SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution)

SRM Nagar, Kattankulathur– 603 203

DEPARTMENT OF AGRICULTURE ENGINEERING

QUESTION BANK

VII SEMESTER

1902701 SOIL AND WATER CONSERVATION ENGINEERING

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SUBJECT: SOIL AND WATER CONSERVATION ENGINEERING
SEM / YEAR: 07 /IV

UNIT-I: SOIL EROSION PRINCIPLES **9**

Approaches to soil conservation – Soil conservation in India - Erosion – Agents -Causes - Mechanics of water erosion – Soil erosion problems - Types of water erosion: Raindrop erosion, Sheet erosion, Rill erosion, Gully erosion, Stream bank erosion –Classification of Gully – Gully Control Structures: Drop Spillway, Drop Inlet, Chute Spillways - Prerequisites for soil and water conservation measures.

PART - A

Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1	List at least four causative factors of land degradation.	BT-1	Remembering
2	What causes accelerated soil erosion all over the world?	BT-3	Applying
3	How will you classify soil erosion?	BT-2	Understanding
4	Demonstrate understanding of accelerated erosion.	BT-3	Applying
5	Categorize soil erosion according to erosion agents.	BT-2	Understanding
6	List out the factors influencing soil erosion.	BT-1	Remembering
7	Write the biological factors that affects soil erosion.	BT-3	Applying
8	Describe about mechanics of water erosion.	BT-1	Remembering
9	List out the types of water erosion.	BT-1	Remembering
10	Write short notes on splash erosion.	BT-3	Applying
11	Describe about sheet erosion.	BT-1	Remembering
12	Write the difference between rill erosion and gully erosion.	BT-2	Understanding
13	What do you understand about stream bank erosion?	BT-3	Applying
14	Define gully erosion.	BT-1	Remembering
15	In what way gullies are developed?	BT-4	Analysing
16	Describe the four stages of gully development.	BT-1	Remembering
17	Based on size, how gullies are classified?	BT-2	Understanding
18	States the principle of Gully control.	BT-1	Remembering
19	List out the types of gully control measures.	BT-1	Remembering
20	What are the engineering gully control measures?	BT-3	Applying
21	What is drop spillway?	BT-3	Applying
22	Give the merits of chute spillway.	BT-2	Understanding
23	List any four uses of drop spillway.	BT-1	Remembering
24	Draw drop inlet spillway and its components.	BT-1	Remembering
25	Define chute spillway.	BT-1	Remembering

PART - B

Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1	Explain the problems arising due to soil erosion.	BT-2	Understanding
2	State the importance of soil conservation practices.	BT-1	Remembering
3	Detail various types of soil erosion.	BT-5	Evaluating
4	Elaborate the agents causing soil erosion with neat sketch.	BT-2	Understanding
5	Demonstrate different forms of water erosion.	BT-3	Applying
6	Explain different types of water erosion.	BT-2	Understanding
7	Detail different types of gullies.	BT-2	Understanding
8	How the runoff can be controlled in gully.	BT-2	Understanding
9	Detail different types of TGCS.	BT-4	Analysing
10	Design the notch dimensions of a wooden slab dam to carry a peak flow of 0.6 m3/sec. The notch has rectangular opening. Width of gully channel is 2.5 m.	BT-3	Applying
11	Detail salient features and planning of PGCS.	BT-4	Analysing
12	Elaborate design procedure of PGCS.	BT-2	Understanding
13	Explain drop spillway components and functions.	BT-4	Analysing
14	Determine the size of concrete pipe needed in a drop-inlet spillway for a peak flow of 2 m3/s and a total head of 3 m. Determine the slope to be given to the pipe for the pipe to flow full. Length of pipe = 12 m, entrance loss coefficient Ke = 0.5 and friction loss coefficient Kc = 0.03.	BT-3	Applying
15	Detail the design procedure for drop spillway.	BT-5	Evaluating
16	Demonstrate drop inlet spillway components	BT-3	Applying
17	Differentiate drop and chute spillway.	BT-5	Evaluating
18	Explain design features of chute spillway.	BT-4	Analysing

