Register Number:……..

KUMARAGURU
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B.E/B.TECH DEGREE EXAMINATIONS: NOV/DEC 2023

(Regulation 2018)

Fourth Semester

AUTOMOBILE ENGINEERING

U18AUT4005**:** Automotive Electrical Engineering

COURSE OUTCOMES

CO1: Apply the fundamental of ac and dc circuits to real time applications.
CO2: Classify the different types of motors and generators based on different parameters.
CO3: Select a suitable motor for automotive application.
CO4: Distinguish the various basic electrical and electronics systems of an automobile.
CO5: Outline the working of different batteries available and select them based on the application.
CO6: Recognize and build small wiring applications / wiring diagrams used in vehicles.

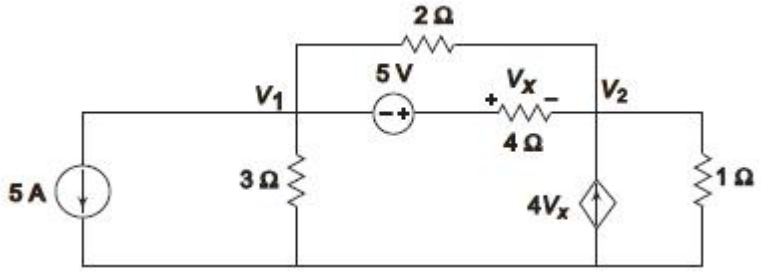
Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-
PART A (10 x 2 = 20 Marks)
(Answer not more than 40 words)

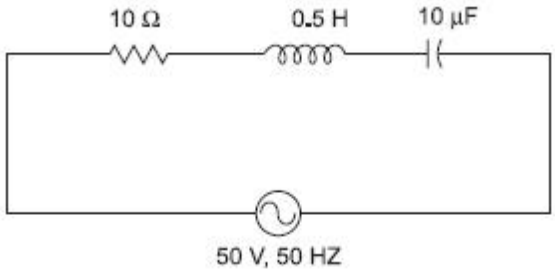
1.	A resistor with a current of 3 A through it converts 500 J of electrical energy to heat energy in 12 s. what is the voltage across the resistor?	CO1	[K_1]
2.	A voltage of v(t) = 100 sin ωt is applied to a circuit. The current flowing through the circuit is i(t) = 15 sin (ωt - 30°). Determine the average power delivered to the circuit.	CO1	[K_3]
3.	Why the d.c. motors are preferred for traction applications?	CO2	[K_1]
4.	Draw the speed torque characteristics of induction motor.	CO2	[K_1]
5.	Write the internal combustion engine requirements in order to start and continue running.	CO3	[K_2]
6.	Write the different types of starter motor.	CO3	[K_1]
7.	What are the requirements of a charging system?	CO5	[K_1]
8.	Write the two conditions for choosing the correct battery for the vehicle.	CO5	[K_2]
9.	Define the term Expert or Intelligent Lighting.	CO6	[K_1]
10.	What is EMC?	CO6	[K_1]

Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

11.	a)	For the circuit shown in the diagram find the voltage across the 4Ω resistor by using nodal analysis.	CO1	[K_3]



b) In the circuit shown in figure, determine the total impedance, current, phase angle and the voltage across each element. CO1 [K3]



12. a) Explain the construction and working principle of dc motor with neat diagram. CO3 [K1]

b) Describe the construction and working principle of a single-phase transformer in detail. CO2 [K1]

13. a) With the basic circuit diagram explain the Starting system of an automotive. CO4 [K1]

b) Explain any two types of starter motor in detail. CO4 [K2]

14. a) Explain in detail about the alternator characteristics with neat diagram. CO4 [K1]

b) Explain the new developments in the automotive alternators in detail. CO4 [K4]

15. a) Explain the construction and battery rating of the Lead-acid batteries with the neat diagram. CO5 [K1]

b) Discuss the common problems with lead acid batteries and Explain how the battery can be tested in detail. CO5 [K4]

16. a) Explain why EMC is such an important issue for automotive electronics system designers. CO6 [K1]

b) With the simplified diagram explain the lighting circuit and dim-dip lights used in the automotive. CO6 [K1]

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