

**Maharashtra Institute of Technology, Aurangabad**

(An Autonomous Institute)

END SEMESTER EXAMINATION

**Second Year B.Tech (Agricultural Engineering) – Feb/Mar-2023**

Course Code : AED-202

Course Name : Tractor Systems and Controls

Duration : 2 Hrs

Max. Marks : 50

Date : 03 FEB 2023

Instructions :

- i) All questions are compulsory  
 ii) Assume suitable data wherever necessary and clearly state it  
 iii) Figures to right indicate full marks

Q. 1	Answer any five(Marks:10)	Marks	CO	BL	PI
a)	What do you mean by Firing order and Firing Interval	2	5	1	
b)	Describe classification of tractor on the basis power	2	4	2	
c)	Differentiate between two stroke and four stroke engine	2	2	2	
d)	What do you mean by power train and gear train	2	2	1	
e)	Classify different sources of farm power	2	1	2	
f)	Match the following: <b>Tractor System</b> i. Clutch ii. Gear box iii. Cooling system iv. Hydraulic brake <b>Component</b> a. Synchronizer b. Pressure plate c. Master cylinder d. Radiator	2	3	2	
g)	Define constant pressure cycle and draw its neat sketch.	2	1	1	
h)	Define depreciation cost and variable cost	2	6	1	
Q.2	Give detail classification of engine and explain different components of engine with their functions	8	2	2	
Q.3	What is the purpose of cooling system? Explain forced circulation water cooling system in tractor with their components and neat sketch. Also Write maintenance required in cooling system of tractor.	8	3	2	
Q.4	a) Explain battery ignition system with their components	4	3	2	
	b) A Four cylinder four stroke diesel engine has a cylinder diameter of 20 cm, stroke-bore ratio is 1.45, clearance volume $4508 \text{ cm}^3$ , engine speed 250 rpm, mean effective pressure $6.8 \text{ kg/cm}^2$ and mechanical efficiency is 75%. Calculate (i) IHP, (ii) BHP (iii) Compression ratio and (iv) Swept volume	4	1	3	
Q.5	a) What do you mean by tractor power outlets explain functions of different tractor power outlets	4	1	2	

	b) Explain hydraulic system in tractor with their components <b>OR(optional)</b>	4	3	2	
<b>Q.5</b>	What do you mean by clutch? Explain working of clutch with their components Also write maintenance required in clutch system.	8	2	2	
<b>Q.6</b>	Find the cost of using a tractor per hour when the cost of 35 hp tractor is Rs. 3, 00,000 life of tractor is 10 year, rate of interest 10% and working hours per year is 1000 hours. (Assume- Hosing, insurance and taxes cost each @ 1% of initial cost, fuel consumption- 6 litres/hour, cost of diesel- 24 rs/litre, cost of lubrication- 30% of fuel cost Repair and maintenance cost-6% of capital cost per year, Wages of operator- 150 rs/day <b>OR(optional)</b>	8	6	3	
<b>Q.6</b>	a) Find the speed ratio between crank shaft speed and rear axle speed for a tractor with 115 cm rear wheel diameter running at a speed 4 km /hr and engine speed of 2200 rev/min.	4	2	3	
	b). Explain working of differential unit with its components	4	4	2	