PART - C

Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1	Define Soil erosion and its necessity for consideration.	BT-5	Evaluating
2	Detail the history of soil conservation in India.	BT-4	Analysing
3	Elaborate the factors influencing water erosion.	BT-2	Understanding
4	Explain in detail about vegetative measures of gully control.	BT-5	Evaluating
5	Detail various types of PGCS.	BT-4	Analysing

UNIT-II: ESTIMATION OF SOIL EROSION **9**

Runoff computation for soil conservation: SCS-CN method – Evolution of Universal Soil LossEquation: Applications and Limitations – Modified Universal Soil Loss Equation –Revised Universal Soil Loss Equation- Permissible erosion – Land use capability classification - Classification of eroded soils.

PART - A

Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1	State the importance of SCS-CN method.	BT-1	Remembering
2	List out the Factors influencing SCS curve number.	BT-1	Remembering
3	What are the various hydrological soil groups?	BT-3	Applying
4	Define Antecedent Moisture Condition.	BT-1	Remembering

5	Write fundamental hypotheses of SCS-CN method.	BT-1	Remembering
6	List out AMC classes.	BT-1	Remembering
7	Brief about land use cover.	BT-4	Analysing
8	How rainfall intensity influences Curve Number.	BT-2	Understanding
9	Give the advantages of SCS - CN method.	BT-5	Evaluating
10	What is the scope of SCS method?	BT-3	Applying
11	Write short notes on sediment yield.	BT-4	Analysing
12	State the importance of USLE.	BT-2	Understanding
13	Write Modified USLE with explained terms.	BT-4	Analysing
14	How will you calculate rainfall erosive factor?	BT-2	Understanding
15	What is soil erodibility factor?	BT-3	Applying
16	Define topographic factor.	BT-1	Remembering
17	Give the stages of crop management factor.	BT-4	Analysing
18	State support practice factor.	BT-1	Remembering
19	List out the uses of USLE.	BT-1	Remembering
20	Illustarate limitations of USLE.	BT-4	Analysing
21	Differentiate USLE and RUSLE.	BT-2	Understanding
22	Write MUSLE expression.	BT-4	Analysing
23	Define Runoff factor.	BT-1	Remembering
24	Give the factors influencing land capability classificaton.	BT-4	Analysing
25	In a 23 ha catchment, soil erosion is to be evaluated. The following information for the catchment is available. Calculate the soil loss. • R = 1000 (MJ-mm/ha) (mm/h) per year • K = 0.25 M/ha/R • LS = 0.1 • Contour - farming in 13 ha (P = 0.6) • Strip cropping in 9 ha (P = 0.3) • Crops are maize and cowpea (assume weighted C= 0.5)	BT-3	Applying

PART - B

Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1	How will you determine curve number based on SCS method?	BT-2	Understanding
2	State the Advantage, Scope and Limitation of SCS-CN Method.	BT-4	Analysing
3	Detail possible prediction errors related to the use of single composite CN values.	BT-3	Applying
4	How will you estimate soil loss?	BT-2	Understanding
5	Brief about USLE equation.	BT-4	Analysing
6	Compare and contrast rainfall erosivity and soil erodibility factors.	BT-2	Understanding
7	How will you identify different land use classes in field.	BT-2	Understanding
8	Detail soil classification with respect to various parameters.	BT-3	Applying
9	Write short notes on climatic and wetness limitations.	BT-4	Analysing
10	Describe coupled SCS CN method with USLE.	BT-3	Applying
11	Compare and contrast USLE and RUSLE.	BT-2	Understanding

12	Brief about RUSLE.	BT-2	Understanding
13	Demonstrate about MUSLE.	BT-6	Creating
14	Write the difference between RUSLE and MUSLE.	BT-2	Understanding
15	Detail about crop management factor.	BT-5	Evaluating
16	Explain the importance of topographic factor in USLE.	BT-3	Applying
17	Write the roles of crop management factor in USLE.	BT-4	Analysing
18	Brief the terms slope, Soil depth and Available Moisture-Holding Capacity (AMC).	BT-4	Analysing

