Set No. : 1

RET/16/TEST-B

**Question Booklet No.**

| 933 | Ag. Engg. (Soil & Water Conservation Engg.) |
|---|---|

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

Roll No. | | | | | | | | | | |

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 fesh 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 [illegible] 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**

ROUGH WORK
रफ़ कार्य

# Research Entrance Test-2016

## 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.** Where is the International Rice Research Institute located ?

(1) Manila (2) Chicago
(3) Cairo (4) Cuttack

**02.** Trypsin is basically what ?

(1) Fatty acid (2) Sugar
(3) Oligo-nucleotide (4) Protein

**03.** GMO stands for what ?

(1) Genetically Modified Organisms
(2) Genetically Multipied Organisms
(3) Green Modified Organisms
(4) Green Modified Orange

**04.** Which international treaty was documented in 1987 and implemented in 1989, to avoid deleterious effects of ultra- violet radiation owing to ozone layer depletion ?

(1) Cartagene protocal
(2) Montreal protocol
(3) Geneva protocol
(4) Antartica Environmental protocol

**05.** The tissue bearing dead cells is ?

(1) Collenchyma (2) Parenchyma
(3) Xylem (4) Phellogen

**06.** Sub-cellular components are separated by means of ?

(1) Chromatography
(2) Autoradiography
(3) Electrophoresis
(4) Differential and density gradient centrifugation

**07.** Which these is a vertebrate animal ?

(1) Prawn (2) Snake
(3) Mosquito (4) Octopus

**08.** Which of these is not a $C_4$ plant ?

(1) Maize (2) Rice
(3) Sorghum (4) Sugarcane

**09.** Cell theory was first formulated by ?

(1) Schleiden and Schwann (2) Rudolf Vrichow
(3) A.V. Leeuwenhock (4) Ruth Sagar

**10.** Apple is a ?

(1) True fruit (2) False fruit
(3) Vegetable (4) Parthenocarpic fruit

**11.** A watershed can be termed as small watershed when :
(1) Channel flow is major contributor
(2) Overland flow is major contributor
(3) Channel network plays important role in flow of runoff
(4) Land use is suppressed

**12.** Darcy's law is valid for :
(1) Laminar and turbulent flow (2) Turbulent flow
(3) Laminar flow (4) Transient flow

**13.** The 2 hour unit hydrograph is having 50 hours base period. To derive constant discharge in the S-curve, following numbers of 2 hour unit hydrograph has to be added by respective lagging :
(1) 25 (2) 50 (3) 48 (4) 52

**14.** Linear Imaging Self-Scanning III sensor has spatial resolution :
(1) 1 m (2) 5.8 m (3) 23.5 m (4) 56 m

**15.** Basic assumptions in Unit Hydrograph theory are :
(1) Time variance and non linear response
(2) Time variance and linear response
(3) Time invariance and non linear response
(4) Time invariance and linear response

**16.** A reservoir in which storage is a function of inflow only is a :
(1) Wedge storage (2) Prism storage
(3) Linear reservoir (4) Non linear reservoir

**17.** Which of the following method computes storm wise direct runoff depth :
(1) Khosla's method (2) Hydrograph method
(3) Curve Number method (4) Rational method

**18.** In hydraulic design of permanent gully control structure the determined parameter is :
(1) Runoff rate (2) Dimension of the structure
(3) Structural strength (4) Forces on the structure

**19.** In the hydraulic-head drops between the equipotential lines are the same, the streamlines and equipotential lines from a :

(1) Rectangle (2) Perfect Square
(3) Curvilinear square (4) None of the above

**20.** The water present in the zone of aeration is termed as :

(1) Ground water (2) Vadose water
(3) Internal water (4) Capillary water

**21.** In a partially penetrated well the flow lines near the well are :

(1) Truly horizontal
(2) Truly perpendicular
(3) Curved upward
(4) Curved upward or downward

**22.** For a confined aquifer the discharge through the entire thickness of aquifer under unit hydraulic gradient is termed as :

(1) Transmissivity (2) Transmissibility
(3) Specific Transmissivity (4) Storability

**23.** A dynamic system is one where the output depends only on :

(1) Current input (2) Previous input
(3) Current and previous inputs (4) None of the above

**24.** In an optimization problem, for all values of h sufficiently close to zero, a function f(x) is said to have a local maximum at $x=x^*$, if :

