Question Booklet No. ....

*(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 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 changes 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 page 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 : 15

FOR ROUGH WORK

Research Entrance Test – 2013

No. of Questions : 50

Time : 2 Hours   Full Marks : 200

Note : (i) This Question Booklet contains **40** Multiple Choice Questions followed by **10** Short Answer Questions.

(ii) 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.

(iii) 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.

1. Most of the land precipitation and evaporation on earth takes place over the :

   (1) land masses

   (2) oceans and seas

   (3) poles of the planet

   (4) subtropical latitudes

2. The downstream portion of a river :

   (1) generally becomes more sluggish

   (2) usually has turbulent flows

   (3) generally is of higher velocity, which is marked by reduced turbulence

   (4) has lower discharges than do upstream portions

3. Which of the following is not a fatty acid ?

   (1) Stearic acid
   (2) Palmitic acid

   (3) Oleic acid
   (4) Phenyl acetic acid

4. Which of the following compounds is not an antibiotic ?

   (1) Penicillin
   (2) Chloramine-T

   (3) Streptomycin
   (4) Chloramphenicol

5. The acceleration with which a particle moves in a straight line, according to the law $v^2 = 4a(x \sin x + \cos x)$, v being the velocity of the particle at a distance x from a fixed point, is :

   (1) 0
   (2) $2ax \cos x$

   (3) $4ax \cos x$
   (4) $2ax \sin x$

6. If $\begin{bmatrix} 2 & 4 \\ 1 & 3 \end{bmatrix} A \begin{bmatrix} 0 & 2 \\ 1 & 3 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, then the matrix A is :

(1) $\begin{bmatrix} 3 & -4 \\ 3/4 & -1 \end{bmatrix}$

(2) $\begin{bmatrix} -13/4 & 3/2 \\ 5/4 & -1/2 \end{bmatrix}$

(3) $\begin{bmatrix} -17/4 & 3/4 \\ -7/4 & -1/4 \end{bmatrix}$

(4) $\begin{bmatrix} 5/4 & 11/4 \\ 3 & -9/4 \end{bmatrix}$

7. If the error in the measurement of radius of sphere is 0.3%, then the percentage error in the measurement of its volume is :

(1) 0.15%

(2) 0.6%

(3) 0.9%

(4) 0.03%

8. The resistance of series combination of two resistances is S. When they are joined in parallel, the total resistance is P. If $S = nP$, then the minimum possible value of n is :

(1) 3

(2) 4

(3) 2.1

(4) 0.89

9. Mitochondria are associated with the function of :

(1) cellular digestion

(2) circulation

(3) protein synthesis

(4) cellular respiration

10. In which parts of eyes, rods and cones are present ?

(1) Retina

(2) Iris

(3) Cornea

(4) Lens

11. Benioff zone is found where :
    (1) Tectonic plates diverge
    (2) Transform fault occurs
    (3) The slant portion of a descending plate during convergence of two plates
    (4) Earthquakes frequently occur

12. The Thematic Mapper enables to delineate the flood water-land boundary in the spectral bands :
    (1) 0.76 to 0.90 μm
    (2) 8.0 to 12.5 μm
    (3) 0.63 to 0.69 μm
    (4) 0.28 to 0.40 μm

13. The transverse resistance has direct bearing with :
    (1) Specific yield
    (2) Electrical resistivity
    (3) Storage coefficient
    (4) Coefficient of Transmissibility

14. For feature coverage estimation from imagery. the important parameter is :
    (1) Reflection
    (2) Refraction
    (3) Digital number
    (4) Albedo

15. Geophysical time scale is related to :
    (1) Seismic stratigraphy
    (2) Pattern of magnetic field developed due to sea-floor spreading
    (3) Same as geological time scale
    (4) Geophysical year 1956

16. What is the term used for maximum moisture which on initially dry soil will adsorb :
    (1) Wilting point
    (2) Field capacity
    (3) Adsorption
    (4) hygroscopic coefficient

17. The maximum permissible limit ot fluoride in drinking water is :
    (1) 45 ppm   (2) 1.5 ppm   (3) 150 ppm   (4) 250 ppm

18. The concept of displacement current is found in :
    (1) Ampere's law
    (2) Faraday's lav
    (3) Maxwell's equation
    (4) Green's function

19. Nutation of earth's axis is :
    (1) Aberration of starlight
    (2) A wavy motion in precessional orbit
    (3) Solar precession is reduced to zero
    (4) The state at which the sun or moon is directly over the earth's equatorial bulge

20. A decrease in atmospheric pressure causes the water levels in wells tapping a confined aquifer to :
    (1) Rise in water levels
    (2) Constant levels
    (3) Fall in water levels
    (4) None of the above

