

Set No. : 1

Question Booklet No.

**RET/14/TEST-B**

**933 Soil & Water Conservation Engg**

(To be filled up by the candidate by blue/black ball point pen)

Roll No.

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Roll No. (Write the digits in words) .....

Serial No. of OMR Answer Sheet .....

Day and Date .....

( Signature of Invigilator )

### INSTRUCTIONS TO CANDIDATES

*(Use only blue/black ball-point pen in the space above and on both sides of the Answer Sheet)*

1. Within 10 minutes of the issue of the Question Booklet, Please ensure that you have got the correct booklet and it contains all the pages in correct sequence and no page/question is missing. In case of faulty Question Booklet, Bring it to the notice of the Superintendent/Invigilators immediately to obtain a fresh Question Booklet.
2. Do not bring any loose paper, written or blank, inside the Examination Hall *except the Admit Card without its envelope.*
3. *A separate Answer Sheet is given. It should not be folded or mutilated. A second Answer Sheet shall not be provided.*
4. Write your Roll Number and Serial Number of the Answer Sheet by pen in the space provided above.
5. *On the front page of the Answer Sheet, write by pen your Roll Number in the space provided at the top, and by darkening the circles at the bottom. Also, wherever applicable, write the Question Booklet Number and the Set Number in appropriate places.*
6. *No overwriting is allowed in the entries of Roll No., Question Booklet No. and Set No. (if any) on OMR sheet and Roll No. and OMR sheet no. on the Question Booklet.*
7. *Any change in the aforesaid entries is to be verified by the invigilator, otherwise it will be taken as unfair means.*
8. *This Booklet contains 40 multiple choice questions followed by 10 short answer questions. For each MCQ, you are to record the correct option on the Answer Sheet by darkening the appropriate circle in the corresponding row of the Answer Sheet, by pen as mentioned in the guidelines given on the first page of the Answer Sheet. For answering any five short Answer Questions use five Blank pages attached at the end of this Question Booklet.*
9. For each question, darken only one circle on the Answer Sheet. If you darken more than one circle or darken a circle partially, the answer will be treated as incorrect.
10. *Note that the answer once filled in ink cannot be changed. If you do not wish to attempt a question, leave all the circles in the corresponding row blank (such question will be awarded zero marks).*
11. For rough work, use the inner back pages of the title cover and the blank page at the end of this Booklet.
12. *Deposit both OMR Answer Sheet and Question Booklet at the end of the Test.*
13. You are not permitted to leave the Examination Hall until the end of the Test.
14. If a candidate attempts to use any form of unfair means, he/she shall be liable to such punishment as the University may determine and impose on him/her.

Total No. of Printed Pages : 16

**RET/14/TEST-B**

**933/Soil & Water Conservation Engg.**

**ROUGH WORK**

**रफ़ कार्य**

**No. of Questions : 50**

**Time : 2 Hours**

**Full Marks : 200**

- Note: (1)** This Question Booklet contains **40** Multiple Choice Questions followed by **10** Short Answer Questions.
- (2)** Attempt as many MCQs as you can. Each MCQ carries **3 (Three)** marks. **1 (One)** mark will be deducted for each incorrect answer. **Zero** mark will be awarded for each unattempted question. If more than **one** alternative answers of MCQs seem to be approximate to the correct answer, choose the closest one.
- (3)** Answer only **5** Short Answer Questions. Each question carries **16 (Sixteen)** marks and should be answered in **150-200** words. Blank **5 (Five)** pages attached with this booklet shall only be used for the purpose. Answer each question on separate page, after writing Question No.

01. Which one of the following is **not** a kharif crop :
- |             |           |
|-------------|-----------|
| (1) Paddy   | (2) Maize |
| (3) Mustard | (4) Arhar |
02. Select the crop, which is used for green manuring :
- |                       |               |
|-----------------------|---------------|
| (1) Daincha (sunhemp) | (2) Sugarcane |
| (3) Tobacco           | (4) Onion     |
03. Panama wilt disease is found in :
- |            |            |
|------------|------------|
| (1) Papaya | (2) Mango  |
| (3) Peach  | (4) Banana |
04. Osmotic expansion of a cell kept in water is chiefly regulated by :
- |               |                  |
|---------------|------------------|
| (1) Ribosomes | (2) Mitochondria |
| (3) Plastids  | (4) Vacuoles     |
05. Community Development Programme was started in :
- |          |          |
|----------|----------|
| (1) 1952 | (2) 1965 |
| (3) 1957 | (4) 1960 |
06. Food grains have :
- |                              |                                |
|------------------------------|--------------------------------|
| (1) Inelastic demand         | (2) Elastic demand             |
| (3) Perfectly elastic demand | (4) Perfectly inelastic demand |
07. The disease "ricket" in animal is caused due to deficiency of :
- |               |               |
|---------------|---------------|
| (1) Vitamin A | (2) Vitamin B |
| (3) Vitamin C | (4) Vitamin D |
08. For comparing the variability of the two series, which one of the following measures is used :
- |                        |                              |
|------------------------|------------------------------|
| (1) Standard Deviation | (2) Mean Deviation           |
| (3) Range              | (4) Coefficient of Variation |

