

2019

(2nd Semester)

Time : 2 hours

Full Marks : 50

Answer all questions

*The figures in the right-hand margin indicate marks**Candidates are required to answer in their own words as far as practicable***(SOIL AND WATER CONSERVATION
ENGINEERING)**1. Fill in the blanks : $\frac{1}{2} \times 10$

- (i) Gully erosion is the advance stage of _____ erosion.
- (ii) Contour bunds are not successful in _____ soil.
- (iii) _____ bunds are mostly used for conservation of moisture and safe disposal of the excess water in high rainfall areas and in light soils.

(iv) Define erosivity and erodibility.

(v) Write the classification of bench terraces depending upon slope of the benches.

(vi) Write briefly about grassed waterways.

6. Attempt any four : 5×4

(i) Write briefly about different permanent gully control structures.

(ii) Write details about the different types of strip cropping.

(iii) Universal soil loss equation.

(iv) Write details about the mechanics of wind erosion.

(v) Discuss briefly on the agronomic measures used for controlling soil erosion.

- (iv) In areas of high rainfall _____ type of bench terrace is suitable.
- (v) V-notch or H-flume is generally used for the measurement of _____.
- (vi) In universal soil loss equation, $A = RKLLSCP$, "R" denotes _____.
- (vii) The movement of very fine particles by wind, mainly less than 0.1 mm in diameter is called _____.
- (viii) _____ instrument is used to study the wind erosion phenomena and estimation of soil loss by wind.
- (ix) Soil erosion in areas with less than _____ percent slopes is controlled by the biological measures.
- (x) Small gullies generally have depth _____ m and catchment area of 2 ha or less.

2. Write (T) for *true* or (F) for *false* answer : $\frac{1}{2} \times 10$

- (i) Geological erosion rate are higher than accelerated erosion rate.

- (ii) Terrace spacing is generally expressed as the vertical intervals between two terraces.
- (iii) Contour strip cropping consists in growing alternate strips of erosion permitting and erosion resisting crops along the contour.
- (iv) Contour bunds are useful in high rainfall areas.
- (v) Dust storms are an example of soil movement through saltation.
- (vi) The gully head gradually progresses towards the downstream side.
- (vii) Erosivity can be defined as the vulnerability or susceptibility of the soil to erosion.
- (viii) In hilly region, the "V" shaped gullies are quite common.
- (ix) The gullies found in plain areas are active in nature.
- (x) For uniform graded bund, a grade of 0.1 % to 0.4 % is adopted.

3. Match the following :

$\frac{1}{2} \times 10$

- | | |
|-----------------------------|--------------------------------------|
| (a) Geological erosion | (i) Shoulder bund |
| (b) Precipitation | (ii) Wind erosion |
| (c) Gully erosion | (iii) Brush wood dam |
| (d) A-frame level | (iv) Natural process |
| (e) Shelter belt | (v) Snowfall |
| (f) Gully control | (vi) Water erosion |
| (g) Bench terrace | (vii) Bench terraces sloping inside |
| (h) USLE | (viii) Bench terrace with level tops |
| (i) Irrigated bench | (ix) Contour Line |
| (j) Hill type bench terrace | (x) Wischmeier |

4. Choose the *correct* answer :

$\frac{1}{2} \times 10$

- (i) Streambank erosion is a what type of erosion.
- Water erosion
 - Wind erosion
 - Coastal erosion
 - None of these

(ii) If the land slope is increased 4 times, then the velocity of water flowing on the slope is

- 2 times
- 4 times
- 8 times
- 16 times

(iii) The terminal velocity of rain drops were found to be

- 4 to 10 m/s
- 2 to 4 m/s
- 10 to 14 m/s
- 14 to 20 m/s

(iv) Orchard bench terraces are of narrow width of about

- 1 m
- 2 m
- 3 m
- 4 m

(v) In which type of strip cropping, strip of grass are found

- (a) Contour strip cropping
 - (b) Field strip cropping
 - (c) Wind strip cropping
 - (d) Buffer strip cropping
- (vi) In which stage of the gully development, local vegetation begins to get stabilized
- (a) Initial stage
 - (b) Development stage
 - (c) Healing stage
 - (d) Stabilization stage
- (vii) Which permanent structure is used at the head of the gully to convey the water safely to gully bed.
- (a) Chute spillway
 - (b) Drop spillway
 - (c) Pipe spillway
 - (d) All of these
- (viii) Minimum wind velocity needed to initiate the movement of soil particle is called
- (a) Terminal velocity

- (b) Threshold velocity
 - (c) Critical velocity
 - (d) None of these
- (ix) Which of the method control wind erosion
- (a) Strip cropping
 - (b) Mulching
 - (c) Moisture conservation
 - (d) All of these
- (x) Vegetative or grassed waterways are used for safe disposal of runoff from
- (a) Terrace area
 - (b) Diversion channel
 - (c) Spillway
 - (d) All of these
5. Attempt any five : 2 × 5
- (i) What are the harmful effects of soil erosion ?
 - (ii) Write briefly about splash erosion.
 - (iii) What are the major factors affecting soil erosions ?