

**Entrance Examinations – 2018**  
**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.

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**PART-A**

1. If a researcher is studying the effect of using laptops in his classroom to ascertain their merit and worth, he is likely conducting which type of research
  - A. Basic
  - B. Applied
  - C. Evaluation
  - D. Experimental
2. Which of the following is the first step in starting the research process?
  - A. Searching sources of information to locate problem.
  - B. Survey of related literature
  - C. Identification of problem
  - D. Searching for solutions to the problem
3. Information is
  - A. Raw data
  - B. Processed data
  - C. input data
  - D. Organized data

4. Which of the following is not covered under Intellectual Property Rights?
  - A. Patents
  - B. Trade Marks
  - C. Thesaurus
  - D. Copyrights
5. If the standard deviation of a population is 9, the population variance is:
  - A. 9
  - B. 81
  - C. 3
  - D. 27
6. Which of the following is not a "Graphic representation"?
  - A. Pie Chart
  - B. Bar Chart
  - C. Table
  - D. Histogram
7. Mean, Median and Mode are
  - A. Measures of deviation
  - B. Ways of sampling
  - C. Measures of central tendency
  - D. None of the above
8. If blue means green, green means yellow, yellow means orange, orange means black, black means white, white means red and red means pink then what is the color of human blood?
  - A. Black
  - B. Red
  - C. White
  - D. None of the above
9. Choose the word which is not similar to the other words in the group.
  - A. Airplane
  - B. Car
  - C. Cycle
  - D. Scooter
10. If ANY = 40, MANY = 53 then MANIAC=?
  - A. 41
  - B. 42
  - C. 43
  - D. 44
11. What is the standard deviation of a sampling distribution called?
  - A. Sampling error
  - B. Sample error
  - C. Standard error
  - D. Simple error
12. The mean of a distribution is 14 and the standard deviation is 5. What is the value of the coefficient of variation?
  - A. 60.4%
  - B. 48.3%
  - C. 35.7%
  - D. 27.8%

13. A negative correlation is present when
- two variables move in the same direction
  - two variables move in opposite directions
  - one variable is constant and other changes
  - None of the above
14. What are the main objectives of data analysis?
- Making the data meaningful
  - Testing null hypothesis
  - Acquiring meaningful results
  - All the above
15. Which one of the following should be used when population under investigation is infinite?
- census method
  - sample method
  - neither sample nor census method
  - either census or sample method
16. Which one is a computed measure of absolute variation?
- Standard deviation
  - Range
  - Quartile deviation
  - None of the above
17. The characteristics of good sample is
- Clarity
  - Flexibility
  - Stability
  - All the above
18. Which one of the following is a non-parametric test?
- Median test
  - Analysis of covariance
  - t-test
  - Critical ratio
19. Identify the sequence in the following string  
ELFA GLHA ILJA \_\_\_\_\_ MLNA
- LLMA
  - KLMA
  - KLLA
  - OLPA
20. In a classified message if LIVING is coded as KGSHLD, how BUDDHA be coded?
- ATEEIB
  - ATACFX
  - AAKGSH
  - ATCCGZ
21. If a tree is 7<sup>th</sup> from left end and 14<sup>th</sup> from right end in a row of trees how many trees are there in the row?
- 18
  - 19
  - 21
  - 20

22. A man is 24 years older than his son. In two years, his age will be twice the age of his son. What is the present age of his son?
- A. 18
  - B. 27
  - C. 26
  - D. 22
23. M scores more than N but less than P. Q scores more than N but less than M. Who is the lowest scorer?
- A. Q
  - B. N
  - C. M
  - D. P
24. Which word does NOT belong with others?
- A. Acute
  - B. Right
  - C. Obtuse
  - D. Parallel
25. Find the numbers followed by 7 in the series 2, 15, 4, 12, 6, 7, ?, ?
- A. 8, 0
  - B. 8, 8
  - C. 8, 4
  - D. 8, 10
26. THEN is coded as VFGL in certain code. How the WORD may be coded?
- A. UQPF
  - B. YMTB
  - C. YMVB
  - D. VQFP
27. Odometer is to mileage as compass is to
- A. direction
  - B. hiking
  - C. needle
  - D. speed
28. The standard error is a statistical measure of the
- A. degree to which a sample has been accurately stratified
  - B. extent to which a sample mean is likely to differ from the population mean
  - C. normal distribution of scores around the sample mean
  - D. clustering of scores at each end of a survey scale
29. If sample size increases the sampling error
- A. Reduces
  - B. Increases in proportion to sample size
  - C. Does not change
  - D. None of the above
30. The term 'data processing error' refers to
- A. Problems with the implementation of the research process
  - B. The unavoidable discrepancy between the sample and the population
  - C. Activities or events related to the sampling process
  - D. Faulty techniques of coding and managing data

