b.i.	Illustrate the working of Bifilament headlamps with a neat sketch.	5	3	2	1
ii.	Explain the construction and working of electric horn with a neat sketch.	5	3	2	1
28. a.	Explain the construction and working of programmed ignition system and various sensors used in it with suitable sketches.	10	3	3	1,3
	(OR)				
b.	Explain the principle of operation of Multipoint Fuel Injection (MPFI) system pertaining to a gasoline engine with a neat sketch. Also discuss its advantages.	10	3	3	1
29. a.	What do you mean by electronic suspension system? Discuss the variable damping suspension control system is an automobile with an example.	10	3	4	1
	(OR)				
b.	What is ABS? Describe the working of ABS with suitable block diagram. Also mention the types of ABS.	10	3	4	1,3
30. a.	Discuss the inertial navigation and dead reckoning navigation system with suitable block diagram.	10	3	5	1
	(OR)				
b.	Explain the objectives of onboard diagnostics II (OBD II) and brief its fault codes.	10	3	5	1,5

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Reg. No.														

B.Tech. DEGREE EXAMINATION, MAY 2022
Sixth Semester

18AUC303J – AUTOMOTIVE ELECTRICAL AND ELECTRONIC SYSTEMS
(For the candidates admitted from the academic year 2018-2019 to 2019-2020)

Note:
(i) **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.
(ii) **Part - B** should be answered in answer booklet.

Time: 2½ Hours Max. Marks: 75

PART – A (25 × 1 = 25 Marks)
Answer **ALL** Questions

		Marks	BL	CO	PO
1.	A battery with a reserve capacity of 120 would be able to deliver _____ for 120 mins before its voltage drops below 10.5 volts. (A) 10.5 amps (B) 15 amps (C) 25 amps (D) 35 amps	1	1	1	1,3
2.	A _____ is used for checking the specific gravity of the electrolyte. (A) Hydrometer (B) Manometer (C) Ammeter (D) voltmeter	1	1	1	1
3.	The material used for field conductor in field windings used in a DC motor is _____ (A) Aluminium (B) Copper (C) Cast iron (D) Cast steel	1	3	1	1,3
4.	_____ are not used as automotive starters because of their low initial torque, but are used to power other automotive accessories. (A) AC motors (B) Compound type motors (C) Series motors (D) Shunt motors	1	2	1	1,4
5.	The _____ makes contact with the metal disc that connects the battery terminal post of the solenoid to the motor terminal. (A) Roller bearing (B) Plunger (C) Overrunning clutch (D) Pole shoe	1	1	1	1,3
6.	_____ is belt driven by the engine that converts mechanical motion into charging voltage and current. (A) Alternator (B) Battery (C) Voltage regulator (D) Cut out relay	1	1	2	1,4
7.	The housing of an AC generator is made up of _____ (A) Cast steel (B) Cast iron (C) Cast aluminium (D) Stainless steel	1	2	2	1,3
8.	Field current in the AC generator is usually about _____ (A) 0.5 to 1.0 ampere (B) 1.0 to 2.5 amperes (C) 1.5 to 3.0 amperes (D) 3.0 to 4.5 amperes	1	1	2	1

9. _____provides protection to the battery and the generators by stopping the flow of electric current when not running, to safeguard the electrical system. 1 2 2 1,4
(A) Ignition coil (B) Slip rings
(C) Voltage regulator (D) Cut out relay

10. The inside of the conventional sealed head lamp is filled with _____gas. 1 1 2 1
(A) Argon (B) Helium
(C) Neon (D) Xenon

11. _____fires the injectors according to engine firing order and is most accurate and desirable method of regulating post full injection. 1 1 3 1,3
(A) Grouped injection (B) Simultaneous injection
(C) Sequential injection (D) Throttle body injection

12. _____provides information to the ECU on exhaust gas oxygen content. 1 1 3 1
(A) Throttle position sensor (B) Lambda sensor
(C) Engine coolant temperature sensor (D) Mass air flow sensor

13. _____has an advantage of equal full distribution to all the cylinders and no chance for it to condense on the walls of intake manifold 1 2 3 1,4
(A) GDI (B) CRDI
(C) MPFI (D) TBI

14. In conventional ignition system, the ignition coil is used to step up the voltage from _____upto ignition voltage _____ 1 3 3 1,3
(A) 6V, 1000V (B) 10V, 5000V
(C) 1.5V, 15000V (D) 12V, 20000V

15. _____is the process of altering the timing of a valve lift event, and is often and to improve performance, fuel economy and emissions. 1 1 3 1
(A) Variable valve timing (B) Cam switching
(C) Cam phasing (D) Gear hobbing

16. _____aims to eliminate the physical connection between the steering wheel and the wheel of a car by using electric motors to change the direction of the wheels. 1 1 4 1
(A) Belt drive (B) Steer by wire
(C) Hydraulic power steering (D) Electronic power assisted steering

17. _____system locates the vehicle position relative to a known starting point by integrating acceleration twice with respect to time. 1 1 5 1
(A) Inertial navigation (B) Dead reckoning navigation
(C) Celestial navigation (D) Radar navigation

18. The function of anti-lock braking system (ABS) is that it 1 1 4 1
(A) Reduces the stopping distance (B) Minimizes the brake fade
(C) Maintains directional control during braking by preventing the wheels from locking (D) Prevents nose dives during braking and thereby postpones locking of the wheels

19. A traction control system in automobile controls the 1 1 4 1
(A) Engine power during acceleration (B) Vibrations on the steering wheel
(C) Stopping distance in case of emergency (D) Toque that is transmitted by the tyres to the road surface

20. A typical cruise control system senses the difference between 1 2 4 1,4
(A) Vehicle speed and tyre speed (B) Set speed and actual speed
(C) Engine angular speed and wheel speed (D) Vehicle speed and engine angular speed

21. _____application will require on-board vehicle digital communications and some sort of control system for handling the information and data. 1 1 5 1
(A) Telematics (B) Genetics
(C) Hydraulics (D) Pneumatics

22. Which of the following trouble codes are grouped for suspension and steering related faults in OBD II? 1 2 5 1,5
(A) P_{xxx} codes (B) B_{xxx} codes
(C) C_{xxx} codes (D) U_{xxx} codes

23. Which of the following diagnostic trouble code indicates emission control system fault? 1 2 5 1,5
(A) P0100 (B) P0200
(C) P0300 (D) P0400

24. The most critical and costly component in the navigation system is _____ 1 1 5 1
(A) Speed sensor (B) Vehicle angular motion sensor
(C) Position sensor (D) Map sensor

25. _____is a method of determining present position from a known earlier position and information about vehicle motion. 1 1 4 1
(A) Dead reckoning navigation (B) Inertial navigation
(C) Radio navigation (D) Signpost navigation

PART – B (5 × 10 = 50 Marks) Marks BL CO PO
Answer **ALL** Questions

26. a. Explain the construction and working principle of lead acid battery. Also write short notes on sulphation issue in battery. 10 3 1 1

(OR)

b. With the help of neat sketches and circuit diagram, explain the construction and working principle of starter motor. 10 3 1 1,3

27. a. Explain the working of mechanical and electronic voltage regulator using necessary sketches and circuit diagrams. 10 3 2 1,3

(OR)