

16/05/19 (AN)

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B.E /B.Tech (FULL TIME) END SEMESTER EXAMINATION APRIL/MAY 2019

B.E AGRICULTURAL AND IRRIGATION ENGINEERING
VI SEMESTER
AI 8603 – TRACTOR AND FARM EQUIPMENTS
(Regulation 2012)

Time: 3 Hours

Answer ALL Questions
(11th question is compulsory)
PART-A (10 x 2 = 20 Marks)

Max. Marks 100

1. List at least four benefits of farm mechanization.
2. What is meant by zero tillage?
3. A tractor has 1.5 m rear wheel diameter. If the final drive gear ratio is 4:1 and differential gear ratio is 3:1. Find the travelling speed of the tractor when the speed of the engine is 1000 rpm and gear box reduction is 2:1.
4. Where are the crawler tractors preferred in farm activities?
5. What is the purpose of ploughing?
6. A three bottom 40 cm mould board plough has a working depth of 15 cm, draft is 1200 kg. If the working speed is 5 km/hr and field efficiency is 85%. How much is the power required to operate the plough?
7. A fluted seed drill has eight furrow openers of single disc type. The furrow openers are spaced 25 cm apart and main drive wheel has a diameter of 120 cm. How many turns of main drive wheel would occur when seed drill has covered 10000 sq.m area.
8. What is a ultra low volume sprayer? Where it commonly used?
9. List the improved types of manually operated fruit harvester.
10. List at least six types of earth moving equipments.

Part – B (5 x 16 = 80 marks)

11. Discuss in detail about the testing and safety rules of farm machines as per Indian standards under the following topics.
 - i) Advantages of standardization
 - ii) Testing
 - iii) Safety
 - iv) Commercial and confidential test of farm machines
 - 12.a)
 - i) What is the function of a Governor in tractor? Classify governing systems. (4 Marks)
 - ii) With a neat sketch explain the working of a centrifugal governor. (8 Marks)
 - iii) Find the percentage regulation in a governor if speed at no load is 1600 rpm and speed at load is 1200 rpm. (4 Marks)
- (OR)
- 12.b) Discuss the trouble shooting in tractors components their causes and remedies under the following headings:
 - i) Engine trouble
 - ii) Clutch slips
 - iii) Poor breaking
 - iv) Hydraulic system disc functioning.
 - 13.a)
 - i) What is a disc plough? Discuss the advantages and disadvantages of using a disc plough over mould board plough. What are the various types? (8 Marks)
 - ii) Calculate the energy in Kg-meter required to prepare one hectare of seed bed with following implements.
 - An indigenous plough cuts 10 cm deep and 20 cm wide triangular furrow and the unit draft is 0.5 kg/sq.cm of furrow cross section. Two ploughings are required.
 - Harrowing twice with 60 cm wide blade harrow having unit draft of 90 kg/meter width of harrow.
 - Leveling twice with a wooden leveler 3 meter long having draft of 40 kg /meter width. (8 Marks)

(OR)



- 13.b) i) What are the cultivators and how are they classified based on their power supply? (4 Marks)
ii) With a neat sketch show different types of shovels and sweeps and which type of agricultural operators are they used. (4 Marks)
iii) A five tine cultivator having tine spacing 8 cm working depth of 5 cm and speed is 3 km/hr. Turning loss is 10%. Soil resistance is 0.6 kg/cm^2 . Width of each furrow is 5 cm. Calculate
a) Time to cover one hectare
b) Maximum draft
c) Required power (8 Marks)
- 14.a) With neat sketch describe a combine harvester, thresher and discuss the functions, its components and advantages and disadvantages. (OR)
- 14.b) i) What is the use of a Duster in agricultural operations. What are the essential components of a duster? (8 Marks)
ii) What are the types of dusters and how to take care and maintain them. (8 Marks)
- 15.a) i) What is the objective of sowing operations. (4 Marks)
ii) List drills and dribblers used for planting various crops. (8 Marks)
iii) What are planters and list their types? (4 Marks) (OR)
- 15.b) List all the special crop harvesting equipment and discuss any two of them in detail.

