

SECTION A

Do not
write in
this margin

Q1: a) Environmental Impact Assessment (EIA) is a process of evaluating the likely environment impact of a proposed project or development taking into account inter-related socio-economic, cultural and human health. /2 marks

V1

b) Impact of soil erosion control on environment

- Improve Land aesthetic /0,5 marks
 - Improve soil stability /0,5 marks
 - Ecosystem preservation /0,5 marks
 - Reforestation /0,5 marks
 - Carbon sequestration /0,5 marks
 - Water preservation /0,5 marks
 - Soil conservation /0,5 marks
- Consider any four

4 marks

Q2: 5 advantages of collecting information relative to climatic conditions

- To identify type of erosion found in that ~~area~~ ^{area.} /1
- To identify land vocation (better use of land) /1
- To identify appropriate soil erosion control method to be applied /1
- To identify tools and Equipment needed /1
- To identify proper time to start activities of controlling soil erosion /1
- Help to define challenges at work place /1
- Help to determine soil lost through runoff /1

Each correct answer equal 1 mark
Consider any five

5 marks

- Q3:
- a) False /1mark
 - b) False /1mark
 - c) True /1mark
 - d) True /1mark
 - e) True /1mark

5marks

Q4: Transit theodolite | Merit transit theodolite

The telescope can rotate (revolve) a complete revolution in horizontal axis /1.5marks

The telescope can not rotate (revolve) it stays in one position /1.5marks

3marks

Q5. Any two advantages of bench terraces in Rwanda

- Control soil erosion (control run-off) /1mark
 - Increase production /1mark
 - Make land productive (more intensive cropping) /1mark
 - Provide fodder for animals /1mark
 - Increase soil fertility /1mark
 - Gives good looking (aesthetic) /1mark
 - Generate job /1mark
- Consider two correct answer

Any two disadvantages of bench terrace in Rwanda

- It is very expensive /1mark
- It requires skilled /1mark
- It reduces cultivable land /1mark
- It takes long time to establish /1mark

Consider any two.

4marks

Q6: six criteria to consider when selecting tools and equipment to be used in fertilizer application

- Type of fertilizer / 0.5 marks
 - Type of crop / 0.5 marks
 - stage of crop growth / 0.5 marks
 - types of soil / 0.5 marks
 - topography / 0.5 marks
 - cost / 0.5 marks
 - weather condition / 0.5 marks
 - Availability of tools and Equipments / 0.5 marks
- Consider any six elements

3 marks

Q7: Methods of soil sampling are:

- Zig-zag / 0.5
 - Traverse / diagonal / 0.5
 - Random sampling / 0.5
 - circular / ring / 0.5
 - Grid / spot / 0.5
 - Transect / Line / 0.5
 - systematic sampling / 0.5
- stratified sampling / 0.5
- consider any four

2 marks

Q8: Four environmental problems associated with fertilizers ^{use} are:

- Ground water contamination
- Eutrophication
- Air contamination
- Acid rain and ammonia redeposition
- global warming
- Fluorosis in animals
- Ozone depletion, stratospheric
- Itai-itai (ouch-ouch) disease

Each correct answer equal 1 mark Consider any 4

4 marks

Q9: Positive impact of fertilizer application are:
on environment

- Recycling of waste /1
 - soil erosion control /1
 - soil structure improvement /1
 - feeding of soil fauna and flora /1
- each correct answer equal 1 mark
Consider any two

Negative impact of fertilizer application on environment are:

- water pollution /1
 - Air pollution /1
 - loss of wild biodiversity /1
 - out break of new pests and diseases /1
 - loss of genetic biodiversity /1
- Consider any Two

4 marks

Q10: ways soil loose nutrients are:

- leaching
 - soil erosion
 - Monocropping
 - over cultivation
 - Change of soil pH (acidic or basic) of soil affect fertility
 - Burning of vegetation (destroys organic matter and soil structure)
 - Continuous cropping
 - Accumulation of salts (nutrients are fixed by soil)
 - Harvesting (nutrient are removed by harvested product)
 - Leaching = plant nutrients are lost beyond the reach of plant root.
 - soil erosion: top soil is lost by the agent of erosion eg wind, water
 - Monocropping: each crop has specific nutrients
 - Continuous cropping, over use of land without fallowing.
- Consider four ways

4 marks

Q11: Method of liquid fertilizer application are:

Do not write in this margin

- a) - - - starter solution / 1 mark
- Foliar application / 1 mark
- Fertigation application through irrigation / 0.5
- Injection into soil / 1 mark
- Aerial application / 1 mark

Consider any two.

b) Characteristics of inorganic fertilizers are.

