

KERALA AGRICULTURAL UNIVERSITY

B.Tech (Agrl.Engg.) 2014 Admission
VI Semester Final Examination-July-2017

Cat. No: Fpme.3216

Marks: 50

Title: Tractor Systems and Controls (2+1)

Time: 2 hours

I Choose the most appropriate answer

(10x1=10)

- Centre to centre distance between front and rear wheel of a tractor is known as
 - Wheel base
 - Wheel tread
 - Equilibrium distance
 - None
- The device that is used for increasing and decreasing the speed of the tractor is
 - Gear box
 - Clutch
 - Differential
 - Crown gear box
- PTO speed of the modern tractors is
 - 1200 ± 10 rpm
 - 540 ± 10 rpm
 - 1000 ± 10 rpm
 - None
- Recommended inflation pressure for tractor front wheel is
 - 2 kg cm^{-2}
 - 3 kg cm^{-2}
 - 4 kg cm^{-2}
 - 5 kg cm^{-2}
- The device that converts rotary motion into reciprocating motion
 - Pitman
 - Cutter bar
 - Bevel gear box
 - Differential
- The term 'Ackerman' is associated with:
 - Gear box
 - Steering system
 - Diesel engine
 - Final Drive
- Cam and lever type steering system is present in
 - MF tractor
 - B 275 tractor
 - John Deere tractor
 - New Holland tractor
- The bearing that is present in the lower side of the kingpin is
 - Thrust bearing
 - Needle bearing
 - Ball bearing
 - Roller bearing

9. The value of toe-in varies in the range of
- 4 ± 2 mm
 - 5 ± 2 mm
 - 4 ± 3 mm
 - 4 ± 1 mm
10. The maximum draw bar hp of category-I tractor is
- Up to 45 hp
 - 50 – 65 hp
 - 60 – 65 hp
 - None

II Write short notes/answers on any FIVE of the following

(5x2=10)

- Quick attaching coupler for three point hitch system.
- Complete drive train of typical tractor.
- Power outlets of a tractor.
- Hydraulic steering of a tractor.
- Balancing of front and rear attached machinery for a tractor.
- Pull- torque-slip relation for wheels on soil.
- JIC symbols of hydraulic system.

III Write short answers on any FIVE

(5x4=20)

- Calculate the location of the centre of gravity for a tractor of the following dimensions

Wheel base	: 2300 mm
Radius of rear wheels	: 720 mm
Radius of front wheel	: 360 mm
Width of rear wheel	: 250 mm
Total weight of tractor	: 1800 kg
Weight carried by front wheel on level Ground	: 630 kg
Weight carried by front wheel when lifted 460 mm from ground	: 540 kg
- Explain the working principle of Differential in a tractor.
- Explain the functioning of automatic draft and position control system.
- Explain the working of a constant mesh gearbox of a tractor with a sketch.
- Explain the working and operation of single plate clutch.
- Explain the static equilibrium analysis for maximum achievable drawbar pull.
- Explain the factors affecting the comfort of tractor operator.

IV Write essay on any ONE

(1x10=10)

- Explain the construction and working principle of a Power tiller with a neat sketch.
- Describe the ergonomical consideration and operational safety in designing tractor.
 - Discuss the various controls of tractors in relation to anthropometrical measurements.
