GIET UNIVERSITY, GUNUPUR – 765022

B. Tech (Fifth Semester – Regular) Examinations, December – 2022

BPCAG5012 – Farm Machinery and Equipment – I
(AGE)

Time: 3 hrs   Maximum: 70 Marks

Answer ALL Questions
The figures in the right hand margin indicate marks.

PART – A: (Multiple Choice Questions)   **(1 x 10 = 10 Marks)**

		[CO#]	[PO#]
Q.1.	Answer **ALL** questions		
a.	Of the following, which are the primary tillage implements	CO3	PO2
	i. Chisel plough and disc harrow ii. Chisel plough and subsoiler		
	iii. Disc plough and disc harrow iv. Leveller and clod crusher		
b.	An implement that pulled and guided by single hitch point of a tractor is	CO3	PO3
	i. Trailed implement ii. Mounted implement		
	iii. Semi mounted implements iv. Self-propelled		
c.	Ploughing is done to	CO2	PO2
	i. Improve soil aeration ii. Increase water holding capacity		
	iii. Destroy weeds iv. All are correct		
d.	The front edge of the share which makes horizontal cut in the soil is		
	i. Cutting edge ii. wing		
	iii. Shin iv. gunnel		
e.	A wheel used for maintaining uniform depth of ploughing in different soil is	CO1	PO2
	i. Transport wheel ii. Gage wheel		
	iii. Land wheel iv. Furrow wheel		
f.	A point at which the resultant of all horizontal and vertical forces acts at	CO3	PO4
	i. Centre of resistance ii. Centre of pull		
	iii. Line of pull iv. Centre of gravity		
g.	The vertical clearance of the MB plough ranges from		
	i. 2 to 5 mm ii. 3 to 5 mm		
	iii. 2 to 5 cm iv. 3 to 5 cm		
h.	Tilt angle of standard disc plough varies from	CO2	PO4
	i. 15 - 25 ° ii. 25-35°		
	iii. 35-42° iv. 42-45°		
i.	The procedure of testing seed drill for correct seed rate is	CO1	PO5
	i. Metering ii. Calculation		
	iii. Calibration iv. Any of these		
j.	The metering mechanism suitable for metering small and large seeds is	CO3	PO4
	i. Fluted roller ii. Internal double run type		
	iii. Cell feed type iv. Cup feed type		

PART – B: (Short Answer Questions)   **(2 x 10 = 20 Marks)**

		[CO#]	[PO#]
Q.2.	Answer **ALL** questions		
a.	Discuss the scope of farm mechanization in India?	CO1	PO2
b.	What is tillage? What are the main objectives of tillage?	CO2	PO2
c.	What is difference between trailed, semi-mounted and mounted implements?	CO2	PO5
d.	Total draft of four bottom, 40cm MB plough when ploughing 17,5cm deep at 5.5 km/h speed is 1700kg, field efficiency is 75%? Calculate unit draft and actual power required?	CO3	PO3

e. Write short notes on: (i) Theoretical field capacity (ii) Effective field capacity	CO2	PO1
f. Describe the functions of following parts: (i) Spool (ii) Frog (iii)scraper (iv) jointer	CO3	PO2
g. What are the different adjustments, repairs and maintenance of disc plough?	CO3	PO2
h. Describe about horizontal and vertical clearance in mouldboard?	CO2	PO2
i. What do you understand by chisel plough, subsoiler and rotary plough?	CO1	PO2
j. What are the functions of harrows?	CO1	PO2

PART – C: (Long Answer Questions)   (10 x 4 = 40 Marks)

Answer **ALL** questions

	Marks	[CO#]	[PO#]
3. a. Write short notes on: (i) Coulter (ii) Gauge wheel (iii) Cleavage edge of the share (iv) Tilt angle (v) Crown of furrow.	5	CO1	PO2
b. Describe the different components of a desi plough with the help of a neat sketch.	5	CO2	PO2
	(OR)		
c. What is a seed drill and what are the functions of a seed drill? Explain seed drill with a neat sketch.	5	CO2	PO2
d. Line of pull of a MB plough is 15° with the horizontal and is in vertical plane which is at an angle of 12° with the direction of travel. Cal. The required pull & side draft, if draft of plough is 1000kg.	5	CO1	PO2
4. a. A farmer purchased a tractor of 45kW power at total cost of 6,00,000/-. The fuel consumption the tractor was 6 litres/h at the ploughing speed of 5km/h. calculate the cost of operation of tractor/hr. Assume interest=10% of capital cost, houses taxes & insurance = 3% of capital cost, lubricants@30% of fuel cost, fuel cost= Rs. 90/lt, Wages @ Rs. 250/- per day for 8 hours. Assume other data, if necessary.	5		
b. What are the forces acting upon a tillage implement? Describe the force Analysis of the implement with a suitable diagram and formulas.	5	CO1	PO2
	(OR)		
c. A fluted feed seed drill has eight furrow openers of single disc type. The furrow openers are spaced 25cm apart and the main drive wheel ha diameter of 120cm. how many turns of main drive wheel would occur when the seed rill has covered one hectare of area?	5	CO2	PO2
d. What are the different parts of a MB plough? Describe its different parts with a neat diagram?	5	CO3	PO2
5. a. How many acres can be covered by a harrow of 1.5m width in a day of 8 hours with bullock power. if each spike of the harrow in giving 1 kg resistance when there are 50 spikes. What power would be necessary for the bullocks to pull the harrow? Assume speed of bullock (4 km/hr)	5	CO2	PO2
b. Describe the different methods of heat treatment?	5	CO2	PO2
	(OR)		
c. Describe different types of seed metering mechanism in a seed drill.	5	CO2	PO2
d. Explain the procedure of calibration of a seed drill	5	CO3	PO2
6. a. What are the different methods of tractor ploughing? What do you understand by round ploughing? Explain with a neat sketch	5		
b. A five tyne cultivator having tine spacing 8 cm, working depth of 5 cm and speed is 3 km/h. Turning loss is 10%. Soil resistance is 0.6 kg/cm2. Width of each furrow is 5 cm. Calculate: (i) Time require to cover one hectare (ii) Maximum draft (iii) Required Power	5	CO3	PO3
	(OR)	CO2	PO4
c. A four bottom MB plough cuts rectangular furrow each 25 cm wide and 15 cm deep. Calculate the actual field capacity, if the plough operates at a speed of 5 km/h with field efficiency of 80%.	5	CO3	PO2
d. What are the different types of cast iron? What are their properties?	5	CO3	PO2

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