Entrance Examinations – 2019
Ph.D. Earth, Ocean and Atmospheric Sciences

Hall Ticket No.

Time : 2 hours   Max. Marks : 70

INSTRUCTIONS

i)   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.

ii)   All questions carry equal marks.

iii) The question paper consists of 70 objective type questions of one mark each. There is **negative marking of 0.33 for each wrong answer.**

iv)   The question paper consists of Part 'A' and Part 'B'.

v)   Answers are to be marked on the **OMR answer sheet** following the instructions provided there upon.

vi)   Hand over the OMR answer sheet at the end of the examination to the Invigilator.

vii) No additional sheets will be provided. Rough work can be done in the question paper itself/ space provided at the end of the booklet.

PART A

1. Which of the following is the first step in starting the research process?
   A. Searching sources of information to locate research problem
   B. Survey of related literature
   C. Identification of research problem
   D. Searching for solutions to the research problem

2. The arithmetic mean of the direct 100 natural, numbers is
   A. 55.2
   B. 50.5
   C. 25.7
   D. 60.1

3. Action research means
   A. A longitudinal research
   B. An applied research
   C. A research initiated to solve an immediate problem
   D. A research with socioeconomic objective

4. The process not needed in experimental research is
   A. Observation
   B. Content analysis
   C. Manipulation and replication
   D. Controlling

5. A man has some hens and cows. If the number of heads be 48 and the number of feet equals 140, then the number of hens will be
   A. 22
   B. 23
   C. 24
   D. 26

6. A Hypothesis contributes to the development of
   A. Theory
   B. Generalization
   C. Evolution
   D. Concept

7. If $0.75 : x :: 5 : 8$, then x is equal to
   A. 1.12
   B. 1.2
   C. 1.25
   D. 1.30

8. The importance of the correlation coefficient lies in the fact that:
   A. There is a linear relationship between the correlated variables.
   B. It is one of the most valid measure of statistics.
   C. It allows one to determine the degree of strength of the association between two variables.
   D. It is non-parametric method of statistical analysis.

9. Research through experiment and observation is called
   A. Clinical Research
   B. Survey Research
   C. Laboratory Research
   D. Empirical Research

10. The number that follows after the series 80, 10, 70, 15, 60, ----- is
    A. 30
    B. 25
    C. 50
    D. 20

11. The chi-square test is
    A. A measure of statistical error propagation
    B. A mean
    C. A statistical significance test
    D. To calculate mode

12. If the number of unknown parameters exceeds the number of equations in a system then
  A. No solution exists
  B. Infinite solutions exist
  C. Unique solution exists
  D. The solution becomes only zero

13. If log 27 = 1.431, then the value of log 9 is
  A. 0.934
  B. 0.945
  C. 0.954
  D. 0.958

14. The mean of the sample means is
  A. An unbiased estimator of the population mean
  B. A biased estimator of the population
  C. Neither biased nor unbiased
  D. Simply a standard deviation

15. Regression coefficient enables to
  A. Assess whether or not two variables measure the same phenomenon
  B. assess the strength of relationship between a quantifiable dependent variable and one or more quantifiable independent variables
  C. measure the difference between two variables
  D. All the above

16. Which of the following is an initial mandatory requirement for pursuing research?
  A. Developing a research design
  B. Formulating a research question
  C. Deciding about the data analysis procedure
  D. Formulating a research hypothesis

17. Which of the sets of activities best indicate the cyclic nature of action research strategy?
  A. Plan, Act, Observe, Reflect
  B. Reflect, Observe, Plan, Act
  C. Observe, Act, Reflect, Plan
  D. Act, Plan, Observe, Reflect

18. A comprehensive full report of the research process is called
  A. Thesis
  B. Summary Report
  C. Abstract
  D. Article

19. The sum of ages of 5 children born at the intervals of 3 years each is 50 years. What is the age of the youngest child?
  A. 4 years
  B. 8 years
  C. 10 years
  D. None of these

20. $\frac{\log \sqrt{5}}{5} =$
    A. ¼
    B. 1/8
    C. ½
    D. 1/7

21. Which one of the following begins the analysis of qualitative data?
    A. Data management
    B. Classifying and interpreting
    C. Reading
    D. Describing the content

22. A systematic way to solve the research problem is called
    A. Technique
    B. Operations
    C. Research methodology
    D. Research Process

23. Hypothesis must have
    A. Applicability
    B. Durability
    C. Testability
    D. Measurement

24. Fundamental research is otherwise called
    A. Action Research
    B. Survey
    C. Pilot study
    D. Pure Research

25. The difference between a number and its two-fifth is 45. What is the number?
    A. 45
    B. 55
    C. 65
    D. 75

26. A systematic step-by-step procedure following logical process of reasoning is called
    A. Experiment
    B. Observation
    C. Deduction
    D. Scientific method

27. 657- PUT, 758- TUB. What is PUB-?
    A. 678
    B. 557
    C. 857
    D. 658

28. The average of 3 consecutive even numbers is 18, What is the largest of these numbers?
    A. 15
    B. 16
    C. 20
    D. 26

29. If a - b = 3 and $a^2 + b^2 = 29$, find the value of ab.
    A. 12
    B. 14
    C. 16
    D. 10

30. Complete the series. SCD, TEF, UGH, VIJ, ------
    A. CMN
    B. UJI
    C. WKL
    D. IJT

31. If ANY = 40, MANY = 53 then MANIAC=?
    A. 41
    B. 42
    C. 43
    D. 44

32. Find the missing numbers in the following sequence; 2, 3, 4, 7, 6, 11, 8, 15, -----, 19
    A. 16
    B. 10
    C. 12
    D. 14

