SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution)

SRM Nagar-Kattankulathur –603203

DEPARTMENT OF AGRICULTURAL ENGINEERING

QUESTION BANK

VIII SEMESTER

1902805 FARM POWER AND MACHINERY MANAGEMENT

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UNIT- I: INTRODUCTION TO FARM POWER AND DESIGN CRITERIA

Modern trends, principles, procedures, fundamentals and economic considerations for design and development of farm power and machinery systems - Reliability criteria in design and its application.

Q.NO	QUESTIONS PART-A	BT LEVEL	COMPETENCE
1.	Define farm power.	BT-1	Remembering
2.	List the sources of farm power used in modern agriculture.	BT-1	Remembering
3.	What is meant by mechanization of agriculture?	BT-2	Understanding
4.	State the need for farm machinery in agriculture.	BT-1	Remembering
5.	Define design criteria in farm machinery development.	BT-2	Understanding
6.	What is meant by reliability in engineering design?	BT-2	Understanding
7.	State any two modern trends in farm power utilization.	BT-1	Remembering
8.	What is system approach in farm machinery design?	BT-2	Understanding
9.	Define economic life of a farm machine.	BT-1	Remembering
10.	What is meant by initial cost of farm machinery?	BT-2	Understanding
11.	Define operating cost with an example.	BT-1	Remembering
12.	What is depreciation in farm machinery economics?	BT-2	Understanding
13.	State the purpose of cost–benefit analysis in machinery selection.	BT-1	Remembering
14.	What is meant by standardization in farm machinery design?	BT-2	Understanding
15.	Define factor of safety.	BT-1	Remembering
16.	What is reliability index?	BT-1	Remembering
17.	State the importance of ergonomics in farm machinery design.	BT-1	Remembering
18.	What is meant by design procedure?	BT-1	Remembering
19.	Define maintenance cost.	BT-1	Remembering
20.	What is break-even point in farm machinery economics?	BT-2	Understanding
21.	What is meant by useful life of a farm machine?	BT-2	Understanding
22.	State any two principles of good machine design.	BT-1	Remembering
23.	Define availability of a machine.	BT-1	Remembering
24.	What is meant by probability of failure?	BT-2	Understanding

25.	State two advantages of mechanized farm operations.	BT-2	Understanding
Q.NO	**QUESTIONS PART-B**	**BT LEVEL**	**COMPETENCE**
1.	Explain the modern trends in farm power and machinery systems and their impact on agricultural productivity.	BT-3	Applying
2.	Describe the principles of farm machinery design with suitable examples.	BT-4	Analyzing
3.	Explain the procedure for design and development of farm machinery systems.	BT-3	Applying
4.	Analyze the economic considerations involved in selecting farm power sources.	BT-4	Analyzing
5.	Discuss the fundamentals of farm machinery design, emphasizing strength, safety and durability.	BT-3	Applying
6.	Explain the concept of reliability and its importance in farm machinery design.	BT-3	Applying
7.	Analyze different reliability criteria used in the design of farm power machines.	BT-3	Applying
8.	Apply reliability concepts to improve the performance of a farm implement of your choice.	BT-4	Analyzing
9.	Discuss the role of economic analysis in the design and development of farm machinery.	BT-4	Analyzing
10.	Explain the cost components of farm machinery and their influence on design decisions.	BT-4	Analyzing
11.	Analyze the trade-off between reliability and cost in farm machinery design.	BT-4	Analyzing
12.	Explain how factor of safety and reliability are related in machinery design.	BT-3	Applying
13.	Apply design principles to justify the selection of materials for farm machinery components.	BT-5	Evaluating
14.	Discuss the importance of system approach in farm power and machinery development.	BT-4	Analyzing
15.	Analyze the impact of mechanization on farm efficiency and economics.	BT-4	Analyzing
16.	Explain the steps involved in economic evaluation of farm machinery with a suitable example.	BT-5	Evaluating
17.	Analyze how modern design procedures improve reliability and service life of farm machinery.	BT-3	Applying
Q.NO	**QUESTIONS PART-C**	**BT LEVEL**	**COMPETENCE**
1.	Explain modern trends in farm power and machinery system design.	BT-4	Analyzing
2.	Describe the principles and procedures involved in the design of farm power and machinery systems.	BT-4	Analyzing
3.	Elaborate the fundamentals of farm machinery system design.	BT-3	Applying
4.	Explain the economic considerations in farm power and machinery system design.	BT-4	Analyzing
5.	Detail reliability criteria in engineering design and their application to farm power and machinery systems.	BT-5	Evaluating

UNIT-II: MACHINERY MANAGEMENT

Maintenance and scheduling of operations. Replacement of old machines, repair and maintenance of agricultural machinery, inventory control of spare parts, work study, productivity, method study.First order Markov chains and their applications in sales forecasting and in problems of inventory control and modeling of workshop processes and quality control.