- It is delivered from no living things //
- It is manufactured in dry, liquid or gaseous forms //
- Nutrients are in soluble form quickly available for plant use. //
- They are caustic to growing plants //
- they can cause injury //
- Nutrients are well calculated. //

Consider any three

5 marks

Q12: a) Soil sampling is collection of soil from different location of the field and taking them to the laboratory for analysis
/ 2 marks

b) Aims of soil sampling are:

- Determination of soil pH or lime requirement / 0.5
- Determination of soil texture / 0.5
- Determination of soil fertility status / 0.5
- Determination of soil organic matter / 0.5
- Determination of soil NPK / 0.5
- Determination of soil type / 0.5
- Determination of soil density / 0.5
- Determination of soil porosity / 0.5
- Determination of soil moisture / 0.5
- " of type of fertilizer / 0.5
- " of type of crop to be grown //

5 marks

Consider any six.

Q13: Precaution measures when using chemical fertilizers are:

Do not write in this margin

- Wear PPE when using chemicals ✓
- Don't eat or drink when using chemicals ✓
- Don't use one empty container for any other purpose ✓
- Keep chemicals out of reach of children and live stocks, and away from food cupboard ✓
- Store chemicals in their original container ✓
- Read all labels carefully before using chemicals ✓
- Use recommended rate (dose) and method of application ✓
- Keep appropriate records for chemical application ✓
- Do not taste or inhale their vapour ✓
- Wash your hand after using chemicals ✓
- Avoid applying chemicals on windy or rainy day ✓
- Avoid chemical spillage as it can pollute water sources ✓
- Empty container should be disposed off promptly and safely ✓
- Do not wear leather gloves or boots as leather can absorb chemicals ✓
- Do not spray chemicals immediately before harvest ✓

each answer is 1 mark Consider only five

5 marks

Q14:

a) Height of collimation = RL of BM + \cancel{BS} of point A

$$= 50 \text{ m} + 2.435 \text{ m} = 52.435 \text{ m}$$

b) Reduced level of station point B = HOC - \cancel{FS} of point B

$$= 52.435 \text{ m} - 1.650 \text{ m}$$

$$= 50.785 \text{ m}$$

4 marks

Q 15: Given Horizontal distance HD = 160 m
Vertical distance VD = 24 m.

$$\text{Slope } (\%) = \frac{24}{160} \times 100 = 15\% \quad /1.5 \text{ marks}$$

$$\text{Slope } (‰) = \frac{24}{160} \times 1000 = 150 ‰ \quad /1.5 \text{ marks}$$

3 marks

Section B

Q 16: * 4 practices applied to maintain the biological soil erosion control measures.

* Fertilization of fixing plant /1.5 most of fixing plants are legumes and are able to fix atmospheric nitrogen so when you add fertilizers on these plant they grow well /1
/2.5 marks

* Weeding of fixing plant /1.5 weeding of fixing plant reduce competition between weeds and fixing plant /1
/2.5 marks

* Pruning of fixing plant /1.5 removal of some plant parts which are diseased, deformed increases viability of fixing plant /1
/2.5 marks

* Zero grazing /1.5 animals can destroy fixing plant so we must protect fixing plant from animals /1
/2.5 marks

Q17: a)

Bench terrace	Progressive terrace
- Very expensive //	- Not Expensive //
It is done once for all //	- It is done continuously //
use Horizontal cultivation	use vertical cultivation //
No presence of ditches //	presence of continuous and discontinuous ditches //
Effective soil erosion control after completion //	Not effective soil erosion control take more time. //
Fertilizer/manure is fully use //	not fully used //
Its establishment is limited by type of soil //	can be established everywhere //
cultivation is easy //	cultivation is difficult //
Consider any three	Consider any three

b) Bands = are heaps of soil constructed along the contours and planted with grasses on top // 2 marks

The heaped soil reduces the speed of running water and encourages sedimentation

Ridges : are ~~heaps~~ ^{heaps} of soil put across a garden to reduce surface run-off //

Ridges are different from band in a way that no grass is planted on top // 2 marks

Ridges are used in growing carrot, Irish potatoes & sweet potatoes

Remarks

Q.18:

