Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

IV SEMESTER B.TECH. (AUTOMOBILE ENGINEERING)

END SEMESTER EXAMINATIONS, April 2017

SUBJECT: Automotive Transmission System [AAE2251]

REVISED CREDIT SYSTEM
(19/04/2017)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

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

1A. Briefly discuss about different friction materials used on the driven Plate Clutches for heavy duty application. **(03)**

1B. State advantages and Limitation of electric drives. **(03)**

1C. Illustrate the working principle of electromagnetic clutch with neat sketch. **(04)**

2A. With a neat sketch explain construction and working of Janney's Hydrostatic drive. **(04)**

2B. A cone clutch with a cone Semi-angle of 12° is to transmit 11.19kW at 750rpm.The width of the face is $1/4^{th}$ of the mean diameter and the normal pressure between the contact faces is not to exceed 8.27×10^{4}Pa.Allowing the coefficient of friction of 0.2, determine the main dimensions of the clutch and the axial force required. **(03)**

2C. State the principle of electric drive conversion and explain the working of ward Leonard control system. **(03)**

3A. With neat sketch explain the constructional details of a synchromesh gear box and illustrate how speed synchronization occurs. **(04)**

3B. Explain the working of a centrifugal governor used in automatic transmission system. **(02)**

3C. What is Free wheel unit? List its application in automotive transmission systems and advantages. **(04)**

4A. Discuss any two technique for neutralizing the torque reactions of rear wheel driven automobile. **(05)**

4B. What is the critical speed of a shaft? What are the factors affecting the critical Speed of a propeller shaft? **(02)**

4C. Write classification of differential unit and explain the working of any one among them. **(03)**

5A. An epicyclic gear train consist of a sun wheel S, a stationary internal gear E and three identical planet wheels P carried on a star shaped planet carrier C.The size of different toothed wheels is such that the planet carrier C rotates at $1/5^{th}$ of the speed of the sun wheel S. The minimum number of teeth on any wheel is 16.The driving torque on the sun wheel is 98.1Nm.Determine (a) number of teeth on different wheels of the trains, and (b) torque necessary to keep the internal gear stationary. **(03)**

5B. The engine of a jeep is known to be able to provide 40.5kW for propulsion purpose. In a certain application, the jeep weighing 12459 N is required to pull a trailer of gross weight 10673 N at a speed of 57.75 Km/h in a top gear on level .The resistance to motion is given by the equation $R=aW+bV^2$ a=0.016,b=0.055 W is in N and V is in Km/h. Find out if the jeep is adequate for the job if the transmission efficiency is 90%.what is the pull in the coupling at this speed ?.If the suitable power is just utilized in top gear by suitably loading the trailer, What is the pull in the coupling at 57.75 Km/h . **(03)**

5C. Define (1) Rolling resistance, (2) draw bar pull, (3) Gradability, (4) Traction. **(04)**