Q.NO	QUESTIONS PART-A	BT LEVEL	COMPETENCE
1.	Define maintenance of agricultural machinery	BT-1	Remembering
2.	What is meant by preventive maintenance?	BT-1	Remembering
3.	Define breakdown maintenance.	BT-1	Remembering
4.	What is operation scheduling?	BT-2	Understanding
5.	State the objective of maintenance scheduling.	BT-1	Remembering
6.	Define replacement of machinery.	BT-1	Remembering
7.	What is meant by economic replacement period?	BT-2	Understanding
8.	Define repair cost.	BT-1	Remembering
9.	What is inventory control?	BT-2	Understanding
10.	Define spare parts inventory.	BT-1	Remembering
11.	What is meant by EOQ (Economic Order Quantity)?	BT-2	Understanding
12.	Define work study.	BT-2	Understanding
13.	What are the two components of work study?	BT-2	Understanding
14.	Define method study.	BT-1	Remembering
15.	What is meant by productivity?	BT-2	Understanding
16.	State any two factors affecting productivity.	BT-1	Remembering
17.	Define time study.	BT-2	Understanding
18.	What is a Markov process?	BT-1	Remembering
19.	Define first order Markov chain.	BT-1	Remembering
20.	What is meant by transition probability?	BT-2	Understanding
21.	Define state of a system in Markov chains.	BT-1	Remembering
22.	What is sales forecasting?	BT-1	Remembering

23.	What is meant by quality control?	BT-2	Understanding
24.	Define workshop process modeling.	BT-1	Remembering
25.	State any two applications of Markov chains in agricultural engineering	BT-2	Understanding
Q.NO	**QUESTIONS PART-B**	**BT LEVEL**	**COMPETENCE**
1.	Explain the maintenance and scheduling of operations in agricultural machinery systems.	BT-3	Applying
2.	Discuss different types of maintenance used for farm machinery and their advantages.	BT-4	Analyzing
3.	Explain the criteria for replacement of old agricultural machines with suitable examples.	BT-4	Analyzing
4.	Analyze the economic factors influencing machinery replacement decisions.	BT-5	Evaluating
5.	Explain the repair and maintenance practices followed for agricultural machinery.	BT-3	Applying
6.	Discuss the importance of inventory control of spare parts in farm machinery management.	BT-3	Applying
7.	Explain EOQ and other inventory control techniques applied to spare parts management.	BT-3	Applying
8.	Analyze the role of work study in improving farm machinery productivity.	BT-4	Analyzing
9.	Explain the steps involved in method study with a suitable example.	BT-4	Analyzing
10.	Discuss the factors affecting productivity of agricultural machinery operations.	BT-4	Analyzing
11.	Explain the concept of first order Markov chains and their basic properties.	BT-4	Analyzing
12.	Apply first order Markov chains for sales forecasting with a suitable illustration.	BT-5	Evaluating
13.	Analyze the application of Markov chains in inventory control problems.	BT-4	Analyzing
14.	Explain how Markov chains are used in modeling workshop processes.	BT-3	Applying
15.	Discuss the application of Markov chains in quality control systems.	BT-4	Analyzing
16.	Analyze the advantages and limitations of Markov chain models in agricultural machinery management.	BT-4	Analyzing
17.	Explain how maintenance planning and inventory control together improve operational efficiency.	BT-5	Evaluating
Q.NO	**QUESTIONS PART-C**	**BT LEVEL**	**COMPETENCE**
1.	Explain maintenance and scheduling of operations in agricultural machinery systems.	BT-3	Applying
2.	Discuss replacement criteria for old machines and the principles of repair and maintenance of farm machinery.	BT-4	Analyzing
3.	Explain inventory control of spare parts in farm machinery workshops**,** including EOQ and ABC analysis.	BT-3	Applying
4.	Describe work study, productivity, and method study techniques in agricultural machinery operations.	BT-4	Analyzing
5.	Explain first-order Markov chains and their applications in sales forecasting, inventory control, workshop modeling, and quality	BT-5	Evaluating

	control.		

