

2016.

Set No. : 1

Question Booklet No.

RET/16/TEST-B

891

Geophysics

(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 30 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 : 20

20.

SEAL

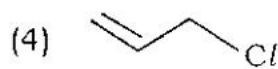
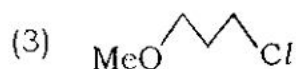
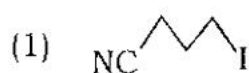
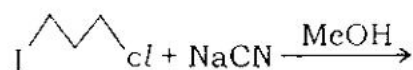
ROUGH WORK

रफ़ कार्य

01. Which is not true for reactions by the S_N2 mechanism ?

- (1) proceeds through a backside attack and results in inversion
- (2) tends to proceed with weak nucleophiles solvents like CH_3OH , H_2O , CH_3CH_2OH .
- (3) rate of reaction proceeds from primary (fastest) > secondary > tertiary (slowest)
- (4) occurs in one step

02. Which is the main product of the following reaction ?



03. Which of the following conditions is necessary for a reaction to be spontaneous ?

(1) $\Delta S_{sur} > 0$

(2) $\Delta S_{sys} > 0$

(3) $\Delta S_{sur} + \Delta S_{sys} > 0$

(4) $\Delta S_{sur} + \Delta S_{sys} < 0$

04. Dead organs are generally stored in formalin. Formalin is :

(1) aqueous formaldehyde

(2) aqueous ferrous sulphate

(3) aqueous formic acid

(4) aqueous ferric alum

- 05.** Regarding "carbon credits", which one of the following statement is **not** correct :
- (1) The carbon credit system was ratified in conjunction with the Kyoto Protocol.
 - (2) Carbon credits are awarded to countries or groups that have reduced greenhouse gases below their emission quota.
 - (3) The goal of the carbon credit system is to limit the increase of carbon dioxide emission.
 - (4) Carbon credits are traded at a price fixed from time to time by the United Nations Environment Programme.
- 06.** Ball bearings are used in bicycles, cars, etc., because :
- (1) the actual area of contact between the wheel and axle is increased.
 - (2) the effective area of contact between the wheel and axle is increased
 - (3) the effective area of contact between the wheel and axle is reduced
 - (4) the actual area of contact between the wheel and axle is reduced.
- 07.** During respiration, energy is released. It is stored in the form of :
- (1) ADP (2) ATP (3) NADP (4) APP
- 08.** Which of the following is known as Royal disease :
- (1) Sickle cell anemia (2) Haemophilia
(3) Alzheimers disease (4) Colour blindness
- 09.** The xylem in plants is responsible for :
- (1) transport of water (2) transport of food
(3) transport of oxygen (4) transport of amino acids

10. Two wires, of the same material, have their lengths in the ratio 1:2 and their diameters in the ratio 2:1. If both are stretched separately by equal weights, the ratio of increase in their lengths, $L_1 : L_2$ would be :
- (1) 1:2 (2) 2:1 (3) 1:8 (4) 8:1
11. Which of the following is NOT a primary "control" of climate ?
- (1) Altitude (2) Latitude
(3) Daily weather (4) Ocean currents
12. The severity of ground motion at a place during an earthquake is measured by :
- (1) magnitude (2) intensity
(3) seismicity (4) seismic moment
13. A wind from 135 degrees is a Wind :
- (1) Northeast (2) Northwest
(3) Southeast (4) Southwest
14. El Nino occurs when the SOI is for an extended period of time :
- (1) Positive (2) Negative
(3) Normal (4) None of the above
15. If the relative humidity decreases it could be due to :
- (1) Temperature decreasing or dewpoint decreasing
(2) Temperature increasing or dewpoint increasing
(3) Temperature decreasing or dewpoint increasing
(4) Temperature increasing or dewpoint decreasing

16. What is the source of Magnetotelluric field below 1HZ ?
- (1) Lightning associated with Thunderstorms,
 - (2) Micropulsations in the Ionosphere
 - (3) Both of above
 - (4) None of above
17. Which one is the best method for mapping sediments below the basaltic layer in Deccan Trap, India ?
- (1) Seismic reflection method
 - (2) Electrical method
 - (3) Magneto telluric method
 - (4) Seismic refraction method
18. Since velocity of P-wave varies inversely with the square root of density, then what will be the effect of increase in density on P-wave velocity ?
- (1) velocity will increase
 - (2) velocity will decrease
 - (3) no change at all
 - (4) velocity will initially increase then decrease
19. A Chinook wind causes :
- (1) A cooling and moistening of air
 - (2) A cooling and drying of air
 - (3) A warming and moistening of air
 - (4) A warming and drying of air
20. Which of the following helps lead to lower pressure ?
- (1) Rising air; Upper level divergence and low level convergence
 - (2) Sinking air; Upper level divergence and low level convergence
 - (3) Rising air; Upper level convergence and low level divergence
 - (4) Sinking air; Upper level convergence and low level divergence