PART - C

Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1	Detail the factors affecting SCS Curve Number.	BT-2	Understanding
2	Elaborate about USLE equation with its factors.	BT-3	Applying
3	Explain in detail about the limitations of USLE.	BT-5	Evaluating
4	Detail different land use capability classes.	BT-2	Understanding
5	Brief about land use capability sub classes.	BT-4	Analysing

UNIT-III: EROSION CONTROL MEASURES **9**

Agronomic practices: contour cultivation - strip cropping – tillage practices – Soil management practices – Bunding: Types and design specifications - Mechanical measures for hill slopes – Terracing: Classification and design specification of bench terrace – Grassed waterways: Location, construction and maintenance – Types of temporary and permanent gully control structures.

PART - A

Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1	State the term contour.	BT-1	Remembering
2	What do you understand about agronomic practices?	BT-2	Understanding
3	Where will you implement contour cultivation?	BT-4	Analysing
4	List out the merits of contour farming.	BT-1	Remembering
5	Define strip cropping.	BT-1	Remembering
6	List out the importance of strip cropping	BT-1	Remembering
7	What are the types of strip cropping?	BT-3	Applying
8	What do you understand about buffer strips?	BT-2	Understanding
9	Under what conditions strip cropping can be applied?	BT-3	Applying
10	How Does Conservation Tillage Reduce Erosion?	BT-2	Understanding
11	What is conservation tillage?	BT-3	Applying
12	How Do Conservation Tillage Practices Lead to Agricultural Sustainability?	BT-2	Understanding
13	State the term zero till.	BT-1	Remembering
14	How will you classify bunds?	BT-4	Analysing
15	State the limitation of contour bund.	BT-1	Remembering
16	What are the mechanical measures we can provide in hill slopes?	BT-2	Understanding
17	Classify terraces.	BT-2	Understanding
18	Write the suitability of a broad base terrace.	BT-4	Analysing
19	How will you maintain the bench terrace?	BT-2	Understanding
20	Write the purpose of a grassed waterway.	BT-4	Analysing

21	What do you understand about ballasting?	BT-3	Applying
22	Define gully.	BT-1	Remembering
23	Based on size, how the gullies are classified?	BT-2	Understanding
24	What are the principles of gully control?	BT-3	Applying
25	Draw a neat sketch illustrating waterfall erosion at gully head.	BT-1	Remembering

PART - B

Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1	Detail the strip cropping practice in erosion control.	BT-5	Evaluating
2	Describe contour cultivation causes and benefits.	BT-4	Analysing
3	Explain the benefits and limitations of tillage practices.	BT-2	Understanding
4	Illustrate types of tillage and its suitability.	BT-2	Understanding
5	Brief about contour bunds.	BT-5	Evaluating
6	Demonstrate graded bund.	BT-3	Applying
7	Differentiate different types of bunds.	BT-2	Understanding
8	Brief about earth work and area lost due to bunding.	BT-2	Understanding
9	Write short notes on terraces.	BT-2	Understanding
10	Detail bench terrace and its types.	BT-5	Evaluating
11	How will you assess the area lost due to terracing?	BT-2	Understanding
12	On a 20% hill slope, it is proposed to construct bench terraces. If the vertical interval of	BT-3	Applying
13	Terrace is 2 m, calculate (i) length of terrace per hectare, (ii) earth work required per hectare, and (iii) area lost per hectare both for vertical cut and batter slope of 1:1. The cut should be equal to fill.	BT-5	Evaluating
14	Explain the components involved in maintenance of bench terraces.	BT-5	Evaluating
15	Detail the construction procedure for grassed waterway.	BT-4	Analysing
16	List out the steps involved in maintenance of grassed waterway.	BT-2	Understanding
17	Give the design criteria of TGCS.	BT-5	Evaluating
18	Brief about planning of design and salient features of PGCS.	BT-4	Analysing

