Printed Pages: 4 **NAG-603**

(Following Paper ID and Roll No. to be filled in your Answer Books)	
Paper ID :	**Roll No.**

B.TECH.

Theory Examination (Semester-VI) 2015-16

TRACTOR SYSTEM & CONTROL

Time : 3 Hours ***Max. Marks : 100***

Note: The question paper is divided into three sections. Attempt all sections.

Section-A

1. Attempt all parts. (2×10 = 20)

(a) What are the possible causes of clutch noise in single disk clutch plate?

(b) What is synchronizer?

(c) Enlist basic components of fluid power transmission?

(d) How does power transmit from I C engine to rear wheel in tractors?

(e) What is principle of operation of differential?

(f) Explain the difference between Caster angle and Camber angle.

(g) What do you mean by rolling resistance and tractive efficiency?

(h) Write the harmful effects of excessive vibration to tractor driver?

(i) Indicate the symbols of following hydraulic circuit:

(i) Pressure relief valve (ii) Temperature Indicator

(j) Write the formula of maximum permissible drawbar pull (P) at which tractor will become unstable.

Section-B

2. Attempt any five parts. (10×5 = 50)

(a) Enlist different type hitches system with help of diagram? What is the design requirement for a tractor three point hitch system for farm machinery?

(b) Explain the Mohr-Coulomb Failure Criteria.

(c) Explain the working of automatic position control & draft control with suitable figure.

(d) Discuss important considerations for foot and hand control in tractor.

(e) A tractor has following specifications:-Total weight of tractor W = 25 KN, Wheel base L = 2170 mm, diameter of Rear wheel D_r =1450 mm, diameter of front wheel D_f = 740 mm, Weight of front wheel on level ground N_f = 8.5 KN, Weight on front wheels when lifted 420 mm above the ground, N_f' =7.5 KN. Determine location of CG.

(f) Describe the mathematical design of single disk clutch plate, both in case of uniform pressure condition & uniform wear condition?

(g) Explain P.T.O shaft & drive for P.T.O shaft in details.

(h) Explain the performance characteristics of hydrostatic transmission in different configurations

Section-C

Attempt any two questions. (15×2 = 30)

3. (i) Discuss mechanics of tractor chassis with the help of diagram.

(ii) Describe the principle of operation & function of differential in brief with neat schematic diagram.

4. (i) Enlist different types of gear box? Explain any one with its working principle?

(ii) Explain steering geometry in details? Draw the relevant diagram where ever is needed?

5. A tractor with a total weight of 30 kN having wheel base of 2200 mm has c.g located 800 mm ahead of centre of rear axle. It pulls a drawbar load of 16 kN at drawbar at an angle of 15° with the horizontal. The hitch point is located 400 mm above ground surface 300 mm behind the centre of rear axle. Calculate the reactions on rear and front wheels of tractor. Also calculate the weight transfer to rear wheel occurring due to above pull developed by the tractor.