ENTRANCE EXAMINATIONS – 2018

(Ph.D. Admissions - January 2019 Session)

Ph.D. Earth, Ocean and Atmospheric Sciences

Hall Ticket No.	

Time : 2 hours

Max. Marks : 80

INSTRUCTIONS

1. Write your Hall Ticket Number in the OMR Answer Sheet given to you. Also write the Hall Ticket Number in the space provided above on the question paper booklet.
2. All questions carry equal marks.
3. The question paper consists of 80 objective type questions of one mark each. There is **negative marking of 0.33** for **each wrong answer.**
4. The question paper consists of Part 'A' and Part 'B'.
5. Answers are to be marked on the **OMR answer sheet** following the instructions provided there upon.
6. Hand over the OMR answer sheet at the end of the examination to the Invigilator.
7. No additional sheets will be provided. Rough work can be done in the question paper itself/ space provided at the end of the booklet.
8. Non-programmable calculators are allowed.

PART-A

1. Which of the following is an essential element of report writing?
   - A. Research Methodology
   - B. Reference
   - C. Conclusion
   - D. All the above
2. Census of India is
   - A. an internal data source
   - B. a syndicate data source
   - C. non-governmental data source
   - D. governmental data source
3. Which of the following is not a measure of central tendency?
   - A. Percentile
   - B. Quartile
   - C. Standard deviation
   - D. Mode

4. Find the missing numbers in the sequence 2, 3, 4, 7, 6, 11, 8, ….., 10, 19
   A. 13
   B. 15
   C. 14
   D. 16
5. Research is primarily
   A. finding solution of any problem
   B. searching again and again
   C. working in a scientific way to find truth of any problem
   D. none of the above
6. Microchip was invented by
   A. Microsoft
   B. IBM
   C. Intel
   D. DELL
7. The best fitted trend line is one for which sum of squares of residuals is
   A. Maximum
   B. Minimum
   C. Positive
   D. Negative
8. The process of systematic arrangement of data in rows and columns is called
   A. Arrangement
   B. Classification
   C. Array
   D. Tabulation
9. The correlation coefficient between U = X and V = -X is
   A. +1
   B. -1
   C. 0
   D. None of the above
10. The objectivity of the research be enhanced through
   A. its validity
   B. its reliability
   C. its impartiality
   D. All the above
11. A research paper is a brief report of research work based on
   A. primary data only
   B. secondary data only
   C. both primary and secondary data
   D. none of the above
12. One of the following search engine is exclusively meant for science-specific information
   A. Google
   B. Bing
   C. Altavista
   D. SCIRUS
13. Plagiarism refers to
   A. illegal duplication of print
   B. converting data in survey and research reports
   C. presenting ideas and expression of others as they are your own without proper acknowledgment
   D. making errors in paraphrasing or citations

14. A reasoning where we start with certain particular statements and conclude with a universal statements is called
    A. inductive reasoning
    B. normal reasoning
    C. deductive reasoning
    D. none of the above
15. Qualitative research
    A. is the same as quantitative research
    B. is subjective in nature
    C. is objective in nature
    D. include rigorous mathematical calculations
16. The mean of a distribution is 14 and the standard deviation is 5. What is the value of the coefficient of variation?
    A. 35.7%
    B. 45.7%
    C. 25.7%
    D. 27.8%
17. Ram runs faster than Raju. Teju runs faster than Ram. Raju runs faster than Teju. If the first two statements are true, the third one is
    A. False
    B. True
    C. Uncertain
    D. All the above
18. If an error of 2% in excess is made while measuring the side of a square, how much percentage of error is involved in the calculated area of the square
    A. 2.02%
    B. 3.0%
    C. 4.04%
    D. 4%
19. Mean, median and mode are all examples of
    A. measures of central tendency
    B. measures of correlation
    C. measures of variation
    D. measures of coefficients
20. A ratio represents the relation between
    A. Part and Whole
    B. Part and Part
    C. Whole and Whole
    D. All the above
21. If the area of a rectangle is 20 sq. cm and its diagonal is $\sqrt{41}$ cm, the perimeter is
    A. 18
    B. 22
    C. 41
    D. 16
22. Which one of the following is called a non-probability sampling?
    A. Systematic sampling
    B. Stratified random sampling
    C. Quota sampling
    D. Cluster sampling