PART - C

Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1	Elaborate agronomic practices of soil erosion control.	BT-5	Evaluating
2	Explain in detail about conservation tillage and its types.	BT-2	Understanding
3	Detail step by step design procedure for bunds.	BT-2	Understanding
4	Brief about design specifications of bench terrace.	BT-5	Evaluating
5	Design a grassed waterway of parabolic shape to carry a flow of 2.6 m3/s	BT-6	Creating

UNIT-IV: WATER CONSERVATION MEASURES **9**

In-situ soil moisture conservation – Water harvesting principles and techniques: Micro catchments, catchment yield using morphometric analysis - Farm ponds: Components, Design, Construction and Protection – Check dams - Earthen dam – Retaining wall.

PART - A

Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1	Define the term in situ moisture conservation.	BT-1	Remembering
2	List out the in-situ moisture conservation techniques.	BT-1	Remembering
3	Draw micro catchment.	BT-1	Remembering
4	List out the functions of micro catchment.	BT-1	Remembering
5	What is water harvesting?	BT-3	Applying
6	State runoff.	BT-1	Remembering
7	Brief about macro catchment water harvesting.	BT-4	Analysing
8	Explain the term Spate Irrigation.	BT-2	Understanding
9	How runoff can be differentiated from flood water harvesting.	BT-2	Understanding
10	State the term farm pond.	BT-1	Remembering
11	Write the types of farm ponds.	BT-2	Understanding
12	What are the various components of farm pond?	BT-3	Applying
13	How can the volume of a farm pond be assessed?	BT-2	Understanding
14	Write the formula for Catchment and cultivable area ratio.	BT-1	Remembering
15	What is morphometric analysis of watershed?	BT-3	Applying
16	Explain bifurcation ratio.	BT-4	Analysing
17	Give a short note on the relief ratio.	BT-2	Understanding
18	How can the form factor be calculated?	BT-2	Understanding
19	Differentiate dam and retaining wall.	BT-2	Understanding
20	Write the factors to be considered while designing a check dam.	BT-4	Analysing
21	Under what circumstances will the retaining wall be constructed?	BT-3	Applying
22	Write any five components of earthen dam.	BT-4	Analysing
23	List out the type of drains.	BT-1	Remembering
24	Write the purpose of Hawksley's expression.	BT-5	Evaluating
25	Give the formula for cut off trench bottom width.	BT-4	Analysing

PART - B

Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1	Write soil condition and bunding options for in situ moisture conservation.	BT-5	Evaluating
2	Write the importance of water harvesting technique.	BT-4	Analysing
3	Describe different types of water harvesting.	BT-2	Understanding
4	Detail long term runoff harvesting structures.	BT-5	Evaluating
5	Brief about flood water harvesting methods.	BT-4	Analysing
6	Elaborate groundwater harvesting and its types.	BT-5	Evaluating
7	Detail different types of farm pond.	BT-2	Understanding
8	With a neat sketch, explain about the dugout pond.	BT-5	Evaluating
9	Write optimization procedure for different farm pond dimensions.	BT-4	Analysing

10	Brief about the check dam and its classification with durability check.	BT-4	Analysing
11	Explain about brushwood dams and its types.	BT-3	Applying
12	Demonstrate various types of retaining wall.	BT-2	Understanding
13	Explain the components of earthen dam.	BT-1	Remembering
14	Write short notes on various types of earthen dam.	BT-4	Analysing
15	Give the design criteria for earthen dam.	BT-3	Applying
16	Illustrate merits and demerits of earthen dam.	BT-3	Applying
17	Compare and contrast earthen and check dams.	BT-2	Understanding
18	Demonstrate the factors that differentiate retaining walls from dams.	BT-3	Applying

PART - C

Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1	Detail in situ moisture conservation techniques.	BT-4	Analysing
2	Demonstrate various water harvesting techniques.	BT-3	Applying
3	Explain design procedure of farm pond.	BT-5	Evaluating
4	Elaborate various morphometry parameters.	BT-3	Applying
5	Write the design procedure for retaining walls.	BT-2	Understanding

UNIT-V: SEDIMENTATION **9**

Sediment: Sources – Types of sediment load – Mechanics of sediment transport –Estimation of bed load – Sediment Graph - Reservoir sedimentation: Basics - Factors affecting sediment distribution pattern, Rates of reservoir sedimentation - Silt Detention Tanks – sediment control methods.