UNIT-III: SYSTEM APPROACH

System approach in farm machinery management and application of programming techniques to the problems of farm power and machinery selection.

Q.NO	QUESTIONS PART-A	BT LEVEL	COMPETENCE
1.	Define a system in the context of farm machinery management.	BT-1	Remembering
2.	What is meant by system approach?	BT-2	Understanding
3.	State the components of a farm machinery system.	BT-1	Remembering
4.	Define subsystem with an example.	BT-1	Remembering
5.	What is meant by input in a farm machinery system?	BT-2	Understanding
6.	Define output of a system.	BT-1	Remembering
7.	What is feedback in system approach?	BT-2	Understanding
8.	What is meant by boundary of a system?	BT-2	Understanding
9.	Define objective function.	BT-1	Remembering
10.	What is meant by decision variable?	BT-2	Understanding
11.	Define constraint in programming problems.	BT-1	Remembering
12.	What is optimization?	BT-2	Understanding
13.	What is meant by linear programming?	BT-2	Understanding
14.	Define non-linear programming.	BT-1	Remembering
15.	What is dynamic programming?	BT-2	Understanding
16.	Define integer programming.	BT-1	Remembering
17.	What is meant by resource allocation problem?	BT-2	Understanding
18.	Define machinery selection problem.	BT-1	Remembering
19.	What is meant by cost minimization?	BT-2	Understanding
20.	What is meant by profit maximization?	BT-2	Understanding
21.	State the need for system approach in farm machinery management.	BT-1	Remembering
22.	What is meant by simulation?	BT-2	Understanding
23.	Define deterministic model.	BT-1	Remembering

24.	Define stochastic model.	BT-1	Remembering
25.	State any two advantages of programming techniques in farm power management.	BT-1	Remembering
Q.NO	**QUESTIONS PART-B**	**BTLEVEL**	**COMPETENCE**
1.	Explain the concept of system approach in farm machinery management with suitable examples.	BT-4	Analyzing
2.	Discuss the importance and advantages of system approach in managing farm power and machinery.	BT-3	Applying
3.	Explain the elements of a farm machinery system and their interactions.	BT-4	Analyzing
4.	Analyze the role of feedback and control in system approach.	BT-3	Applying
5.	Explain how linear programming can be applied to farm machinery selection problems.	BT-3	Applying
6.	Formulate a linear programming model for optimal selection of farm power sources.	BT-4	Analyzing
7.	Analyze the constraints affecting farm machinery selection using system approach.	BT-3	Applying
8.	Explain the application of dynamic programming in farm machinery management.	BT-4	Analyzing
9.	Discuss the use of integer programming in machinery allocation and selection.	BT-4	Analyzing
10.	Explain how system approach helps in cost minimization of farm operations.	BT-4	Analyzing
11.	Analyze the trade-off between machinery cost and field capacity using programming techniques.	BT-4	Analyzing
12.	Explain the role of simulation models in farm power planning.	BT-5	Evaluating
13.	Apply programming techniques to solve a resource allocation problem in agriculture.	BT-4	Analyzing
14.	Analyze the limitations of system approach in farm machinery management.	BT-3	Applying
15.	Explain the steps involved in applying system approach to farm machinery decision making.	BT-5	Evaluating
16.	Discuss the integration of system approach and programming techniques in farm mechanization planning.	BT-4	Analyzing
17.	Explain the concept of system approach in farm machinery management with suitable examples.	BT-3	Applying
Q.NO	**QUESTIONS PART-C**	**BT LEVEL**	**COMPETENCE**
1.	Explain the system approach in farm machinery management and its major components.	BT-4	Analyzing
2.	Discuss the need for a system approach in farm power and machinery management.	BT-3	Applying
3.	Explain the application of programming techniques in farm machinery selection.	BT-5	Evaluating
4.	Describe the use of integer and dynamic programming in farm power planning and machinery selection.	BT-4	Analyzing
5.	Explain the formulation of programming models for farm machinery selection and their limitations.	BT-5	Evaluating

UNIT-IV: PLANNING OF MACHINERY

Time and motion study, Man-machine task system in farm operations, planning of work system in agriculture, Computer application in selection of power units and to optimize mechanization system.

