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EAG-501

B. Tech.

(SEM. V) (ODD SEM.) THEORY EXAMINATION, 2014-15

DESIGN OF AGRICULTURAL TRACTORS AND MACHINERY

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

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

SECTION-A

1   Attempt the following short answer type   **10×2=20** questions :

(a)   For which purposes the units straw walker and header are used?

(b)   What is the main advantage of load sensing system?

(c)   List the operations performed by self propelled combine harvester.

(d)   Name any two machine parts made from cast iron and soft centre steel.

(e) On what factor the performance of rasp bar cylinder with open gate depends upon.?

(f) From which material the seed rollers of seed cum ferti -drill is made up of.?

(g) Which material is used for piston rings? Show the heat treatment used for it.?

(h) Name any two most important functions of cooling system.

(i) Give any two applications of friction clutches.

(j) Why ground wheel is provided in manually operated seed-cum ferti seed drill?.

SECTION - B

2 Attempt any three parts of the following : 10×3=30

(a) Describe the step-by-step procedure of cylinder designing.

(b) Design a seed cum fertilizer drill for 35 H.P. Tractor. Assume necessary data.

(c) Explain the forces acting on the tillage implements with the help of a neat diagram.

(d) What are the essential parts and their working of a combine harvester? What design should be kept in mind to minimize grain losses?

(e) How will you classify hydraulic cylinders? With the help of neat sketch explain the design of single acting type hydraulic cylinder.

SECTION - C

3   Attempt any five questions :   **10×5=50**

(a)   Describe the design considerations of vertical conveyor reaper? What are the total forces acting on a standard reciprocating knife cutter bar of a bullock operated VCR. The bullocks are operating at a speed of 3.6 km/hr. Assume any other data required.

(b)   Design a tractor drawn disc plough for 40 H.P. tractor to be operated in medium soil conditions up to a depth of 17.5 cm. Assume the required data.

(c)   Explain the mechanics of hitching of primary tillage machineries from a tractor?

(d)   A two stroke four cylinder engine having bore diameter of 250mm and stroke length 500 mm is working at 150 rpm. The mean effective pressure is 7 kg/cm^2. The mechanical efficiency is 86%. Calculate IHP, BHP and stroke bore ratio.

(e)   Explain the basic components of fluid power transmission and Automatic draft control system of a tractor.

(f)   Define "Traction". What are the factors affecting traction? Explain in detail.

(g) Write short notes on:

(i) Design of threshing machines..

(ii) Annealing and case hardening.

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