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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Fifth Semester, B.E. - Electrical and Electronics Engineering

Semester End Examination; February / March - 2022

Hybrid Electric Vehicles (Technical Skill - I)

Time: 2 hrs

Max. Marks: 50

Note: All questions are compulsory and each question carries TWO marks.

Q. No.	Questions
1.	Objective behind using a hybrid vehicle is (a) Reduction in fuel consumption (b) Reduction in emission (c) Increased power and Torque (d) All of the above
2.	What are the basic blocks /units of a hybrid vehicle? (a) Motor + Engine+ Power Control unit (b) Motor + Battery + Power control Unit (c) Motor + battery + Power control Unit+ Engine (d) Motor + Power control unit
3.	First hybrid electric vehicle was built by Dr. Ferdinand Porsche in Germany in the year. (a) 1895 (b) 1898 (c) 1834 (d) 1930
4.	What is meant by the term Regenerative braking? (a) It's when electricity is generated during deceleration & braking (b) It's when the battery is charged during engine idling (c) Its when the battery is recharged from the main supply (d) Its when the battery is discharged during vehicle moving
5.	A fuel cell produces electricity from _____ and _____ (a) Petrol / Oxygen (b) Nitrogen / Oxygen (c) Hydrogen / Oxygen (d) Water / Oxygen
6.	There are _____ methods and _____ modes of charging an electric vehicle (a) Three, four (b) Two, three (c) Four two (d) Three, Two
7.	Fuel Economy of PHEV's is calculated by combining _____MPG numbers (a) 35% city and 65% highway (b) 65% city and 35% highway (c) 45% city and 55% Highway (d) 55% city and 45% Highway

8. Chevrolet Volt vehicle was designed for:
 - (a) Maintenance mode
 - (b) Combined power mode
 - (c) Power split mode
 - (d) Stationary charging mode.
9. To reduce cold start Emissions in PHEV's run the vehicles in _____ mode for first few minutes
 - (a) Engine – Alone Mode
 - (b) Electric-only mode
 - (c) combined power mode
 - (d) power split mode
10. A Utility factor in PHEV is defined as
 - (a) The ratio of CD range of a PHEV to the total distances driven in daily commuting
 - (b) The ratio of CS range of a PHEV to the total distances driven in daily commuting
 - (c) The ratio of CD range of a PHEV to the total distances driven in monthly commuting
 - (d) The ratio of CS range of a PHEV to the total distances driven in in monthly commuting.
11. Why DC-DC converter is used in HEV?
 - (a) To interface the battery, super capacitor or fuel cell to the DC link
 - (b) To manage the charge / discharge of the battery
 - (c) To control the DC bus voltage
 - (d) All of the above
12. Which is the filtering circuit used in HEV?
 - (a) LC high-pass filter
 - (b) LC Low-pass filter
 - (c) LC band-pass filter
 - (d) LC notch filter
13. Which are the issues to be addressed in the design of HEV power electronics circuit?
 - (a) Electrical Design
 - (b) Magnetic design
 - (c) EMC design
 - (d) All of the above
14. The bidirectional DC-DC converter in HEV is also called
 - (a) Boost DC-DC converter
 - (b) Buck DC-DC converter
 - (c) Buck-Boost DC-DC Converter
 - (d) Boost-Buck DC-DC Converter
15. Which power electronic device is used for high voltage, high power hybrid configuration.
 - (a) IGBT
 - (b) MOSFET
 - (c) SCR
 - (d) BJT
16. Which type of motor is used in series hybrid vehicles?
 - (a) Stepper motor
 - (b) Claw pole DC motor
 - (c) Switched Reluctance motor
 - (d) permanent Magnet Motor

17. How speed of the Induction motor can be changed?
- (a) change the number of poles
 - (b) change frequency
 - (c) change slip
 - (d) All of the above
18. Windage loss in induction motor is due to
- (a) Stator winding
 - (b) Rotor winding
 - (c) Rotation of the Rotor
 - (d) Stator Iron
19. The most commercially used permanent Magnet material in traction drive motors is
- (a) Neodymium – Ferrite –boron
 - (b) Dysprosium- Ferrite-boron
 - (c) Gadolinium – Cobalt-boron
 - (d) Samarium – nickel – cobalt
20. In permanent Magnet motor if the magnets are inserted inside the rotor in the pre-cut slots then it is called
- (a) Surface permanent magnet motor
 - (b) Interior Permanent Magnet motor
 - (c) Internal permanent magnet motor
 - (d) superficial permanent magnet motor
21. The energy stored in a battery is dependent on
- (a) Battery voltage
 - (b) charging current
 - (c) charging time
 - (d) Discharging time
22. The energy efficiency of a battery is in the range
- (a) 35-45%
 - (b) 45-55%
 - (c) 55-95%
 - (d) 55-75%
23. In Lead Acid battery the electrolyte is composed of
- (a) Sulfuric acid
 - (b) Nitric acid
 - (c) Oxalic Acid
 - (d) Hydrochloric acid
24. Which method of charging is fastest and more popular?
- (a) CC charging
 - (b) CV charging
 - (c) CC-CV charging
 - (d) Pulse charging
25. Which statement is true
- (a) Li ion cells offer higher resistance at higher temperature
 - (b) DOD of 85% is the best value to maximize battery life
 - (c) Lower the energy density safer is the battery chemistry
 - (d) Li ion does not works at 45°C
- (a) (b) (c) (d)