Sandy soil
Particle size = 0.2mm

has coarse ~~structure~~ rough texture //

workability is easy //

water holding capacity is low //

~~consider only three~~

Erodibility is high //

leaching is high //

permeability is high //

capillarity is low //

- few but large air spaces //

- well drained //

Improvement //

- Addition of manure and fertilizers //

- Addition of clay and mulch //

- Irrigation. //

- crop rotation //

~~consider only two~~

clay soil
Particle size = 0.002mm

has smooth ~~structure~~ fine texture //

workability is difficult //

water holding capacity is high //

~~consider only three~~

Erodibility is low //

leaching is low //

permeability is low //

capillarity is high //

- many pores but small. //

- drainage is very poor //

Improvement //

- Addition of manure and fertilizers //

- Addition of lime //

- drainage //

- crop rotation //

is rich in base (P) //

~~consider only two~~

remarks

Q.

Q19. a) Procedures of Constructing bench terraces

- slope measurement /1
- contour line measurement /1
- Keeping top soil carefully on one side /1
- Digging the soil deeply /1
- Construction of embankment /1
- leveling flat band / platform /1
- Re-filling / recovering on flat bund /1
- keep in ward slope (1-2) to /1

Consider any four

b) Leave a space of a width of 20 cm for agroforestry trees - /0.5

- Mark the base of a terrace of width of 80 cm on the line - /0.5
- Put plugs in adjacent a continuous line of lumps (40 cm wide and 60 cm length) /0.5
- Put the earth to a depth 20 cm above furrows (clods guard)
- put another line of lumps while piling earth above the clods /0.5
- respect slope of 70 to /0.5
- respect in ward slope of 1-2 to /0.5

Consider any six

c) Three factors to consider during designing of progressive terraces are :

- The slope /1
- The surface to knock /1
- Soil structure and texture /1
- use of land after terracing /1

Consider any three

10 marks

Q 20: Given = UR = 1,65 m
a) LR = 0,59 m

stadia factor = 100.

$$\text{Distance} = (UR - LR) \times 100 \quad / 2 \text{ marks}$$

$$= (1,65 - 0,59) \times 100$$

$$= \underline{106 \text{ m}} \quad // \quad / 3 \text{ marks}$$

b) Procedure of slope determination using N-frame.

Procedure 1: mark the starting point and ending point in direction of slope from top to the bottom

Procedure 2: ~~and then~~ place N-frame level + carpenter level on starting points ~~and check the air bubble in carpenter level is between two marks~~

Procedure 3: ~~slope = $\frac{EVD}{EAD}$~~

Procedure 3: check the air bubble in carpenter level is between two marks

Procedure 4: record vertical distance on shortest leg to the ground procedure is repeated and continue by recording until point B.

$$\text{Procedure 5: slope} = \frac{EVD}{EAD} \times 100$$



$$\text{slope} = \frac{\sum VD}{\sum HD}$$

3 marks

10 marks

Q 21: a)

Do not
write in
this margin

i) Different in elevation = Σ of back reading -
 Σ of front reading

$$= 6,16 \text{ m} - 7,79 \text{ m} //$$

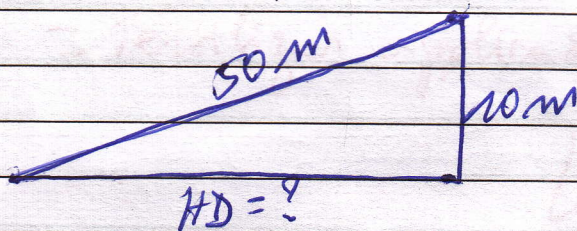
$$= -1,63 \text{ m} //$$

A < B

ii) conclusion point A is ~~below~~ point B
above // 2 marks

iii) slope = $\frac{1,63}{17,40} \times 100 = 9,36\%$ // 2 marks

b)



using pythagoras theorem

$$(50)^2 = (10)^2 + (HD)^2$$

$$(HD)^2 = (50)^2 - (10)^2$$

$$HD = \sqrt{2500 - 100} = \sqrt{2400} = 49 \text{ m}$$

$$HD = 48,9 \text{ m} \approx 49 \text{ m} //$$

$$\text{slope} = \frac{VD}{HD} \times 100 = \frac{10}{49} \times 100 = 20,4\%$$

// 2 marks

10 marks

DRAFT