23. What is the value of log_5 512 if log 2 = 0.3010 and log 3 = 0.4771
    A. 2.85
    B. 2.967
    C. 3.876
    D. 4.121
24. Which one of the following methods serve to measure correlation between two variables?
    A. Scatter Diagram
    B. Coefficient of Rank Correlation
    C. Frequency Distribution
    D. Two-way table
25. The independent variable refers to
    A. a variable which serves as the aim of an experiment
    B. the variable which shows us the effect of the manipulation
    C. the variable being manipulated or varied in some way by the researcher
    D. the variable which is only used in the control condition
26. If the unknown parameters to be estimated exceeds the number of equations then
    A. Solutions become infinite
    B. No solution exists
    C. Unique solution exists
    D. None of the above
27. A theory
    A. is independent of research methodology
    B. should be viewed uncritically
    C. is an accumulated body of knowledge
    D. includes inconsequential ideas
28. The measure of the extent to which responses vary from the mean is
    A. The mode
    B. The standard deviation
    C. The variance
    D. The normal distribution
29. Which environmental pollutants are responsible for acid rain?
    A. Nitrous oxide and sulphur dioxide
    B. Ozone and Carbon dioxide
    C. Carbon monoxide and carbon dioxide
    D. Carbon dioxide and Nitrogen
30. An outlier is
    A. A score that is left out of the analysis because of missing data
    B. A type of variable that cannot be quantified
    C. An extreme value at either end of a distribution
    D. None of the above
31. Which of the following word does NOT belong with the others?
    A. Noun
    B. Preposition
    C. Adverb
    D. Punctuation
32. Find the next series in the string FAG, GAF, HAI, IAH, ...
    A. JAK
    B. HAL
    C. JAI
    D. HAK

33. The Internet Protocol (IPv4) is an example of a
    A. connection-less network layer protocol
    B. connection-oriented network layer protocol
    C. connection-less transport layer protocol
    D. connection-oriented transport layer protocol
34. Which one of the following is best described as a kernel for Linux?
    A. Export
    B. Micro
    C. Layered
    D. Monolithic
35. Of the following, which one has highest calorific value?
    A. Wood
    B. Petrol
    C. LPG
    D. Methane
36. A particle having at least one dimension less than 10^{-7} meter, is known as
    A. Macro particle
    B. Nano particle
    C. Milli particle
    D. Micro particle
37. Endemic species are found
    A. In a particular area
    B. Near the equator
    C. At the North pole
    D. At the South pole
38. Ultra High Frequency waves normally propagate by means of
    A. Ground waves
    B. Sky waves
    C. Space waves
    D. Surface waves
39. The waves used in common TV remote control are
    A. X-rays
    B. UV rays
    C. Infra-Red rays
    D. Gamma rays
40. Which of the following thermometer is independent of the substance or material used in its construction?
    A. ideal gas thermometer
    B. resistance thermometer
    C. mercury thermometer
    D. All the above

PART-B

41. Which of the following magmas will be more viscous?
    A. Magma rich in SiO_2
    B. Magma containing high concentration of alkalis and magnesium
    C. Magma deficient in SiO_2
    D. Both 'A' and 'B'

42. Spinifex texture is the characteristic of texture of
    A. Gabbro
    B. Dolerite
    C. Komatiite
    D. Basalt
43. Ozone layer lies in the
    A. Troposphere
    B. Stratosphere
    C. Thermosphere
    D. Mesosphere
44. Gas molecules that absorb thermal infrared radiation and present in large quantity to affect climate system are known as
    A. diatomic molecules
    B. noble gases
    C. variable gases
    D. greenhouse gases
45. Which geophysical method is suitable for mineral discrimination?
    A. Self-potential method
    B. Gravity method
    C. Induced polarization method
    D. Seismic method
46. The acceleration due to gravity at the earth's centre is
    A. Zero
    B. 9.8 m/sce^2
    C. 4.9 m/sce^2
    D. 1.0 m/sce^2
47. The mixed layer directly comes in contact with the abyss in
    A. in the eastern equatorial pacific
    B. in the western equatorial Indian Ocean
    C. around Antarctica
    D. in Bay of Bengal
48. Seasons on Earth occur because of
    A. disproportionate distribution of land mass in northern and southern hemispheres
    B. tilt of the Earth's axis of rotation
    C. changes in the specific heat of water and land mass and the wind circulation that is a consequence of the changes in the temperature
    D. Non-linearity in ENSO dynamics
49. The characteristic mineral of lower mantle is
    A. Rutile
    B. Anatase
    C. Perovskite
    D. Spinel

50. Stishovite is a high-pressure polymorph of
    A. Olivine
    B. Garnet
    C. Zeolite
    D. Quartz
51. The spatial scale of a mesoscale systems is of the order of
    A. meters to 1 km
    B. km to hundreds of km
    C. a few thousands of km
    D. a few km
52. Cyclonic system in the Northern Hemisphere is not associated with one of the following
    A. Low pressure
    B. Counter-clockwise wind
    C. Clockwise wind
    D. rising air
53. Magnetic meridian is a
    A. plane
    B. line
    B. point
    D. None of the above
54. If the length of a current carrying wire is doubled its resistivity becomes
    A. Half
    B. Doubled
    C. Remains the same
    D. Becomes 4 times
55. Which of the following waves are equatorially trapped?
    A. Kelvin waves
    B. Rossby waves
    C. Mixed Rossby-Gravity waves
    D. All the above
56. In removing the heat from the oceans to the atmosphere, the latent heat is
    A. more powerful than the sensible heat
    B. similar to the sensible heat
    C. negligible
    D. less powerful than the sensible heat
57. Which discontinuity separates inner and outer cores
    A. Mohorovicic
    B. Conrad
    C. Repetti
    D. Lehman
58. Paleomagnetismwas so important in discovering plate tectonics because
    A. It allowed measurement of mountain building rates
    B. It illustrated the location of the north pole
    C. It illustrated sea floor spreading
    D. It allowed the depth of the oceans to be measured

