



(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 180858

Roll No.

| | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|
| | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|

B. Tech.

(SEM. VIII) THEORY EXAMINATION, 2014-15

TRACTOR DESIGN PRINCIPLES

Time : 3 Hours]

[Total Marks : 100

Note : Attempt each question. Assume data wherever necessary.
The use of calculator is permitted.

SECTION - A

1 Answer the following short answer type **10×2=20**

questions :

- For what purpose air cleaner is used ? Mention its advantages.
- Briefly show the actions performed by a combine.
- What do you mean by specific fuel consumption of a tractor?
- What do you mean by hitching? What are the types of hitching ?
- What is the function of Thermostat valve?
- What do you mean by agricultural tractor? Name any six tractors commonly used in India?

- (g) Define primary tillage. Mention the objectives of primary tillage.
- (h) Give main specifications of any five tractors manufactured in India.
- (i) What is the difference between I.H.P. and B.H.P.?
- (j) How performance of a Rasp-bar cylinder of wheat thresher depends?

SECTION-B

- 2 Attempt any three questions : **10×3=30**
- (a) A Massey Ferguson 1035 diesel tractor has a three cylinder, four stroke engine (one power stroke for two revolutions)with cylinder bore = 88.9 mm, stroke = 127 mm, compression ratio 16.5 : 1, belt horse power = 32 and engine speed = 2000 rpm, calculate :
 - (i) Piston displacement.
 - (ii) Displacement volume
 - (iii) Piston speed
 - (iv) Stroke-bore ratio.
 - (b) What are the functions of a connecting rod? What are their components ? Design the big end section of a connecting rod for 25 HP Tractor.
 - (c) What are the modern features of an ideal air cleaner? How will you estimate the quantity of air intake by the engine?
 - (d) What are the forces acting on tillage implements? Explain with the help of a figure. Also discuss the implements of tillage?
 - (e) Explain the historical development of agricultural tractors in India.

SECTION - C

3 Attempt all parts of the following : 10×5=50

- (a) What are the important test conditions of a tractor?
How belt performance test differ from drawbar performance test?

OR

Explain the principle of Hydraulic control system with the help of a diagram.

- (b) For what purposes the radiator in a vehicle is used.
Mention the important parameters of designing of a radiator depends?

OR

A gear pump operating at a speed of 2200 rpm developing a pressure Of 10 MPa requires input power of 10.70 KW. Its torque efficiency taken as 70%. Calculate the oil flow rate of pump in lit/min and its displacement volume/ revolution. Also calculate theoretical disadvantages of pump if its volumetric efficiency is 80%.

- (c) What are disc angle and tilt angle ? Design a disc plough for 35 H.P. Tractor. Assume the necessary data.

OR

Explain the design of mechanical power transmission of agricultural tractors.

- (d) Design cylinder head and stud for liner for a vertical four stroke diesel engine which has following specifications:
- (i) BHP =10
 - (ii) RPM =1000
 - (iii) IMEA=3.5 kg/cm²
 - (iv) Mech. Efficiency: 0.8

OR

Design a cast iron piston for a four cylinder tractor engine with following specifications:

- (i) Cylinder bore = 100 mm
 - (ii) Stroke = 120 mm
 - (iii) Speed = 2200 rpm.
 - (iv) Max. gear pressure = 50 Kg / cm²
 - (v) EMEP = 6.5 Kg/cm²
 - (vi) Fuel consumption = 0.17 kg/bhp/hr.
- (e) Give a procedure for balanced design for stability of a tractors.

OR

How will you calculate /hour cost of operation of a 35 H.P. Tractor ?