09. Which one of the following is an anticoagulant ?
- (1) Heparin (2) Interleukin  
(3) Plasmin (4) Lymphokine
10. The fertility of soil is reduced by :
- (1) Alternate cropping (2) Intensive cropping  
(3) Nitrogen fixing bacteria (4) None of the above
11. A synthetic unit hydrograph can be developed for a basin having :
- (1) A stream gauging station  
(2) A rain gauge network and no stream gauging station  
(3) No rain gauge and stream station  
(4) A rain gauge station and information on soil characteristics
12. Cypress Creek formula is used to compute :
- (1) Design discharge for flat land  
(2) Design discharge for sloppy land  
(3) Design rainfall  
(4) Discharge from a creek
13. If a 4-h unit hydrograph of a catchment has a peak ordinate of  $60 \text{ m}^3 \text{ s}^{-1}$ , the peak ordinate of a 8-h unit hydrograph for the same catchment will be :
- (1)  $> 60 \text{ m}^3/\text{s}$  (2)  $< 60 \text{ m}^3/\text{s}$   
(3)  $= 60 \text{ m}^3/\text{s}$  (4) Data inadequate
14. Soil detachability increases as the :
- (1) Size of particle reduces  
(2) Size of particle increases  
(3) Impact angle of raindrop reduces  
(4) Length of slope reduces

15. In an embankment the core is made of a material which is ?  
(1) impermeable (2) Porous  
(3) permeable (4) Sandy
16. Interception loss is :  
(1) More towards end of storms  
(2) More at the middle of storms  
(3) Uniform throughout the storms  
(4) More at the beginning of storms
17. The formula for estimation of evapotranspiration using only temperature and day length is known as :  
(1) Thornthwaite formula (2) Penman formula  
(3) Christiansen formula (4) Blaney- Criddle formula
18. A 100 ha watershed received a rainfall at a rate of  $5 \text{ cmh}^{-1}$  for 2 hours. If the runoff generated by the storm was at the rate of  $1 \text{ m}^3 \text{ s}^{-1}$  for 10 hours, the runoff coefficient for the watershed would be :  
(1)  $3.6 \times 10^{-3}$  (2)  $6 \times 10^{-2}$  (3) 0.36 (4) 36
19. The soil erodibility factor need to be determined for use in the Universal Soil Loss Equation. The length, in m and slope, in % of the experimental plot to be used for this purpose respectively are :  
(1) 19,12 (2) 21,11 (3) 22,9 (4) 23,8
20. Stilling basin is provided in chute spillway for :  
(1) Energy formation (2) Energy dissipation  
(3) Wave formation (4) Flow measurement
21. Period for which water is supplied to a crop is called as ?  
(1) delta (2) duty  
(3) base (4) irrigation intensity

22. Discharge rate of emitters usually ranges from :
- (1) 2-10 liters/day (2) 2-10 liters/hr  
(3) 2-10 liters/min (4) 2-10 liters/sec
23. Tensiometer operates only upto :
- (1) 0.85 bar (2) 1.0 bar  
(3) 1.5 bar (4) 2.0 bar
24. A conduit in which liquid flows with free surface is called as ?
- (1) conduit flow (2) open channel flow  
(3) pipe flow (4) pressurized flow
25. The dimension of Manning's roughness coefficient is :
- (1)  $L^{-1/3}T$  (2)  $L^{-1/6}$  (3)  $L^{-1/6}T$  (4)  $T$
26. The most efficient cross section from hydraulic point of view is :
- (1) Semi circular (2) Parabolic  
(3) Trapezoidal (4) Triangular
27. Amount of water used in metabolic action is :
- (1) 2 to 5% of ET (2) less than 1% of ET  
(3) about 10% of ET (4) zero
28. Drainage coefficient is the depth of water to be removed from an area in a period of :
- (1) 1 hour (2) 24 hour  
(3) 48 hour (4) 36 hour
29. Darcy's law is valid as long as the Reynold's number is :
- (1) 2 (2) 5  
(3) less than 1 (4) 10