31. An outlier in data is
- A. An extreme value at either end of a distribution
  - B. A type of variable that cannot be quantified
  - C. A score that is left out of the analysis because of missing data
  - D. A compulsive liar who is proud to be gay
32. When to conduct a multivariate analysis test?
- A. If a third variable might be moderating the relationship
  - B. If there could be an intervening variable
  - C. If the relationship between two variables might be spurious
  - D. All the above
33. Normal Distribution is
- A. Bimodal
  - B. Symmetric
  - C. Skewed
  - D. Uniform
34. The quantitative approach requires
- A. correctness of calculation
  - B. selective use of data
  - C. a scientific rigor in the collection of data
  - D. All the above
35. A smaller sample size can be used if
- A. greater accuracy is required
  - B. more detailed analysis is to be undertaken
  - C. the variability in the population is smaller
  - D. the variability in the population is large
36. Which of the following is not a measure of dispersion?
- A. Median
  - B. Variance
  - C. Standard deviation
  - D. Quartile deviation
37. Highly skewed data is best described by
- A. Range
  - B. Variance
  - C. Quartile deviation
  - D. Percentiles
38. A correlation coefficient cannot take the value
- A. 0
  - B. -1
  - C. 1.5
  - D. 0.556
39. The regression line may be referred to as
- A. the least squares line
  - B. the line of best fit
  - C. the regression of y on x
  - D. All the above
40. Random numbers are used to
- A. to change the parameters
  - B. model the problem variability
  - C. add predictability to the output variables
  - D. model the status variables

PART-B

41. Which of the following magmas will be more viscous?
- Magma rich in  $\text{SiO}_2$
  - Magma containing high concentration of magnesium, alkalis and aluminium
  - Magma deficient in  $\text{SiO}_2$
  - Magma rich in  $\text{Ca}^{2+}$ ,  $\text{Mg}^{2+}$  and  $\text{Fe}^{2+}$  ions
42. Mariana Trench is the deepest known point in Earth's oceans which is located in
- Eastern North Pacific
  - Western South Pacific
  - Western North Pacific
  - Eastern South Pacific
43. Stishovite is a polymorph of
- Olivine
  - Garnet
  - Zeolite
  - Quartz
44. The Koenigsberger ratio is defined as
- Remanent magnetization / induced magnetization
  - induced magnetization / remanent magnetization
  - induced magnetization / 1.5
  - Remanent magnetization / 3.0
45. Peridotites containing olivine and orthopyroxene (enstatite, bronzite, hypersthene) as essential minerals, is known as
- Wherlite
  - Harzburgite
  - Lherzolite
  - Limburgite
46. Which of the following currents is not found in the Indian Ocean
- Wyrki Jet
  - Canary current
  - Agulhas current
  - Somali current
47. The most widely used antenna in GPS is
- Slotted antenna
  - Paraboid antenna
  - Microstrip antenna
  - Horn antenna
48. The characteristic assemblage of eclogite facies
- Lawsonite – glucophane-chloritoid
  - Garnet – diopside-ilmanite
  - Garnet – pigeonite-epidote
  - Garnet – omphacite-rutile
49. Which of the following is a stable air mass?
- continental polar
  - maritime
  - maritime tropical
  - All of the above