PART - A

Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1	Define the term sedimentology.	BT-1	Remembering
2	Describe the sedimentation process.	BT-1	Remembering
3	Write the different sources of sedimentation.	BT-2	Understanding
4	Draw a sediment diagram.	BT-1	Remembering
5	Give any five factors that are influencing sedimentation.	BT-2	Understanding
6	Draw a relationship between sediment yield and watershed area.	BT-2	Understanding
7	What are the four modes of particle transport?	BT-3	Applying
8	Define boundary layer.	BT-1	Remembering
9	Write the various types of sediment transport.	BT-2	Understanding
10	Illustrate the Hjulstrom curve.	BT-3	Applying
11	List out the factors that govern suspended load.	BT-1	Remembering
12	How are the sediment particles categorized during transport?	BT-5	Evaluating
13	Write the importance of sediment graphs.	BT-4	Analysing
14	Draw a neat sketch of a sediment graph.	BT-1	Remembering
15	Why do we need to consider reservoir sedimentation?	BT-4	Analysing
16	List out the influencing factors of reservoir sedimentation.	BT-1	Remembering
17	Define trap efficiency.	BT-1	Remembering

18	Explain sediment delivery ratio.	BT-5	Evaluating
19	What is the post constructive measures of reservoir sedimentation?	BT-3	Applying
20	Write the importance of design capacity.	BT-2	Understanding
21	Brief about silt detention tanks.	BT-4	Analysing
22	Define the term reservoir constriction.	BT-1	Remembering
23	Give the merits of the detention tank.	BT-5	Evaluating
24	List out the steps involved in detention tank design.	BT-1	Remembering
25	Write Schoklitch formula.	BT-2	Understanding

PART - B

Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1	Detail the sources of sedimentation.	BT-4	Analysing
2	Explain the factors affecting sedimentation.	BT-5	Evaluating
3	Brief about bed load.	BT-4	Analysing
4	Write short notes on suspended load.	BT-2	Understanding
5	Demonstrate about dissolved load.	BT-6	Creating
6	How can the bed load be measured?	BT-2	Understanding
7	In what way, suspended load can be estimated?	BT-3	Applying
8	Compare wash load and bed load.	BT-2	Understanding
9	Differentiate suspended and dissolved load.	BT-2	Understanding
10	Write short notes on any five losses due to sedimentation.	BT-2	Understanding
11	Illustrate equal discharge increment method with formula.	BT-3	Applying
12	How will you estimate the rate of sedimentation in a reservoir?	BT-4	Analysing
13	Detail pre constructive measure of reservoir sedimentation.	BT-5	Evaluating
14	Brief any five factors affecting sedimentation of reservoir.	BT-4	Analysing
15	Explain equal width increment method.	BT-5	Evaluating
16	Elaborate sediment graph and its importance with a neat sketch.	BT-3	Applying
17	Describe the basics of reservoir sedimentation.	BT-4	Analysing
18	Detail the analytical method of bed load estimation.	BT-5	Evaluating

PART - C

Q.NO	QUESTIONS	BT LEVEL	COMPETENCE
1	Describe the losses due to sedimentation in water resources.	BT-5	Evaluating
2	Elaborate different types of sediment transport mechanism.	BT-4	Analysing
3	Write down the estimation procedure of reservoir sedimentation.	BT-2	Understanding
4	Detail the factors affecting reservoir sedimentation.	BT-2	Understanding
5	How will you calculate bedload and suspended load?	BT-3	Applying