(1) $f(x^*) \leq f(x^*+h)$ (2) $f(x^*) \geq f(x^*+h)$
(3) $f(x^*)=f(x^*+h)$ (4) $f(x^*)=f(x^*+h)=0$

**25.** Solution of constrained optimization problem with equality constraint could be obtained by :

(1) Lagrange Multiplier method (2) Kuhn-Tucker method
(3) Both 1 and 2 (4) None of the above

**26.** The micro wave radar band is :

(1) 1 mm to 5 mm (2) 1 mm to 10 mm

(3) 1 mm to 100 mm (4) 1 mm to 1000 mm

**27.** Which wave band has longest wavelength :

(1) Gamma rays (2) X-rays

(3) Radio waves (4) Ultra violet

**28.** Swath of satellite is determined by :

(1) Its orbit (2) Field of view

(3) Look direction (4) Tilt from earth

**29.** Any set of observable characteristics which directly or indirectly lead to the identification of an object and/or its condition is termed as :

(1) Signature (2) Ground truthing

(3) Swath (4) Symbology

**30.** The laser system used for remote sensing is referred to as :

(1) Active laser remote sensing (2) Passive laser remote sensing

(3) RADAR (4) LIDAR

**31.** According to the Indian Meteorological department (IMD), an area is considered to be drought affected if it receives the total seasonal rainfall less than :

(1) 75% of its normal value (2) 50% of its normal value

(3) 25% of its normal value (4) 20% of its normal value

**32.** The overland flow in an irrigation border strip is a case of :

(1) Steady flow

(2) Unsteady flow

(3) Steady flow with decreasing discharge

(4) Unsteady flow with decreasing discharge

**33.** Static head of a pump is equal to :

(1) Suction head
(2) Delivery head
(3) Sum of suction and delivery head
(4) None of the above

**34.** Minor irrigation projects have Culturable Command Area :

(1) Less than 2000 ha (2) Less than 3000 ha
(3) 2000 to 5000 ha (4) None of the above

**35.** Borders constructed along the general slope of field are called as :

(1) Straight borders (2) contour border
(3) cross borders (4) all above

**36.** Rainfall used to meet the crop water requirement is called :

(1) Effective rainfall (2) Normal rainfall
(3) Available rainfall (4) Field capacity rainfall

**37.** The usual mess size of the screen hole in a screen filter is :

(1) 80 mesh (2) 100 mesh
(3) 120 mesh (4) 140 mesh

**38.** 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

**39.** A saline soil has :

(1) EC > 4 mmhos/cm at 25°C (2) EC < 4 mmhos/cm at 25°C
(3) EC < 2 mmhos/cm at 25°C (4) EC > 2 mmhos/cm at 25°C

**40.** Mole drainage is the most suitable in :

(1) Very low permeability soils (2) Very high permeability soils
(3) Course textured soils (4) Loamy soils

## *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.

**1.** An agricultural watershed of soil group 'C' in DVC has an average slope of 1.5% and an area of 1000 hectares. A rainfall of 24 hours duration for the area is 76.2 mm while the runoff volume calculated by Curve number technique is 31.4 mm. The length to width ratio of the watershed is 3.5: 1. Determine time to peak and time of concentration of the watershed.

**2.** Define **five** important morphological Characteristics of a watershed and describe any **two** of them.

**3.** What are the bands of EMR which are the important for remote sensing ? Briefly describe different types of scattering.

**4.** What are the basic assumptions of the unit hydrograph theory ?

**5.** Describe the methodology for mechanical analysis test of soils. Briefly describe the procedure for qualitative reporting of this test.

**6.** An aquifer has an average thickness of 60 cm and an aerial extent of 100 ha. Estimate the available ground water storage if :

(i) the aquifer is unconfined and the fluctuation in ground water table is observed as 15 m.

(ii) the aquifer is confined and the piezometric head is lowered by 50 m which drains half the thickness of the aquifer.

Assume a storage coefficient of $2 \times 10^{-4}$ and specific yield as 16 %.

**7.** Define system and briefly describe the system approach. Describe the basic problem in system analysis.

8. Briefly describe the criteria for selection of irrigation methods.

9. Briefly describe the design of drip irrigation system.

10. Describe in brief the reclamation of salt affected soils.

| Question No. | Page for Short Answer |
|---|---|

| Question No. | Page for Short Answer |
|---|---|

| Question No. | Page for Short Answer |
|---|---|

| Question No. | Page for Short Answer |
|---|---|

Question No. Page for Short Answer

# 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 गाढा 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 का/को, भागी होगा/होगी।