Q.NO	QUESTIONS PART-A	BT LEVEL	COMPETENCE
1.	Define time study.	BT-1	Remembering
2.	What is meant by motion study?	BT-2	Understanding
3.	State the objective of time and motion study.	BT-1	Remembering
4.	Define work cycle.	BT-1	Remembering
5.	What is standard time?	BT-2	Understanding
6.	Define allowances in time study.	BT-1	Remembering
7.	What is meant by rating factor?	BT-2	Understanding
8.	Define man–machine system.	BT-1	Remembering
9.	What is a man–machine chart?	BT-2	Understanding
10.	Define idle time.	BT-1	Remembering
11.	What is meant by task system in farm operations?	BT-2	Understanding
12.	Define work system planning.	BT-1	Remembering
13.	State the importance of planning of work system in agriculture.	BT-1	Remembering
14.	What is meant by field efficiency?	BT-2	Understanding
15.	Define machine utilization factor.	BT-1	Remembering
16.	What is mechanization index?	BT-2	Understanding
17.	Define optimization in mechanization planning.	BT-1	Remembering
18.	What is meant by computer application in farm machinery planning?	BT-2	Understanding
19.	Define power unit selection.	BT-1	Remembering
20.	What is meant by decision support system (DSS)?	BT-2	Understanding
21.	Define input data for mechanization planning models.	BT-1	Remembering
22.	What is meant by output performance indicators?	BT-2	Understanding
23.	State any two advantages of computer-aided machinery planning.	BT-1	Remembering
24.	Define simulation model in farm operations.	BT-1	Remembering

25.	What is meant by optimal mechanization system?	BT-2	Understanding
Q.NO	**QUESTIONS PART-B**	**BTLEVEL**	**COMPETENCE**
1.	Explain the principles and procedure of time study applied to farm operations.	BT-4	Analyzing
2.	Describe the motion study techniques used to improve efficiency in agricultural work.	BT-3	Applying
3.	Analyze the importance of time and motion study in planning farm machinery operations.	BT-4	Analyzing
4.	Explain the man–machine task system with a suitable farm operation example.	BT-2	Understanding
5.	Analyze the interaction between man and machine in farm operations.	BT-3	Applying
6.	Explain the use of man–machine charts in improving operational efficiency.	BT-3	Applying
7.	Discuss the planning of work systems in agriculture for different farm operations.	BT-3	Applying
8.	Explain how work system planning improves labor and machinery utilization.	BT-4	Analyzing
9.	Describe the criteria for selection of power units for agricultural operations.	BT-4	Analyzing
10.	Explain the role of computer applications in selecting appropriate power units.	BT-4	Analyzing
11.	Analyze how computer-based models help in optimizing mechanization systems.	BT-4	Analyzing
12.	Explain the steps involved in optimization of mechanization systems.	BT-5	Evaluating
13.	Apply computer techniques to plan a mechanized system for a typical farm.	BT-3	Applying
14.	Analyze the constraints involved in mechanization planning.	BT-4	Analyzing
15.	Explain the advantages and limitations of computer-aided mechanization planning.	BT-5	Evaluating
16.	Discuss the role of simulation models in planning agricultural operations.	BT-3	Applying
17.	Analyze how proper planning of machinery improves productivity and reduces cost.	BT-5	Evaluating
Q.NO	**QUESTIONS PART-C**	**BT LEVEL**	**COMPETENCE**
1.	Explain time study and motion study techniques and their role in improving efficiency in farm operations.	BT-3	Applying
2.	Describe the man–machine task system in agriculture and its importance in achieving optimum productivity.	BT-4	Analyzing
3.	Explain the planning of work systems in agriculture, including work measurement, labor allocation, and scheduling.	BT-3	Applying
4.	Discuss the application of computers in selecting farm power units for power matching and capacity planning.	BT-5	Evaluating
5.	Explain the use of computer applications in optimizing agricultural mechanization systems with respect to cost and productivity.	BT-3	Applying