50. Which one is an apparent force?  
A. Magnetic force  
B. Coriolis force  
C. Pressure gradient.  
D. Viscous force
51. The acceleration due to gravity at the centre of the Earth is  
A. 9.2 meter/sec<sup>2</sup>  
B. zero  
C. 9.8 meter/sec<sup>2</sup>  
D. 4.9 meter/sec<sup>2</sup>
52. Crenulation cleavage develops during  
A. Thrusting  
B. Rifting  
C. Superimposed deformation  
D. Extension
53. The acceleration due to gravity calculated by Clairaut's theorem is valid for  
A. Geoid  
B. Spheroid  
C. Earth's topography  
D. Circle
54. Loess corresponds to  
A. Eolian deposits  
B. Braided river flood plain  
C. Alluvial fan  
D. Lake deposits
55. If the length of a current carrying electric conductor is halved its resistivity  
A. becomes half  
B. becomes double  
C. does not change  
D. becomes zero
56. The average salinity of seawater is about ----- psu.  
A. 3.5  
B. 0.35  
C. 35.5  
D. 3.5
57. Geostrophic balance describes the force balance between -----  
A. acceleration and pressure gradient force  
B. advection and diffusion  
C. gravitational force and pressure gradient force  
D. coriolis force and pressure gradient force
58. In the lower troposphere, the main source of heat is  
A. insolation  
B. geothermal energy  
C. terrestrial radiation  
D. absorption of the UV radiation by Ozone
59. 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 crystallines  
D. Higher Himalayan sequences with Tibet

60. Specific yield of unconfined aquifer indicates
- A. Water capacity
  - B. Volume of water
  - C. Water retained
  - D. Nature of cementing material
61. Apparent resistivity is defined as
- A. the true resistivity of the bottommost formation
  - B. the true resistivity of a homogeneous fictitious layer
  - C. average of all the true resistivities of the formations
  - D. the true resistivity of the topmost formation
62. The trilobite fauna is restricted to
- A. Lower Paleozoic
  - B. Upper Paleozoic
  - C. Mesozoic
  - D. Cenozoic
63. The particle motion in a compressional wave is
- A. in the direction of propagation
  - B. opposite to the direction of propagation
  - C. perpendicular to the direction of propagation
  - D. no motion at all
64. The great mass extinction event occurred during
- A. Permian
  - B. Jurassic
  - C. Cambrian
  - D. Eocene
65. Walker circulation is manifested by
- A. inherent tropical radiation characteristics
  - B. conditional instability
  - C. non-uniform heating across the tropics
  - D. weak Coriolis force
66. Typical period of revolution of a polar-orbiting Earth satellite, orbiting at a height of ~700 km from the Earth's surface is
- A. 24 hrs
  - B. 65 minutes
  - C. 12 hrs
  - D. 100 minutes
67. Placer deposits are found
- A. on beach and in near shore areas
  - B. in Deep Ocean basins
  - C. in Trenches
  - D. in rift-valleys
68. Density gradient in oceans tend to produce one the following phenomenon.
- A. tide
  - B. tsunamis
  - C. internal wave
  - D. ripples
69. Upon applying a force if the shape of a body is changed then the corresponding stress is
- A. Tensile stress
  - B. Bulk stress
  - C. Shearing stress
  - D. Compressive stress



70. Most common location for tropical cyclones formation with about 33% of global number of tropical cyclones.
- Western Pacific
  - Atlantic basin
  - Indian Ocean
  - Southern Ocean
71. Wadati diagram is useful to find out
- Velocity of the seismic waves
  - Origin time of an earthquake
  - The arrival time of the seismic waves
  - The epicentral distance
72. Mountains such as Rockies and Himalayas excite -----in the atmosphere
- stationary Rossby waves
  - equatorial Kelvin waves
  - shallow gravity waves
  - equatorial Rossby waves
73. Lehman discontinuity is located at a depth of
- 120 km
  - 690 km
  - 240 km
  - 410 km
74. What is the area of Indian Exclusive Economic Zone (EEZ)?
- 1.5 million sq. km
  - 10.25 million sq. km
  - 2.35 million sq. km
  - 5.75 million sq. km
75. During summer monsoon, Tibetan anticyclone is most intimately associated with
- subtropical westerly Jetstream.
  - Somali Jetstream
  - Madden-Julian oscillation
  - tropical easterly Jetstream
76. The half-life period of Sm-Nd isotope system is
- 106 Ga
  - 103 Ma
  - 200 Ma
  - 5.0 Ga
77. What is the percentage of mass of the planet Earth make up the outer core?
- only 1%
  - about 32%
  - about 25%
  - about 5%
78. Structural unconformity is formed by
- Seismicity
  - No sedimentation & erosion process
  - Sea level changes
  - Compressional forces
79. The western boundary currents are -----, -----, and -----.
- cold, deep, fast
  - warm, deep, fast
  - warm, deep, slow
  - cold, shallow, slow

80. Entropy of dry atmospheric air is proportional to
- A. its potential temperature
  - B. temperature
  - C. natural logarithm of its potential temperature
  - D. natural logarithm of its temperature

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