

B TECH
(SEM-VI) THEORY EXAMINATION 2018-19
TRACTOR SYSTEM & CONTROLS

Time: 3 Hours**Total Marks: 100****Note:** Attempt all Sections. If require any missing data; then choose suitably.**SECTION A****1. Attempt all questions in brief. 2 x 10 = 20**

- a) How a constant mesh type gear box works?
- b) What are the main functions of the fly wheel?
- c) Describe traction theory.
- d) Explain basic principles of hydraulic system?
- e) How a differential lock works?
- f) What do you mean by hydraulic controls?
- g) Describe the role of a power tiller?
- h) What is wheel slip?
- i) Enlist different tests of a tractor.
- j) Enlist the objectives of ergonomics?

SECTION B**2. Attempt any three of the following: 10 x 3 = 30**

- a) What are the main components of a power tillers? Explain its working.
- b) Derive an expression for torque for single plate clutch.
- c) If it is desired to obtain 160 kg.m torques at the transmission output shaft, what gear ratio would be necessary if transmission efficiency is 96% and input torque is 15 kg.m.
- d) Determine the hourly cost of operating an international B 275 diesel tractor costing Rs. 2, 00,000. The tractor is owned by a farmer and expected to have a useful service life of 12 years when operated about 1000 hours every year. The tractor develops 35 bhp consumes 8 liters of fuel per hour at 3/4th load. The tractor weights 1627 kg. Assume that there is no overhead charge on the tractor.
- e) Explain the working principle of fluid coupling and torque converter with the help of neat sketches.

SECTION C**3. Attempt any one part of the following: 10 x 1 = 10**

- a) A tractor has 1.5 meter rear wheel diameter. If final drive gear ratio is 5:1 and differential gear ratio is 3:1, find the travelling speed of a tractor when the speed of the engine is 1250 rev/min and gear box reduction is 2:1.
- b) Write shorts notes on:
 - i. Traction efficiency
 - ii. Coefficient of traction

4. Attempt any one part of the following: 10 x 1 = 10

- a) A tractor has belt speed of 1000 rpm at normal engine speed. A feed mill has a recommended speed of 2200 rpm. Find the size of pulley, needed on the feed mill.
- b) What is the function of a differential in a tractor?

5. **Attempt any *one* part of the following:** **10 x 1 = 10**
- a) Define mechanics of tractor chasis with the help of diagram.
 - b) Write shorts notes on:
 - i. Camber angle
 - ii. Rolling resistance
6. **Attempt any *one* part of the following:** **10 x 1 = 10**
- a) What do you mean by transmission system of a tractor? What are the functions of the transmission system?
 - b) What do you understand by Final derive arrangement in a tractor?
7. **Attempt any *one* part of the following:** **10 x 1 = 10**
- a) A 25 hp tractor is running at 1000 rpm, total reduction of speed is 10:1; find the tractive force at each driving wheel, if the diameter of the driving wheel is 1.32 meters.
 - b) What is the principle of friction clutch? Explain the working of a single plate clutch with the help of diagram.