Total No. of Questions : 8]

SEAT No. :

PE2307

[Total No. of Pages : 2

[6584]-216
B.E. (Mechanical Engineering)
ELECTRICAL AND HYBRID VEHICLE
(2019 Pattern) (Semester - VIII) (402051 E) (Elective - VI)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Solve Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7or Q.8***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Use of electronic pocket calculator is allowed.***
5) ***Assume suitable data, if necessary.***

Q1) a) Explain with neat sketch construction and working of brushless DC motor and also state its advantages and disadvantages. **[9]**

b) Determine the rating of motor required for following data: Gross curb weight (GCW) = 100 Kg , load on vehicle =70 kg, Maximum speed = 50 kmph., Road friction = 0.01, Coefficient of drag =0.9, Density of air = 1.2 kg/m^3, Frontal area of vehicle = 0.6 m^2 ,Wheel radius= 0.28 m. Suggest the motor rating to cover the distance of 90 kms per charge. **[9]**

OR

Q2) a) Explain with neat sketch construction and working of Li-ion battery used for EV. **[9]**

b) In e-auto, the battery rating is 20Ahs at 24 volts. It has maximum speed of 25 kmph and motor has power of 250 Watts. How much distance it will cover. Assume suitable data.

Case 1 Using lead acid battery (Assume power available 50%)

Case 2 Using Li-ion battery (Assume power available 95%)

How much range will increase? **[9]**

Q3) a) Compare between mechanical differential and electric differential. **[8]**

b) Explain the concept of fuel efficiency analysis and its significant features for electric vehicle? **[9]**

OR

P.T.O.

Q4) a) Electric vehicle has the following attributes :drag coefficient of 0.20 with vehicle frontal cross sectional area 2.5m^2 , available battery energy of 25kWh.Assuming density of air 1.2 kg/m^3.At particular moment with a vehicle speed of 100km/hour, calculate aerodynamic drag force, power and distance covered for driving condition of i) calm condition with no wind ii) windy conditions with a 12 km/h headwind. **[9]**

b) Write a note on braking system in EV and their types **[8]**

Q5) a) What is retrofitting and explain problems associated with retrofitting of two wheeler. **[9]**

b) Explain with neat sketch construction and working of rear end suspension system in vehicles. **[9]**

OR

Q6) a) What is homologation? What are the national/international testing/ regulation/licensing/approval organizations and agencies? **[9]**

b) Write a note on crash testing and testing of tracks. **[9]**

Q7) a) Explain with neat sketch charging architecture. **[8]**

b) Explain following: grid voltages, frequencies and wiring, real power, apparent power and power factor. **[9]**

OR

Q8) a) Describe and illustrate a typical structure of battery management systems (BMS) along with its significant functions. **[9]**

b) Describe and illustrate hazard/safety management of batteries during/after operations. **[8]**

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Total No. of Questions : 8]

SEAT No. :

PE2314

[Total No. of Pages : 2

[6584]-223
B.E. (Mechanical)
INDUSTRIAL ENGINEERING
(2019 Pattern) (Semester - VII) (402044D) (Elective - III)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Solve Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.***
2) ***Figures to the right indicate full marks.***
3) ***Use of electronics calculator is allowed.***
4) ***Assume suitable data, if necessary.***

Q1) a) Sketch and explain in brief Material flow patterns & the Selection criterion for material handling. **[9]**

b) Explain in detail factors affecting selection of location for the industrial plant. **[8]**

OR

Q2) a) Enlist material handling equipment and describe any three of them & Define material handling. **[9]**

b) Compare Product layout and Process Layout and explain factors affect while selecting plant Layout. **[8]**

Q3) a) What is Line balancing? Explain Assembly line balancing in detail. **[8]**

b) Calculate the forecast for February to July for trading firm Rudra industries which uses exponential smoothing with smoothing constant 0.18 for estimating a demand. Following table shows the demand for 6 months. The forecast for January is 550 units. **[9]**

Month	Actual Demand
January	480
February	520
March	525
April	498
May	477
June	564

OR

P.T.O.

Q4) a) Write a short on **[8]**

i) Master production schedule

ii) Capacity Planning

b) Explain the need for forecasting. **[9]**

Past data on the sale of Diesel engines for the last 12 years is given below. By the method of three yearly moving averages establish the trend values and forecast demand for 13th year. If the actual demand for 13th year is 540 nos. what shall be the forecast of 14th year. Take value of smoothing constant is 0.25

Year	1	2	3	4	5	6	7	8	9	10	11	12
Sale numbers	335	350	330	340	380	410	430	440	430	460	500	560

Q5) a) Explain any three selective control techniques of inventory. **[9]**

b) Explain the term EOQ. **[9]**

A production company requires 9500 units per year. Ordering cost is Rs. 130 per order & carrying cost is 21%. Purchase price per unit is Rs. 48. Determine

i) EOQ

ii) Optimum no. of orders

iii) Total cost including acquisition of material.

OR

Q6) a) Explain the role of material management in Cost Reduction & Value Improvement. Explain the term "MRP-I". **[9]**

b) The rajesh enterprises use EOQ logic to determine the order quantity for its. various components and are planning its orders. The Annual consumption is 90,000 units, Cost to place one order is Rs.1200, Cost per unit is Rs.50 and carrying cost is 7% of Unit cost. Find, **[9]**

i) EOQ & No. of order per year,

ii) Ordering Cost and Carrying Cost

iii) Total Cost of Inventory.

Q7) a) Explain Key result area in detail. What is value engineering? Explain steps in value analysis. **[10]**

b) What is Performance Appraisal? Explain Performance Appraisal methods. **[8]**

OR

Q8) a) What is Merit Rating? Enlist and explain the methods of Merit Rating in Performance appraisal. **[9]**

b) Explain the-terms Rapid Upper Limb Assessment (RULA) and Rapid Entire Body Assessment (REBA). **[9]**

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