Reg. No.									

MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
A Constituent Institution of Manipal University

V SEMESTER B.TECH. (AUTOMOBILE ENGINEERING)
END SEMESTER EXAMINATIONS, NOV/DEC 2016

SUBJECT: AUTOTRONICS [AAE 3151]
REVISED CREDIT SYSTEM
(24/11/2016)

Time: 3 Hours   MAX. MARKS: 50

Instructions to Candidates:

❖ Answer **ALL** the questions.
❖ Missing data may be suitable assumed.

1A. Classify sensors based on nature of contact and give examples of each of them. **(02)**

1B. Depict the characteristic curves of TPS. **(03)**

1C. Explain the construction & functioning of Zirconia Type Lambda Sensor with a neat sketch. **(05)**

2A. What is relay? State the main functions of relay. **(02)**

2B. A DC motor of 8 pole, lap wound is provided with $240V_{DC}$ Supply. The back emf generated by the motor is 120V, at speed of 500 rad/s. Find the Voltage Constant as well as the speed of the motor if a frictional torque of 20Nm acts on it. Torque Constant is 0.6 Nm/A, armature resistance is 1.5 Ω and armature current is 60 A. **(03)**

2C. Explain the following driving modes of stepper motors with the help of diagram **(05)**
    I. Single Coil Driving Mode
    II. Full Step Driving Mode
    III. Half Step Driving Mode

3A. Enumerate few important attributes while performing wiring harshness of a vehicle. **(02)**

3B. What is Ion Sensing Technique? How does it help in determining knock or misfire in a multi-cylinder engine? **(03)**

3C. The Sun roof Power Window motor which is connected to the battery has a **(05)** current rating of 15A and return path is given to the ground. The connection runs for 25ft from the Ignition switch. The battery generates a voltage of 13.2V when the engine is functioning. Suggest a suitable wire which will help in the proper working of the window.
(Reference Chart is Provided in next page.)

4A. What are different protocol layers in CAN Protocol? Mention their attributes. **(02)**

4B. What are the types of TPMS? Give the advantages and shortcomings of **(03)** them.

4C. What is CAN Protocol? Classify them based on the application and write **(05)** short notes on various protocol based on the transfer rates.

5A. What are network nodes? Draw a schematic diagram to show the **(02)** constituents of it.

5B. What is Schmitt Trigger? How does it support CKP? Explain with neat **(03)** schematic diagram

5C. What are components of Anti-lock braking system? Explain the different **(05)** operating positions of modulator.

AWG Gauge	Resistance Per 1000 Foot	Resistance Per Foot
20	10.3600 ohms	0.010360 ohms
18	6.5200 ohms	0.006520 ohms
16	4.0800 ohms	0.004080 ohms
14	2.5800 ohms	0.002580 ohms
12	1.6200 ohms	0.001620 ohms
10	1.0200 ohms	0.001020 ohms
8	0.6400 ohms	0.000640 ohms
6	0.4020 ohms	0.000402 ohms
4	0.2530 ohms	0.000253 ohms
2	0.1590 ohms	0.000159 ohms
1	0.1260 ohms	0.000126 ohms
0	0.1000 ohms	0.000100 ohms

Reference Chart