KUMARAGURU
college of technology
character is life

Register Number: …….

B.E DEGREE EXAMINATIONS: MAY 2015

(Regulation 2013)

Fourth Semester

AUTOMOBILE ENGINEERING

U13AUT403: Automotive Electrical and Electronics

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

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. What makes a battery “low maintenance” or “maintenance free”?
   a) Material used to construct the grids.
   b) The plates are constructed of different metals.
   c) The electrolyte is hydrochloric acid solution.
   d) The battery plates are smaller, making more room for additional electrolytes.
2. When a battery becomes completely discharged, both positive and negative plates become _____ and the electrolyte becomes _____.
3. Which unit contains a hold-in winding and a pull-in winding?
   a) Field coil
   b) Starter solenoid
   c) Armature
   d) Ignition switch
4. Operating an alternator in a vehicle with a defective battery can harm the _____.
5. The primary (low-voltage) ignition system must be working correctly before any spark occurs from a coil. Which component is not in the primary ignition circuit?
   a) Spark plug wiring
   b) Ignition module (igniter)
   c) Pickup coil (pulse generator)
   d) Ignition switch
6. Vacuum advance compensates for varying ……..
7. Statement 1: most Electronic Ignition systems have no method of setting ignition timing.
   Statement 2: advance curves are determined by the Engine Control Module.
   Which is correct?
   a) Statement 1
   b) Statement 2
   c) Both Statements
   d) Neither Statement 1 nor Statement 2
8. Distributor ignition systems can be triggered by a_____ generator for transistor controlled ignition.
9. Current to the brake light switch usually comes from the

a) Ignition switch feed
b) Headlight switch feed
c) Turn signal switch feed
d) Direct battery feed

10. On an engine fitted with Electronic Fuel Injection, engine load may be determined by a _____sensor.

PART B (10 x 2 = 20 Marks)

(Not more than 40 words)

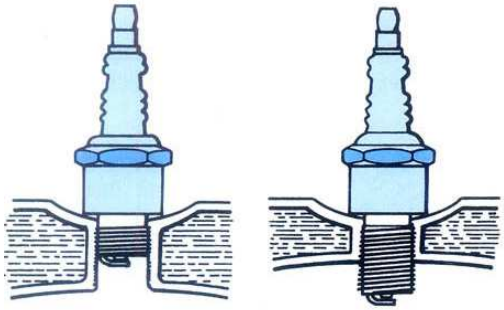
11. List the chemical reaction which occurs during charging and discharging in a lead acid battery.
12. The amount of sulfate in the electrolyte is determined by the electrolyte's specific gravity. Justify
13. List any four functional requirements of automotive starter motor.
14. Mention the need for placing a warning lamp (WL) in the instrument cluster for the vehicle electrical charging systems.
15. 

Fig.1

For the Fig.1 spark plugs write the inferences in brief based on its reach.

16. Mainstream of the two-wheelers are employed with magneto- ignition systems. Justify
17. How the distributor is compensated for firing the air fuel mixture in the distributor less ignition system?
18. List all the components involved in capacitive discharge systems.
19. Mention the requirement of monitoring engine and vehicle speed in modern day instrument cluster.
20. Either positive or negative terminals of the battery in vehicle are connected to chassis and engine. Justify its need.

PART C (5 x 14 = 70 Marks)

(Not more than 400 words)

Q.No. 21 is Compulsory

21. i) Demonstrate the construction and working principle of lead acid battery. Also discuss any two methods of charging the lead acid batteries. (10)

ii) The below Fig.2 and Fig.3 batteries are employed in car and truck respectively. Since both the batteries voltage are 12 V, if the car battery is fitted to the truck what will be the effect? (4)

Fig.2

Fig.3

22. a) With neat sketch demonstrate the pre-engaged starter construction and it's working. Also brief operation of inertia and sliding armature type starter motor drive units.

