KUMARAGURU
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B.E DEGREE EXAMINATIONS: MAY 2018

(Regulation 2015)

Fourth Semester

ELECTRONICS AND COMMUNICATION ENGINEERING

U15ECTE05**:** Automotive Electronics

COURSE OUTCOMES

CO1: Describe various mechanical systems in an automobile (K2).

CO2: Illustrate different types of electronic systems in an automobile (K3).

CO3: Outline the various stages of Integrated development environment to design an embedded system (K3).

CO4: Explain the various embedded systems used in automotive applications (K2).

CO5: Compare Vehicle Communication Protocols (K3).

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

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Match list I with list II and select the correct answer for petrol engine.   CO1 [K_2]

List I	List II
A. Intake stroke	1. mixture is compressed
B. Compression stroke	2. mixture is Ignited or burnt
C. Power stroke	3. Air-Fuel mixture is taken inside the cylinder
D.Exhaust stroke	4. Waste gases are thrown out

	A	B	C	D
a)	2	1	3	4
b)	4	2	1	3
c)	2	4	1	3
d)	3	1	2	4

2. Gasoline engines are _____ than diesel engines.   CO1 [K_1]

   a) heavier   b) lighter

   c) unpredictable   d) none of the mentioned

3. When the Adaptive Cruise Control (ACC) system is in 'time gap control', it sends information   CO2 [K_3]
   to_____ to control the clearance between the ACC Vehicle and the Target Vehicle.
   1) Engine control module
   2) Brake control module
   3) Transmission control module
   4) Ignition control system

a) 1 and 2   b) 1 and 4

c) 1,2 and 3   d) 2 and 3

4. _____ includes the Arithmetic and logical unit and the circuits that execute instructions for a program. CO3 [K₁]

a) Control unit   b) Execution Unit

c) Bus interface unit   d) CPU

5. Assertion (A): When a low priority task makes the high priority task to be in waiting state in the long run. CO3 [K₃]

Reason (R): This condition leads to priority inversion and neither of the tasks will be completed within its deadline

a) Both A and R are Individually true and R is the correct explanation of A   b) Both A and R are Individually true but R is not the correct explanation of A

c) A is true but R is false   d) A is false but R is true

6. Match the following CO3 [K₃]

List I	List II
A. Class browser	i. allows the programmer to visualize the structure of object-oriented programming code.
B. Object browser	ii. examine and reference the properties of an object-oriented class hierarchy.
C. Class hierarchy diagram	iii. examine the objects instantiated in a running application program

a) ii-i-iii   b) i-ii-iii

c) iii-ii-i   d) iii-i-ii

7. In Battery coil ignition system, the correct sequence of flow of current is CO1 [K₂]

a) Battery – Ammeter – Ignition coil – Distributor – Spark plug   b) Battery – Ignition coil – Ammeter – Distributor – Spark plug

c) Battery – Ammeter – Distributor – Ignition coil – Spark plug   d) Battery – Distributor – Ammeter – Ignition coil – Spark plug

8. ECU in an electronics injection system used for CO4 [K₂]

a) Meeting only certain operating Conditions   b) Calculating the appropriate injection timing

c) Closing the injection valve   d) Calculating engine timing cycle

9. Assertion (A): The throttle position input is used to determine the optimum time and characteristics of gear in the vehicles.   CO4 [K₂]

   Reason (R): The optimum time and gear position are generated based on the input from oxygen sensor.

   a) Both A and R are Individually true and   b) Both A and R are Individually true but
      R is the correct explanation of A   R is not the correct explanation of A

   c) A is true but R is false   d) A is false but R is true

10. Which of the following can be used for long distance communication?   CO5 [K₂]

    a) I2C   b) Parallel port

    c) SPI   d) RS232

PART B (10 x 2 = 20 Marks)
(Answer not more than 40 words)

No.	Question	CO	K
11.	Differentiate between diesel and petrol engine.	CO1	[K₂]
12.	Define Drum brake and Disc brake.	CO1	[K2]
13.	Write the function of clutch.	CO2	[K₂]
14.	List out the necessity of using electronics in Automobiles.	CO2	[K₂]
15.	List out the four approaches used in Edit-Test-Debug Cycle in an IDE.	CO3	[K₂]
16.	Enumerate the differences between Interpreter and Compiler.	CO3	[K2]
17.	Name some real time applications of embedded systems.	CO4	[K₂]
18.	Name five sensors used in engine management system.	CO4	[K₂]
19.	Explain the need for vehicle communication protocols with examples.	CO5	[K₂]
20.	Write down the data frame rate of I2C bus.	CO5	[K₂]

Answer any FIVE Questions:-
PART C (5 x 14 = 70 Marks)
(Answer not more than 300 words)

Q.No. 21 is Compulsory

21. With a neat sketch, explain the working principle of an ABS system.   CO2 [K₂]

22. Describe the fuel injection system in SI engines with necessary diagram.   CO1 [K₂]

23. Discuss any two comfort system in automobiles and draw the sketch wherever required.   CO2 [K₃]

24. a) Discuss the host and target machine with neat diagram. (8) CO3 [K₂]

   b) Explain in detail how the target system interacts with the host system. (6) CO3 [K₂]

25. Give a brief note on CAN communication protocol along with its suitable frame format. CO5 [K₂]

26. a) Illustrate about the Transmission Control Unit with a neat sketch. (7) CO5 [K₂]

   b) Write a note on infotainment systems. (7) CO4 [K₂]

27. Elaborate the operating principle of Electronic Ignition System in Automobiles. Mention its advantages over mechanical ignition system. CO4 [K₂]

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