Total No. of Printed Pages: 2

National Institute of Technology Delhi

Name of the Examination: B.Tech./ M.Tech./ Ph.D.
End Semester Examination (Spring, 2022)

Branch	**: EE**	**Semester**	**: II**
Title of the Course	**: Electrical Vehicle**	**Course Code**	**: EEL 611**
Time	**: 03 Hours**	**Maximum Marks**	**: 50**

Instructions:

1. ***Assume suitable data, if necessary.***
2. ***The marks are indicated in the right-hand margin.***
3. ***The answer should be written in short and explained with the help of a figure.***

SECTION A: Answer all questions [3 x 2]

Q.A. 1. Write down the reasons for choosing the composite 1-phase ac-to-dc system for all electrification in India.

Q.A. 2. Explain the Co-efficient of adhesion.

Q.A. 3. Explain the reason of the series motor is not suitable for traction duty.

SECTION B: Answer all questions [5x 6]

Q.B.1. Describe the technical performance analysis of retired electric vehicle batteries in their second life.

Q.B.2. Explain the classification of the bidirectional converter and describe all isolated topologies in detail with comparison to each other.

Q.B.3. Write down the comparison of Battery Electric Vehicle, Hybrid Electric Vehicle and Fuel Cell Electric Vehicle.

Q.B.4. Draw the architecture of parallel hybrid system and explain the difference between all types of hybrid electric vehicle architecture.

Q.B.5. Elaborate each electric Motors with their features for uses the Electric Vehicles.

SECTION C: Answer all questions [2x7]

Q.D.1. An electric train accelerates uniformly from rest to a speed of 50 km/h in 25 seconds. Then it coasts for 70 seconds against a constant resistance of 60 N/t and Further broken to rest with uniform retardation of 3.0 km/h/s in 12 seconds.

Compute:-

(i) Uniform acceleration
(ii) Coasting retardation Electric Traction 1727
(iii) Schedule speed if station stops are of 20-second duration

Allow 10% for rotational inertia. How will the schedule speed be affected if duration of stops is reduced to 15 seconds, other factors remaining the same?

Q.D.2. A motor coach is being driven by two identical DC series motors. First motor is geared to driving wheel having diameter of 90 cm and other motor to driving wheel having diameter of 86 cm. The speed of the first motor is 500 r.p.m. when connected in parallel with the other across 600 V supply. Find the motor speeds when connected in series across the same supply. Assume armature current to remain same and armature voltage drop of 10% at this current.