Reg. No.										

Manipal Institute of Technology, Manipal

(A Constituent Institute of Manipal University)

VII SEMESTER B.TECH (AUTOMOBILE ENGINEERING)

END SEMESTER EXAMINATIONS, NOV/DEC 2016

SUBJECT: EARTH MOVING EQUIPMENTS AND FARM MACHINERY [AAE 473]

REVISED CREDIT SYSTEM

Time: 3 Hours (06/12/2016) MAX. MARKS: 50

Instructions to Candidates:

- Answer **ANY FIVE FULL** the questions.
- Missing data may be suitable assumed.

1A.	What are the applications of tractors? How are the tractors classified?	**(02)**
1B.	With a neat sketch, explain the working of a pressurized liquid cooled system used for I C engines	**(02)**
1C.	Illustrate the power transmission system of a hydraulic excavator with a relevant diagram.	**(03)**
1D.	Estimate the probable output for the 270 H P bulldozer fitted with a straight blade in banked cubic metres, dozing under the following conditions: (a) ground moderately hard - dry, frosty conditions; output modification factor assessed at 8% (b) terrain level- no grade or gravity factor; (c) operator efficiency - average(d) job efficiency - 50-minute working hour (e) average distance material to be moved - 80 metres. The manufacturer supplied data claims that output possible for 80 m of plant movement is 250 LCM/hr.	**(03)**
2A.	Discuss the salient features of different types of blades (any five) used on bull dozers.	**(03)**
2B.	What are the factors that affect the output of an earth moving equipment? Explain briefly	**(05)**
2C.	A tandem powered scraper of 400 HP with a 15 m^3 bowl capacity, excavates for 1 min, then travels 1000 m over a level haul road to spread- dump the load. Maneuvers and spread time averages 0.7min. Average haul speed is 40 kmph, what is the output of the scraper in LCM/hr	**(02)**
3A.	Explain the constructional details of an under carriage used in track type of dozers.	**(04)**
3B.	With a neat sketch, explain the essential features of a scraper.	**(04)**
3C.	What is a belt loader? Discuss the principle of working of such an equipment	**(02)**
4A.	What are graders? Where are they most suitable? Illustrate the working principle of such earth moving plants.	**(03)**
4B.	With a neat sketch, explain the essential features of a mould board plough used on tractors.	**(05)**
4C.	What is tillage? What are the objectives of tillage?	**(02)**
5A.	What are coulters? Discuss the details of a rolling type of coulter.	**(03)**
5B.	What are the advantages and dis advantages of disc plough?	**(02)**

5C. Calculate the size of a tractor to pull a four bottom 35 cm MB plough through a depth of 8 cm. The soil resistance is 0.8 kg/cm^2. The speed of the tractor is 5.5 kmph, transmission and tractive efficiency of the tractor being 80% and 30% respectively. **(03)**

5D. What are shovels? What are the factors that affect the output from a shovel? **(02)**

6A. What is harrowing? Explain the features of spring tyne harrows **(02)**

6B. Calculate the cost of operation of a 35 HP tractor per hour and hp hour.Initial cost is Rs. 5,50,000-00, life of the tractor is 12 years, number of working hours are 1200 per year, interest on the capital is 10%, cost of the diesel is Rs. 60 per litre, fuel consumption is 5 litres per hour, wages of the driver is Rs. 60,000/ year , lubricants cost is 35% of the fuel cost, repairs and replacements is 10% of initial cost; housing, taxes and insurance is 1.35% each of the initial cost. **(04)**

6C. Write short notes on (i) Tower cranes (ii) clamshell **(04)**