UNIT-V: ECONOMIC ANALYSIS

Energy conservation - performance and power analysis - cost analysis of machinery - fixed cost and variable costs, effect of inflation on cost; selection of optimum machinery and replacement criteria- Break-even analysis, reliability and cash flow problems; mechanization planning

Q.NO	QUESTIONS PART-A	BTLEVEL	COMPETENCE
1.	Define energy conservation in agricultural machinery.	BT-1	Remembering
2.	What is meant by performance analysis of machinery?	BT-2	Understanding
3.	Define power analysis.	BT-1	Remembering
4.	What is specific fuel consumption?	BT-2	Understanding
5.	Define cost analysis of farm machinery.	BT-1	Remembering
6.	What is meant by fixed cost?	BT-2	Understanding
7.	List any two components of fixed cost.	BT-1	Remembering
8.	Define variable cost.	BT-1	Remembering
9.	State any two examples of variable costs.	BT-1	Remembering
10.	What is meant by inflation?	BT-2	Understanding
11.	Define optimum machinery selection.	BT-1	Remembering
12.	What is meant by replacement criteria?	BT-2	Understanding
13.	Define break-even analysis.	BT-1	Remembering
14.	What is break-even point?	BT-2	Understanding
15.	Define reliability in economic analysis.	BT-1	Remembering
16.	What is meant by cash flow?	BT-2	Understanding
17.	Define net present worth (NPW).	BT-1	Remembering
18.	What is benefit–cost ratio?	BT-2	Understanding
19.	Define payback period.	BT-1	Remembering
20.	What is meant by annual cost of machinery?	BT-2	Understanding
21.	Define mechanization planning.	BT-1	Remembering
22.	What is meant by life cycle cost?	BT-2	Understanding
23.	State any two benefits of energy-efficient machinery.	BT-1	Remembering
24.	What is meant by depreciation?	BT-2	Understanding
25.	State two objectives of economic analysis in farm machinery management.	BT-1	Remembering
Q.NO	QUESTIONS PART-B	BTLEVEL	COMPETENCE
1.	Explain the concept and importance of energy conservation in agricultural mechanization.	BT-3	Applying

2.	Describe the methods used for performance and power analysis of farm machinery.	BT-4	Analyzing
3.	Analyze the cost structure of agricultural machinery with suitable examples.	BT-3	Applying
4.	Explain the fixed and variable costs involved in machinery operation and ownership.	BT-2	Understanding
5.	Analyze the effect of inflation on machinery cost and replacement decisions.	BT-3	Applying
6.	Explain the criteria for selection of optimum machinery for a given farm.	BT-4	Analyzing
7.	Discuss the economic principles involved in machinery replacement decisions.	BT-3	Applying
8.	Explain break-even analysis and its application in farm machinery economics.	BT-4	Analyzing
9.	Analyze the relationship between reliability and economic performance of machinery.	BT-4	Analyzing
10.	Explain the concept of cash flow analysis in farm machinery investment.	BT-4	Analyzing
11.	Apply net present worth method to evaluate a farm machinery investment.	BT-4	Analyzing
12.	Analyze the payback period and benefit–cost ratio in machinery selection.	BT-5	Evaluating
13.	Explain the role of economic analysis in mechanization planning.	BT-3	Applying
14.	Analyze the trade-off between energy efficiency and cost in farm machinery selection.	BT-5	Evaluating
15.	Explain the life cycle cost analysis of agricultural machinery.	BT-3	Applying
16.	Discuss the reliability and cash flow problems associated with mechanization planning.	BT-5	Evaluating
17.	Analyze how economic analysis supports sustainable and profitable mechanization planning.	BT-3	Applying
Q.NO	**QUESTIONS PART-C**	**BT LEVEL**	**COMPETENCE**
1.	Explain energy conservation and performance analysis of agricultural machinery.	BT-3	Applying
2.	Discuss cost analysis of farm machinery, including fixed and variable costs and the effect of inflation.	BT-4	Analyzing
3.	Explain the selection of optimum machinery and replacement criteria used in farm mechanization.	BT-5	Evaluating
4.	Discuss break-even analysis, reliability, and cash flow problems in machinery investment decisions.	BT-5	Evaluating
5.	Explain mechanization planning in agriculture and its importance in efficient farm power management.	BT-3	Applying