30. Spacing of mole drains varies from :
- |                |                |
|----------------|----------------|
| (1) 2 to 5 m   | (2) 5 to 10 m  |
| (3) 10 to 15 m | (4) 15 to 20 m |
31. The porosity of an aquifer material having bulk density 1g/cc and particle density 2.65g/cc is :
- |            |            |
|------------|------------|
| (1) 72.25% | (2) 50.35% |
| (3) 62.26% | (4) 40%    |
32. In a soil column of volume  $V$ , if  $V_y$  be the volume of water drained by gravity force and  $V_w$  is the volume of water retained against gravity force, the specific yield is equal to :
- |                                  |                                  |
|----------------------------------|----------------------------------|
| (1) $[V_y/(V_y+V_w)] \times 100$ | (2) $V_y/V$                      |
| (3) $(V_y/V) \times 100$         | (4) $[V_y/(V_y+V_w)] \times 100$ |
33. Performance of a well is measured by :
- |                         |                       |
|-------------------------|-----------------------|
| (1) Specific yield      | (2) Specific capacity |
| (3) Storage coefficient | (4) Safe yield        |
34. The Ratio of piezometric head to phreatic head of a semi - confined aquifer is :
- |          |             |             |          |
|----------|-------------|-------------|----------|
| (1) $>1$ | (2) $0 - 1$ | (3) $1 - 2$ | (4) $>2$ |
|----------|-------------|-------------|----------|
35. The minimum pumping time required for an accurate estimate of specific yield of an unconfined aquifer depends on :
- |                              |                         |
|------------------------------|-------------------------|
| (1) Aquifer porosity         | (2) Specific yield      |
| (3) Aquifer transmissibility | (4) Storage coefficient |
36. The function  $f(x) = X_1^2 + X_2^2 - 4X_1 - 2X_2 + 5$  is-
- |                      |                     |
|----------------------|---------------------|
| (1) Concave          | (2) Convex          |
| (3) Strictly concave | (4) Strictly convex |



37. A system whose variation in space is either non-existent or ignored is termed as ?
- (1) Distributed parameter system      (2) Continuous system  
(3) Discrete system                      (4) Lumped parameter system
38. A reservoir operation problem in which release decisions need to be made sequentially across the time period can be solved ideally by :
- (1) Linear programming                  (2) Goal programming  
(3) Dynamic programming                (4) Non linear programming
39. Out of different types of GPS available in the market the most precise GPS i.e. precise position service has horizontal accuracy-
- (1) Within 100 m                          (2) Within 56 m  
(3) Within 22 m                          (4) Within 10 m
40. Contour maps developed by GIS helps in deriving-
- (1) Slope maps and flood maps  
(2) Slope, DEM and flood maps  
(3) Only DEM  
(4) Slope, DEM and aspect maps

**Short Answer Questions**

**Note :** Attempt any **five** questions. Write answer in **150-200** words. Each question carries **16** marks. Answer each question on separate page, after writing Question Number.

01. Classify the storm pattern and discuss the impact of storm pattern on runoff peak.
02. Explain design components of permanent gully control structures.
03. What are the causes of failure of soil conservation structure ?
04. Prove that most economical section of rectangular channel giving maximum discharge would be when depth is half the breadth.
05. Briefly describe the plan for interlinking of Indian rivers.
06. What is remote sensing ? Describe in brief application of remote sensing and GIS in land use and land cover mapping.
07. Distinguish between ground surface contour maps and water table contours. Explain how water table contour map are prepared and state their uses.
08. Describe the laplace equation for ground water flow potential. Explain how laplace equation is satisfied in isotropic formations.
09. In tile drainage systems drains are to be installed at impervious layer exist at depth of 2 m below the ground surface. The hydraulic conductivity of soil is 1.8 m/day. The average discharge of the drainage system is 2 mm/day. Calculate the required spacing of the drains if the water table is to be kept at 1.5 m from the ground level.
10. Briefly describe the drip irrigation system.

