.	Site name list Explanation	3 marks 3 marks	**6**
OR	iii.	Layout for public charging facility Definition Explanation	 3 marks 3 marks	**6**
Q.5	i.	Central management centre is required for EV charging infrastructure 1 mark for each reason	(1 mark * 4)	**4**
	ii.	Different charging issues in charging infrastructure Definition Explanation	 3 marks 3 marks	**6**
OR	iii.	Smart grid Smart mobility	3 marks 3 marks	**6**
Q.6	i.	Impact of electric vehicle on grid. 1 mark for each impact	(1 mark * 4)	**4**
	ii.	Application of V2G technology Role in peck load Off load periods	2 marks 2 marks 2 marks	**6**
OR	iii.	Indian scenario for electric vehicle development by GoI. 1 mark for each point	(1 mark * 6)	**6**

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