59. Which of the following are NOT features associated with mid-ocean ridges?
    A. Explosive volcanic eruptions
    B. A central valley
    C. Underwater magma production
    D. Widespread hydrothermal activity
60. Which of the following theories does not apply to the ENSO process?
    A. Bjernkes feedback
    B. Delayed oscillator theory
    C. Recharge discharge theory
    D. WISHE theory
61. High-nutrient, low-chlorophyll (HNLC) regions are regions of the ocean where the abundance of phytoplankton is low due to
    A. low macronutrients
    B. strong atmospheric easterlies
    C. tropical oceanic temperatures
    D. low micronutrients such as Fe
62. Which of the following mineral crystallizes in tetragonal system
    A. Garnet
    B. Orthoclase
    C. Livine
    D. Rutile
63. When molar Al_2O_3 / (K_2O + Na_2O + CaO) > 1.0 then according to Shand's classification of Alumina saturation, the rock is classified as
    A. Metaluminous
    B. Peraluminous
    C. Peralkaline
    D. Alkaline
64. At any given time, clouds cover the Earth's surface by about
    A. 85%
    B. 40%
    C. 70%
    D. 25%
65. The gradient wind speed in an anticyclone is
    A. smaller than the geostrophic wind speed
    B. greater than the geostrophic wind speed
    C. identical to the geostrophic wind speed
    D. None of the above
66. Area of triangle formed by the vertices (0,0), (-7,0) and (0,4) is
    A. 14 B. 25 C. 28 D. 32
67. Which of the following rock characterize deep water environment?
    A. Marl
    B. Sandstone
    C. Loess

D. Carbonaceous shale

68. The gravity field of the earth decreases
    A. Only with height
    B. Only with depth
    C. Both with height and depth
    D. Remains constant
69. Great mass extinction event in Earth history occurred during
    A. Permian
    B. Jurassic
    C. Cambrian
    D. Eocene
70. The trilobite fauna is restricted to
    A. Lower Palaeozoic
    B. Upper Palaeozoic
    C. Mesozoic
    D. Cenozoic
71. Which of the following statements about the barrier layer is FALSE?
    A. It is the layer within the isothermal layer and below the mixed layer
    B. A Barrier layer is seen in Bay of Bengal through most of the year
    C. It is a layer in which the salinity decreases rapidly with depth
    D. it can be due to either advection of fresh surface water or rainfall
72. Oceanic tides are caused by
    A. Interaction between earth and moon
    B. shifting of plates on the ocean plates
    C. Ekman currents
    D. meridional variations in salinity
73. Which of the following meteorological and climatological techniques records weather conditions at least once every 6 hours and in some locations every hour?
    A. Climatological services
    B. Synoptic stations
    C. Precipitation stations
    D. World Meteorological Organization
74. A balance between the Coriolis and Pressure Gradient Force is termed as the
    A. gradient wind
    B. geostrophic wind
    C. cyclostrophic wind
    D. ageostrophic wind
75. The highest wind speed and heavy rain of a hurricane found in the
    A. Eye B. Eye wall C. Cloud wall D. None of the above
76. Main Central thrust in Himalayan orogen separates
    A. Siwalik hills and lesser Himalayan sequences
    B. Subathu Formation and lesser Himalayan sequences
    C. Lesser Himalayan sequences and high Himalayan crystalline
    D. None of above

77. A thrust is a
    A. Normal fault
    B. Low angle reverse fault
    C. Decollement
    D. wrench fault
78. Transform faults are characterized by
    A. Lateral slip of plates
    B. Oblique slip of plates
    C. Vertical slip of plates
    D. Normal slip of plates
79. Depleted mantle is characterised by
    A. High $^{143}Nd/^{144}Nd$, low $^{87}Sr/^{86}Sr$ and low $^{206}Pb/^{204}Pb$
    B. Low $^{143}Nd/^{144}Nd$, low $^{87}Sr/^{86}Sr$ and low $^{206}Pb/^{204}Pb$
    C. High $^{143}Nd/^{144}Nd$, high $^{87}Sr/^{86}Sr$ and high $^{206}Pb/^{204}Pb$
    D. High $^{143}Nd/^{144}Nd$, high $^{87}Sr/^{86}Sr$ and low $^{206}Pb/^{204}Pb$
80. Using the apparent resistivities $\rho_{0.1}$ and ρ_{10} measured at 0.1 and 10 Hz, the Percent Frequency Effect (PFE) is defined as
    A. $\frac{(\rho_{0.1}-\rho_{10})}{\rho_{10}} X100$
    B. $\frac{(\rho_{0.1}+\rho_{10})}{\rho_{10}} X100$
    C. $\frac{(\rho_{0.1}X\rho_{10})}{\rho_{10}} X100$
    D. $\frac{(\rho_{0.1}-\rho_{10})}{\rho_{10}} X10$

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