Q. Code:847816

Reg. No. | | | | | | | | | | | | | |

B.E./ B.TECH. DEGREE EXAMINATIONS, MAY 2024

Fourth Semester

AE22402 AUTOMOTIVE ELECTRICAL, ELECTRONICS AND MICROCONTROLLER SYSTEMS

(Automobile Engineering)

(Regulation 2022)

TIME:3 HOURS **MAX. MARKS: 100**

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Describe the basic principles of electrical, electronics and automotive dashboard instruments.	**3**
CO 2	Identify the requirements and discuss the automotive starting system, charging system and lighting system.	**3**
CO 3	Outline the application of electronics in automotive ignition and injection system.	**3**
CO 4	Illustrate the working of sensors and microcomputer controlled devices in Automobiles.	**3**
CO 5	Outline the working principle of safety systems employed in vehicles.	**3**

PART- A (20 x 2 = 40 Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	Prioritize the factors affecting electrical resistance in a conductor.	**1**	**3**
2.	Prioritize the general rules about magnetic field around a conductor.	**1**	**3**
3.	Identify the type of switch used in head light dimmer and sketch its symbol.	**1**	**3**
4.	Identify any four dashboard instruments which ensure safety in city driving conditions.	**1**	**2**
5.	Prioritize the significant requirements of a starter motor used in automotive vehicles.	**2**	**3**
6.	Justify the preference of alternators over direct current generators in automotive charging system.	**2**	**3**
7.	Validate the necessity of voltage regulator in the battery charging system.	**2**	**3**
8.	Identify and defend the most preferred reflector shape in automotive headlights.	**2**	**3**
9.	State the need of ignition system in a SI origin.	**3**	**3**
10.	Identify the significance of ignition advance mechanisms and the types of conventional advance mechanisms employed in engines.	**3**	**3**
11.	Enumerate the advantages of electronic ignition system.	**3**	**2**
12.	Differentiate the fuel injection system used in spark ignition and compression ignition engines.	**3**	**3**
13.	Identify the significance of sensor in automotive applications.	**4**	**3**
14.	Identify the principle used in detonation sensor.	**4**	**2**
15.	Differentiate microprocessor and microcontroller used in automotive applications.	**4**	**3**
16.	Enumerate the advantages of electronic steering system.	**4**	**2**
17.	Identify the different types of air bags available in the vehicle to safeguard the driver.	**5**	**2**

18.	Identify the most commonly used seat belt locking mechanism in the passenger cars.	**5**	**3**
19.	Briefly discuss the road navigation system available in the passenger cars.	**5**	**2**
20.	Write short notes on anti-theft system used in automotive vehicles.	**5**	**2**

PART- B (5 x 10 = 50 Marks)

		Marks	CO	RBT LEVEL
21. (a)	Identify and sketch the symbols of any five most commonly used electronic components in an electric circuit and explain their functions.	**(10)**	**1**	**3**
	(OR)			
(b)	Identify the essential components of a microprocessor with a block diagram and discuss them in detail.	**(10)**	**1**	**3**
22. (a)	Identify the most commonly employed starter drive mechanism in automotive vehicles and explain its working with a neat sketch.	**(10)**	**2**	**3**
	(OR)			
(b)	Identify the significance of the most commonly employed alternator in automotive vehicles and explain its working with a neat sketch.	**(10)**	**2**	**3**
23. (a)	With a simple line diagram identify the key components of a conventional ignition system and explain its construction and working.	**(10)**	**3**	**3**
	(OR)			
(b)	Identify the most commonly employed fuel injection system in modern diesel engines and explain its working with a neat sketch.	**(10)**	**3**	**3**
24. (a)	Identify the sensor used to maintain the stoichiometric air fuel ratio in an engine and explain its construction and working with a neat sketch.	**(10)**	**4**	**3**
	(OR)			
(b)	Illustrate the key components involved in collision avoidance system and explain its working with a neat sketch.	**(10)**	**4**	**3**
25. (a)	Identify the system used to improve the steering control during panic braking condition and explain its working with a neat sketch.	**(10)**	**5**	**3**
	(OR)			
(b)	Identify the self restraint system used to reduce the impact of the accidents and explain its working with a neat sketch.	**(10)**	**5**	**3**

PART- C (1x 10=10Marks)

(Q.No.26 is compulsory)

		Marks	CO	RBT LEVEL
26.	Prioritize the requirements of different spark plugs in SI engines and compare the different spark plugs with their applications.	**(10)**	**3**	**3**

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