21. The product of the total volume of rock and the difference between porosity and specific yield gives :
    (1) The volume of drained water
    (2) The specific porosity
    (3) The specific permeability
    (4) The volume of retained water

22. Lehmann discontinuity is located at a depth of :
    (1) 690 km
    (2) 410 km
    (3) 120 km
    (4) 240 km

23. The first hydrocarbon bearing reservoir was discovered, in India, is :
    (1) Palaeozoic rocks
    (2) Pleistocene rocks
    (3) Eocene rocks
    (4) Tertiary rocks

24. The Poisson's relation in potential field entails :
    (1) To obtain magnetic field from gravity field
    (2) To obtain the mass of a causative body
    (3) To get the volume of magnetic body
    (4) Geomagnetic field

25. A strong motion seismograph measures :
    (1) Acceleration of the ground motion
    (2) The velocity of the ground motion
    (3) The displacement of the ground
    (4) Both the displacement and velocity of the ground motion

26. The dryness or wetness of atmosphere is estimated by :
    (1) Mixing Ratio
    (2) Specific Humidity
    (3) Relative Humidity
    (4) Absolute Humidity

27. Rain shower is associated with :
    (1) Stratocumulus Cloud
    (2) Nimbostratus Cloud
    (3) Cumulonimbus Cloud
    (4) Altostratus Cloud

28. The coriolis force acts on :
    (1) bodies at rest only
    (2) moving air parcel only, but not on other moving objects
    (3) on all moving objects
    (4) on all objects, whether at rest or in motion

29. In humid air, virtual temperature :
(1) is always more than its actual temperature
(2) is always less than its actual temperature
(3) is always equal to its actual temperature
(4) can be either more or less than its actual temperature, depending upon relative humidity

30. For an unsaturated air, the wet-bulb temperature is :
(1) always more than its dew-point temperature
(2) always less than its dew-point temperature
(3) equal to its dew-point temperature
(4) can be either more or less than its dew-point temperature, depending upon relative humidity

31. When a deep layer of moist-air is forced to rise due to solar radiational heating, the resulting rainfall is known as :
(1) Orographic rain
(2) Cyclonic rain
(3) Convectional rain
(4) None of these

32. For the same horizontal pressure gradient, the Geostrophic Wind is :
(1) weaker at 60° latitude than at 30° latitude
(2) Stronger at 60° latitude than at 30° latitude
(3) same at both the latitude
(4) none of these

33. In a cyclostrophic flow, the rotation is :
(1) always cyclonic
(2) always anticyclonic
(3) either cyclonic or anticyclonic both
(4) none of the above

34. The wavelength of maximum emission in the solar radiation occurs in :
(1) Visible band
(2) Near infrared band
(3) Ultraviolet band
(4) Microwave band

35. Monsoon climate is caused by :
(1) High temperature
(2) Low temperature
(3) Temperature variation
(4) Seasonal reversal of wind

36. Seasonal contrasts are more striking in :
(1) equatorial region
(2) tropical region
(3) sub tropical region
(4) polar region

37. The basic control for the earth's temperature pattern is :

   (1) Ocean currents   (2) Surface elevation

   (3) Land-sea contrast   (4) Distribution of insolation

38. Tropical cyclone do not occur close to equator because of :

   (1) excessive heat   (2) calm air

   (3) low pressure gradient   (4) weak coriolis force

39. Which country has the larger period of day time during summer:

   (1) India   (2) Nigeria   (3) Norway   (4) Mexico

40. Doldrum belt is a region of :

   (1) High Pressure and Strong wind   (2) Moderate Pressure

   (3) Low Pressure and Calm wind   (4) Low pressure and Strong wind

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. How with electrical resistivity and seismic methods, the Civil Engineering site investigations are made?

2. Describe the general idea of how to use high resolution aerial photography to locate a fault or fracture zone.

3. Discuss the condition for obtaining H-type curve in a resistivity survey. Also discuss the probable layer comprising suitable geological rock materials in which ground water may occur.

4. Describe a method of radioactive dating by which the age of Khondalites can be determined.

5. Derive an expression for getting travel-time curve during elastic wave propagation through a multi-layered earth.

6. What is meant by the term insolation ? Why does the sun produce shortwave radiation where as the earth produce long-wave radiation ?

7. What is ozone-hole? Discuss the importance of Ozone layer in the atmosphere

8. What are the rain-bearing weather systems over India during winter season ?

9. Briefly describe the climatology of thunderstorm.

10. Why it is difficult to breath at high altitudes ?

Roll No. : ....

Q. No. :

Roll No. : ....

Q. No. :

FOR ROUGH WORK