(OR)

b) (i) An exploded view of a typical alternator showing all of its internal parts in Fig.4 demonstrate the function of each components or systems shown. Also with necessary circuit diagram and waveform brief the diode conduction and blocking state in the diode assembly. (10)

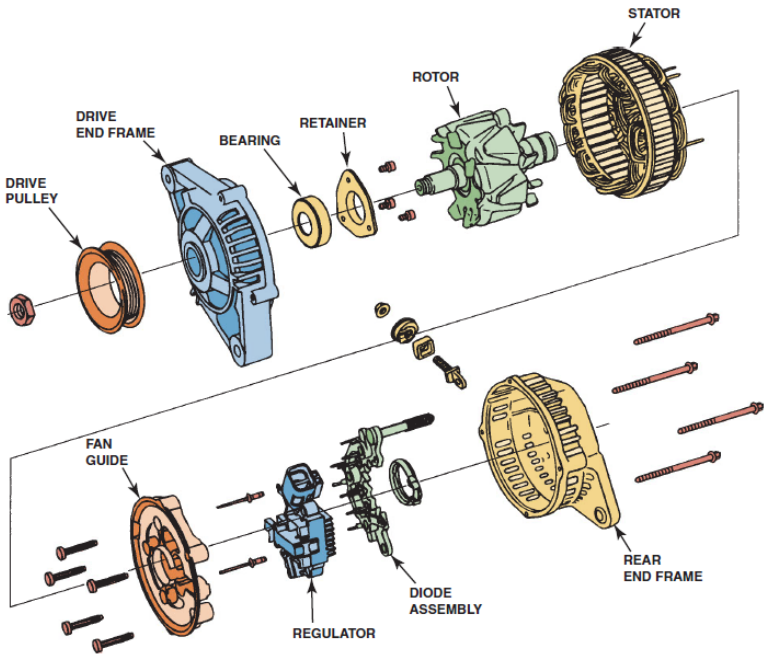


Fig.4

(ii) Majority of the modern day alternator fitted vehicles are employed with electronic regulator systems instead of mechanical regulator circuit. Justify. (4)

23. a) With a neat schematic illustrate the battery coil ignition systems for a typical four cylinder (in-line) engine. For the same brief about the firing order. Also calculate if the engine runs at 6000 rpm how many sparks per minute that would be applied by the distributor to all the four cylinders?

(OR)

b) Describe the construction and working of spark plug. Also explain the role of centrifugal and vacuum advance mechanism in the ignition distributor system.

24. a) Explain the construction and operation of distributor less ignition systems. Also by employing electronic control unit discuss with block diagram, how the sparks are applied in the spark plug based on the different physical parameters measured by the sensors fitted in the engine?

(OR)

b) (i) Demonstrate with neat sketch of capacitive discharge ignition system. (7)

(ii) Either with flowchart or block diagram discuss about the closed-loop control strategy for electronic ignition systems. (7)

25. a) Typical instrument clusters of a passenger car are shown in the Fig.5 brief the operation of each tells tales (parameters) which are shown. Also discuss locate the sensors position and operation if available for these tell tales.

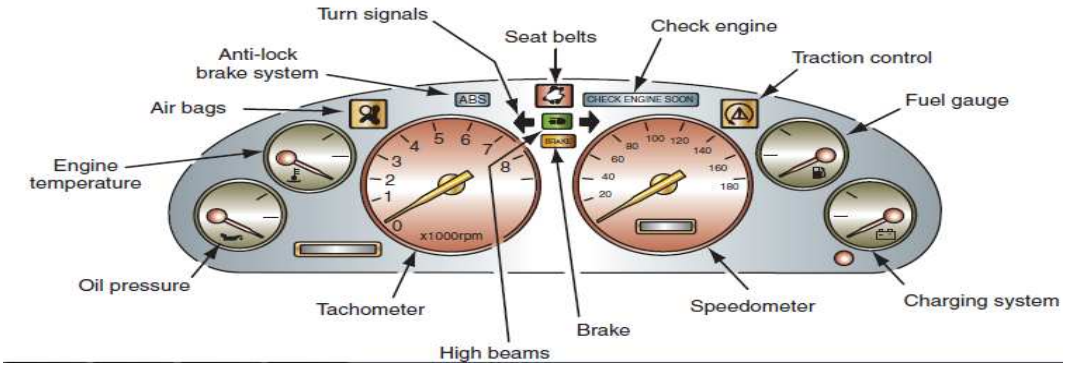


Fig.5

(OR)

b) (i) Illustrate with wiring diagram for high beam and low beam of head lamp lighting systems. (7)

(ii) List the functional requirements of windscreen wiping systems. Also discuss the linkage and wiring diagram for the same. (7)

****