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BEY–004

BACHELOR OF SCIENCE (APPLIED SCIENCE–ENERGY) (BSCAEY)

Term-End Examination

December, 2025

BEY-004 : ZERO EMISSION VEHICLES

Time : 3 Hours *Maximum Marks : 70*

Note : *(i) Attempt any* ***seven*** *questions.*

(ii) All questions carry equal marks.

1. (a) What roles do renewable energy sources play in improving zero emission vehicle infrastructure ? 5

   (b) Why do zero emission vehicles have a higher upfront cost compared to conventional vehicles ? 5

2. Discuss in detail the various emission, monitoring and control techniques. 10

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3. Describe in detail any *five* combustive properties of hydrogen. 10

4. Explain electric drive train topologies with the help of block diagrams. 10

5. Define energy efficiency in electric propulsion systems. Discuss various factors which affect the efficiency of an electric motor. 10

6. (a) How does the hybrid system switch between the electric motor and the internal combustion engine ? 5

   (b) Explain the working principle of a fuel cell with the help of a neat sketch. 5

7. Explain energy flow in a hybrid electric vehicle during the following driving conditions : 5+5

   (a) Acceleration

   (b) Cruising

8. (a) Discuss the importance of charge compatibility in the EV ecosystem. 5

   (b) How does fast charging impact battery life and efficiency ? 5

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9. Write short notes on any *two* of the following : 5+5

   (a) Backfire

   (b) Induction motor drive

   (c) Green hydrogen

   (d) Role of AI and smart systems in zero emission vehicles

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