21. The boundary between the crust and mantle :
- (1) coincides with the boundary between the asthenosphere and lithosphere
 - (2) Is marked by a change in velocity of seismic waves
 - (3) Is the source of the S-wave shadow zone
 - (4) Is marked by sudden change in gravity value
22. Convolution in time domain is equal to :
- (1) multiplication in frequency domain
 - (2) Deconvolution in frequency domain
 - (3) division in frequency domain
 - (4) addition in frequency domain
23. A low pressure system that is weakening will be.....(A) A low pressure system that is strengthening will be(B)
- (1) (A) filling, (B) deepening
 - (2) (A) filling, (B) lifting
 - (3) (A) digging, (B) lifting
 - (4) (A) digging, (B) deepening
24. Low frequency EM Induction method (<50 kHz) is based on :
- (1) Diffusion equation
 - (2) Wave equation
 - (3) Poisson equation
 - (4) Laplace equation
25. The shape of the time-distance curve for the seismic reflection is :
- (1) Straight line
 - (2) parabola
 - (3) quadratic
 - (4) hyperbola
26. Which of the following is natural source geophysical method ?
- (1) IP method
 - (2) Electrical method
 - (3) Gravity method
 - (4) Seismic method

27. The shear wave is :

- | | |
|------------------|------------------|
| (1) Longitudinal | (2) Dilatational |
| (3) Irrotational | (4) Transverse |

28. What does a 40% chance of rain mean ?

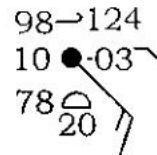
- (1) The forecaster is correct 40% of the time
- (2) There will be rain in 40% of the forecast region
- (3) The forecast has a 40% chance of being right
- (4) Any point location in the forecast region has a 40% chance of rain

29. The strongest portion of a cyclone including strong winds any heavy rain is the :

- | | |
|------------------|----------------|
| (1) Eye | (2) Eye wall |
| (3) Feeder bands | (4) Wall cloud |

30. Using the station plot given below, the pressure at the station is :

- | | |
|---------------|----------------|
| (1) 998 hPa | (2) 978 hPa |
| (3) 912.4 hPa | (4) 1012.4 hPa |



31. What time of the day are thunderstorms generally most common :

- | | |
|-------------------|---------------------|
| (1) Early morning | (2) Around midnight |
| (3) Around noon | (4) Late afternoon |

32. Positive gravity anomalies are often associated with :

- (1) deep ocean trenches
- (2) mid oceanic ridge
- (3) large cavern system beneath the Earth's surface
- (4) all of these

33. Hematite is a substance :
- | | |
|-------------------|-----------------------|
| (1) Diamagnetic | (2) Paramagnetic |
| (3) ferromagnetic | (4) Antiferromagnetic |
34. The latitude correction in gravity is maximum at :
- | | |
|----------------|----------------|
| (1) 0° | (2) 45° |
| (3) 60° | (4) 90° |
35. Which of the following methods is best suited to estimate the resistivity variations in the upper mantle ?
- (1) Magnetotellurics
 - (2) Electrical resistivity
 - (3) Controlled Source Electromagnetics
 - (4) Ground Penetrating Radar
36. The SP anomaly over ore bodies :
- (1) always positive
 - (2) always negative
 - (3) can be both (a) and (b)
 - (4) depends on the depth and dimension of ore body
37. Why is strong heating of the ground by the sun associated with thunderstorm ?
- (1) leads to greater instability
 - (2) reduce the relative humidity
 - (3) reduces the dew point
 - (4) increases the pressure gradient
38. In stratosphere UV radiation is absorbed by the ozone layer so lapse rate is :
- (1) Positive
 - (2) negative
 - (3) zero
 - (4) may be positive or negative both

- 39.** Cyclones are less prominent in Arabian sea than Bay of Bengal because :
- (1) Lower SST
 - (2) Stronger winds over Arabian sea
 - (3) Less fresh water input from the land
 - (4) Higher salinity of Arabian sea
- 40.** The most important greenhouse gas is :
- | | |
|--|-------------------------------------|
| (1) CO_2 and CFC | (2) CO_2 and CH_4 |
| (3) CO_2 and H_2O | (4) CO_2 and SO_2 |

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.** Describe the difference between profiling and sounding in electrical resistivity survey. Explain the configurations used for these surveys.
- 02.** Define monsoon. Discuss various components of the summer monsoon.
- 03.** What do you understand by induced and remnant magnetization of rocks ?
- 04.** What do you understand by NMO and DMO in seismic data interpretation ?
- 05.** What are the differences between tropical and extratropical cyclone ?
- 06.** Discuss the application of Geophysical method in subsurface imaging.
- 07.** Discuss the basic principles of gravity and magnetic method in Geophysics.
- 08.** Define the solar constant and albedo. Describe with the help of a diagram the heat balance of earth-atmosphere system.
- 09.** Explain the dynamics of thunderstorm.
- 10.** What is veering and backing of wind and the type of advection associated with it ?

Question No.

Page for Short Answer

Question No.

Page for Short Answer

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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 30 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 नत्काल 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 का/की, भागी होगा/होगी।