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EAG605

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : **180614**

Roll No.

B. Tech.

(SEM. VI) THEORY EXAMINATION, 2014-15

TRACTOR SYSTEM & CONTROL

Time : **3** Hours] [Total Marks : **100**

Note: The question paper is divided into three sections. Attempt each section. Assume data wherever necessary. The use of calculator is permitted.

SECTION - A

1 Attempt each short answer type question:

(a) What is the multiple disc clutch?

(b) What is Brake horse power (BHP).

(c) List the types of tractor steering mechanism.

(d) What do you mean by "Toe-in" on tractor?

(e) Define "Unit draft". Name the factors on which it depend.

(f) Define the "Rolling Resistance".

(g) What are the advantages of change speed gear?

(h) What do you mean by automatic hitching?

(i) Define the term "Ergonomics" with an example.

(j) Name the harmful effect of excessive Vibration to tractor driver.

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SECTION - B

2 Attempt any three parts of the following:

(a) What are the important considerations for ergonomic design of tractor seat?

(b) What is the design requirement for a tractor three point hitch system for farm machinery?

(c) Explain the depth and draft control of hydraulic system.

(d) Discuss Ackerman steering mechanisms with help of neat diagram.

(e) A 'diesel tractor consumes 6 liters/hour of high speed diesel fuel of 9000 kcal/lit heat value. Calculate the power available at the drawbar, if thermal efficiency is 32 per cent, mechanical 80 per cent and transmission 85 percent. Neglect rolling resistance and traction losses.

SECTION - C

3 Attempt all questions:

(a) What are crawler tractors? What are their constructional features?

OR

(a) Enumerate the design features of mechanical steering. How the control on Crawler tractor is ensured?

(b) What do you mean by fuel horse power? Calculate the BHP of a 4 cylinder, 4 stroke-cycle 'nternal combustion engine of 10 × 12.5 cm. The mean effective pressure is 7 kg persq.cm. The speed of engine is 1200 rpm. Assume mechanical efficiency as 80 per cent.

OR

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(b) What are the advantages of cone clutch? Give the design parameters.

(c) What are the factors affecting on traction?

OR

(c) Determine the traction force developed by a track type wheel 30 cm wide and 150 cm contact length weighing 15 kN moving on a soil having following parameters:

$C=1.3N/cm^2$; $K_c=3$; $\theta=28^0$; $n = 2$

Assume that lugs on the track are such that the soil is sheared off in a plane area of lugs.

(d) Define vibration. Explain the forced and free vibration.

OR

(d) Explain the methods by which noise pollution is controlled. What is the maximum theoretical pressure in dB that can exist.

(e) A tractor is taking a turn at a radius of 5.56 m on concrete road without application of break. The height of c.g. of tractor is 900 mm and the distance of c.g. from the tractor tipping axis is 600 mm. Calculate the critical turning speed of tractor at which lateral tipping of tractor would begin.

OR

(e) Define the terms: Coefficient of traction; Tractive efficiency; Tractive efforts and Travel reduction.