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Question No.

प्रश्न संख्या

Page for Short Answer

लघु उत्तरीय के लिए पृष्ठ

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## अभ्यर्थियों के लिए निर्देश

(इस पुस्तिका के प्रथम आवरण पृष्ठ पर तथा उत्तर-पत्र के दोनों पृष्ठों पर केवल नीली-काली बाल-प्वाइंट पेन से ही लिखें)

1. प्रश्न पुस्तिका मिलने के 10 मिनट के अन्दर ही देख लें कि प्रश्नपत्र में सभी पृष्ठ मौजूद हैं और कोई प्रश्न छूटा नहीं है। पुस्तिका दोषयुक्त पाये जाने पर इसकी सूचना तत्काल कक्ष-निरीक्षक को देकर सम्पूर्ण प्रश्नपत्र की दूसरी पुस्तिका प्राप्त कर लें।
2. परीक्षा भवन में लिफाफा रहित प्रवेश-पत्र के अतिरिक्त, लिखा या सादा कोई भी खुला कागज साथ में न लायें।
3. उत्तर-पत्र अलग से दिया गया है। इसे न तो मोड़ें और न ही विकृत करें। दूसरा उत्तर-पत्र नहीं दिया जायेगा। केवल उत्तर-पत्र का ही मूल्यांकन किया जायेगा।
4. अपना अनुक्रमांक तथा उत्तर-पत्र का क्रमांक प्रथम आवरण-पृष्ठ पर पेन से निर्धारित स्थान पर लिखें।
5. उत्तर-पत्र के प्रथम पृष्ठ पर पेन से अपना अनुक्रमांक निर्धारित स्थान पर लिखें तथा नीचे दिये वृत्तों को गाढ़ा कर दें। जहाँ-जहाँ आवश्यक हो वहाँ प्रश्न-पुस्तिका का क्रमांक तथा सेट का नम्बर उचित स्थानों पर लिखें।
6. ओ० एम० आर० पत्र पर अनुक्रमांक संख्या, प्रश्नपुस्तिका संख्या व सेट संख्या (यदि कोई हो) तथा प्रश्नपुस्तिका पर अनुक्रमांक और ओ० एम० आर० पत्र संख्या की प्रविष्टियों में उपरिलेखन की अनुमति नहीं है।
7. उपर्युक्त प्रविष्टियों में कोई भी परिवर्तन कक्ष निरीक्षक द्वारा प्रमाणित होना चाहिये अन्यथा यह एक अनुचित साधन का प्रयोग माना जायेगा।
8. प्रश्न-पुस्तिका में प्रत्येक प्रश्न के चार वैकल्पिक उत्तर दिये गये हैं। प्रत्येक प्रश्न के वैकल्पिक उत्तर के लिए आपको उत्तर-पत्र की सम्बन्धित पंक्ति के सामने दिये गये वृत्त को उत्तर-पत्र के प्रथम पृष्ठ पर दिये गये निर्देशों के अनुसार पेन से गाढ़ा करना है।
9. प्रत्येक प्रश्न के उत्तर के लिए केवल एक ही वृत्त को गाढ़ा करें। एक से अधिक वृत्तों को गाढ़ा करने पर अथवा एक वृत्त को अपूर्ण भरने पर वह उत्तर गलत माना जायेगा।
10. ध्यान दें कि एक बार स्याही द्वारा अंकित उत्तर बदला नहीं जा सकता है। यदि आप किसी प्रश्न का उत्तर नहीं देना चाहते हैं, तो संबंधित पंक्ति के सामने दिये गये सभी वृत्तों को खाली छोड़ दें। ऐसे प्रश्नों पर शून्य अंक दिये जायेंगे।
11. रफ कार्य के लिए प्रश्न-पुस्तिका के मुखपृष्ठ के अंदर वाला पृष्ठ तथा उत्तर-पुस्तिका के अंतिम पृष्ठ का प्रयोग करें।
12. परीक्षा के उपरान्त केवल ओ एम आर उत्तर-पत्र परीक्षा भवन में जमा कर दें।
13. परीक्षा समाप्त होने से पहले परीक्षा भवन से बाहर जाने की अनुमति नहीं होगी।
14. यदि कोई अभ्यर्थी परीक्षा में अनुचित साधनों का प्रयोग करता है, तो वह विश्वविद्यालय द्वारा निर्धारित दंड कां/की, भागी होगा/होगी।