KUMARAGURU
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B.E DEGREE EXAMINATIONS: MAY 2018

(Regulation 2015)

Sixth Semester

ELECTRICAL AND ELECTRONICS ENGINEERING

U15EEPE20**:** Automotive Electronics

COURSE OUTCOMES:

CO1: Gain the knowledge on electrical and electronics systems available in modern automobiles.

CO2: Understand the role of various Electronics Control Units embedded in modern automobiles.

CO3: Understand the internals of various embedded systems design to ensure drivers safety and comfort.

CO4: Apply the concepts of various protocols in establishing communication between nodes/ Electronics Control Units.

CO5: Visualize the internals of each Electronics Control Unit with time stamp using IDE and RTOS support.

CO6: Design and develop simple firmware modules to support Electronics Control Units communication at real-time balancing standards and pollution norms

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

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Identify the automobile charging system component(s)   CO1   [K_1]

     1. Air bag   2. Voltage regulator   3. Alternator

  a)   1 & 3   b)   2 & 3

  c)   1& 2   d)   1, 2 & 3

2. Automobile engine is started by using a(n)   CO1   [K_2]

  a)   Capacitor   b)   DC motor

  c)   Alternator   d)   IC engine

3. Match the following   CO2   [K_3]

Device	Subsystem
A. Gear	1. Power train
B. Radio	2. Body
C. Convertible Top	3. Multimedia

  a)   A-1,B-2,C-3   b)   A-1,B-3,C-2

  c)   A-2,B-1,C-3   d)   A-2,B-3,C-1

4. **Assertion (A)**: HVAC is a closed loop system   CO3   [K_3]

   Reason (R): Condenser is used in the HVAC

a)	Both A and R are individually true and R is the correct explanation of A	b)	A is true but R is false
c)	Both A and R are individually true but R is not the correct explanation of A	d)	A is false but R is true

5. Identify the correct sequence of embedded system software development   CO5 [K2]

    1. Edit code   2. Translate code   3. Debug code

a)	1, 3, 2	b)	3, 2, 1
c)	1, 2, 3	d)	2, 1, 3

6. IDE require   CO5 [K1]

    1. Hardware tools   2. Emulators   3. Software tools

a)	1 & 3	b)	2 & 3
c)	1& 2	d)	1, 2 & 3

7. Match the following   **(CO6,K2)**   CO6 [K2]

System	Application
A. EMS	1. Engine
B. Navigation	2. GPS
C. ESP	3. Safety

a)	A-1,B-2,C-3	b)	A-1,B-3,C-2
c)	A-3,B-1,C-2	d)	A-2,B-3,C-1

8. Assertion (A): Active safety system prevents vehicle accident.   CO6 [K3]

   Reason (R): Engine management system is supervising the vehicle security

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

9. Communication speed of LIN is   CO4 [K2]

a)	100 Mbps	b)	Less than 20 Kbps
c)	2Gbps	d)	50Mbps

10. FLEXRAY protocol is used in   CO4 [K2]

a)	Onboard computing	b)	Traction control
c)	Engine management system	d)	Multimedia system

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

11. State the functions of starting system.   CO1 [K2]

12.	List the components of HVAC in automobiles.	CO1	[K$_2$]
13.	What are the standards followed for emission?	CO2	[K$_1$]
14.	What is the function of ABS?	CO5	[K$_2$]
15.	What is the need for cross compiler?	CO3	[K$_2$]
16.	What is PC based debugger in IDE environment?	CO3	[K$_2$]
17.	Compare active and passive safety system of a vehicle.	CO6	[K$_3$]
18.	List any two roles of Navigation system.	CO5	[K$_2$]
19.	State the features of SPI protocol.	CO4	[K$_2$]
20.	What is the use of KWP 2000 protocol?	CO4	[K$_2$]

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

Q.No. 21 is Compulsory

21.	i) Describe working of power train in automobiles.	(7)	CO2	[K$_2$]
	ii) Draw the block diagram of charging system in automobiles.	(7)	CO1	[K$_3$]
22.	State and explain various ECUs in automobiles.		CO2	[K$_2$]
23.	Explain the function of various sensors and actuators in automobiles.		CO3	[K$_2$]
24.	Describe the vehicle safety system and control.		CO6	[K$_2$]
25.	Explain the components of of Integrated development environment and the connectivity.		CO5	[K$_2$]
26.	Describe the engine management system in detail.		CO6	[K$_2$]
27.	i) Describe the features of CAN protocol used in automobiles.	(7)	CO4	[K$_2$]
	ii) Distinguish between I^{2}C and USB communication protocols.	(7)	CO4	[K$_3$]

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