33. The aim of qualitative analysis of scientific data is
    A. To manipulate the data to achieve the objectives of research
    B. To pave the way for better understanding of the data
    C. To build cause and effect relationships
    D. To triangulate

34. The Report submitted when there is a time lag between data collection and presentation of result is called
    A. Thesis
    B. Interim report
    C. Summary Report
    D. Article

35. Given $x_1=17$, $x_2=21$, $x_3=0$, $x_4=17$, then $\sum_{i=1}^{4} x$ equals?
    A. 34
    B. 55
    C. 38
    D. None of the them

PART B

36. When was the earth's magnetic field quieter for longer period in geological past?
    A. during the Cretaceous period from 120 to 84 Ma
    B. during the Jurassic period from 166 to 155 Ma
    C. during the beginning of Tertiary period when dinosaurs and many other species were extinct
    D. during the beginning of Phanerozoic Eon when first multicelled organisms appeared on earth

37. Spinifex texture is a characteristic feature of
    A. Gabbro
    B. Dolerite
    C. Komatiite
    D. Basalt

38. Loess corresponds to
    A. Eolian deposits
    B. Braided river flood plain
    C. Alluvial fan
    D. Lake deposits

39. In the late 20 century, the 'Ozone Hole' was prominent over the
    A. South Pole during austral spring
    B. Arctic during austral spring
    C. Antarctic during boreal spring
    D. Himalayas during summer monsoon.

40. Potential temperature is invariant during the following
    A. isobaric process
    B. adiabatic process
    C. isothermal process
    D. all of the above.

41. Where did P- and S-wave velocities are found maximum within the Earth?
    A. within the inner core
    B. within the lower-most crust
    C. within the lower-most mantle
    D. at Mohorovicic boundary

42. The first primitive mammals have appeared during.
    A. Triassic
    B. Palaeocene
    C. Carboniferous
    D. Permian

43. The average density of surface seawater is about ----------
    A. 1027 g/m³
    B. 1027 g/cm³
    C. 1.027 kg/m³
    D. 1027 kg/m³

44. The increase in nutrient concentrations is associated with ----------
    A. upwelling
    B. downwelling
    C. both A and B
    D. None of these

45. 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

46. Why did P-Waves travel faster than S-Waves in Solid media?
    A. because of contribution of bulk modulus in P-wave velocity
    B. because of shear modulus value equal to zero
    C. because P-waves are displaced parallel to wave motion
    D. because S-waves vibrates perpendicular to the general wave motion

47. The western boundary currents are ---------- and ----------.
    A. cold and fast
    B. warm and fast
    C. cold and slow
    D. warm and slow

48. Coesite is a high pressure polymorph of
    A. Diopside
    B. Hypersthene
    C. Olivine
    D. Quartz

49. Pick the right statement relevant to the evolution of asesimic ridges of global oceans
    A. The source (except tertiary one) lies at deeper depth
    B. ridge age linearly changes
    C. not associates with seismicity
    D. all of the above statements are true

50. Density gradient in oceans tend to produce one the following.
    A. tide
    B. Tsunami
    C. internal wave
    D. ripples

51. The following finite difference scheme, when used in a weather model, is always unstable.
        A. Trapezoidal implicit scheme
        B. Implicit backward scheme
        C. Matsuno scheme
        D. Explicit forward scheme

52. What is the major difference between passive and active continental margins?
        A. One associates with the seismicity, but the other one is not
        B. One associates with the lithospheric plate boundary, but the other one is not
        C. One has continental rise, but the other one instead has subduction zone
        D. All of the above

53. A thrust is a
        A. normal fault
        B. low angle reverse fault
        C. decollement
        D. wrench fault

54. The vorticity equation in isobaric coordinates does not contain contribution from
        A. tipping term
        B. solenoidal term
        C. divergence term
        D. all of the above

55. Deepest point in world is Mariana Trench which lies in
        A. Eastern North Pacific
        B. Western South Pacific
        C. Western North Pacific
        D. Eastern North Pacific

56. What is the thickness of inner core?
        A. 2200 km
        B. 2900 km
        C. 1200 km
        D. 100 km

57. The characteristic assemblage of eclogite facies
        A. Lawsonite -- glaucophane
        B. Garnet – diopside
        C. Garnet - pigeonite
        D. Garnet - omphacite

58. The equatorial Undercurrent is not a geostrophic current because
        A. it represents a force balance between horizontal pressure gradient force and friction force
        B. it represents a force balance between horizontal pressure gradient force and coriolis force
        C. it represents a force balance between coriolis force and friction force
        D. None of the above

59. The moisture content of the atmosphere decreases rapidly with height, which can be explained by
    A. Clacius-Clapeyron equation
    B. Wien's law
    C. Boys-Ballot law
    D. Kirchoff's law

60. Age of the ocean floor decreases from
    A. deep oceans to continental shelf
    B. trenches to the mid-ocean ridge
    C. trench to continental margin
    D. mid-ocean ridge to the continental margin

61. Ophiolites corresponds to
    A. Abducted slices oceanic crust and mantle
    B. Basaltic eruptions in island arc
    C. Ultramafic intrusions in continental rift
    D. Basaltic eruptions in Ocean islands

62. Which of the following statements is FALSE?
    A. Easterlies are seen over the equator from surface through 80 km height
    B. The tropospheric subtropical Jetstreams in both hemispheres are westerlies.
    C. The winter polar night jet in the stratosphere/lower mesosphere winter is from east to west.
    D. The subtropical jets owe their existence to meridional temperature shear.

63. The oceans cover ---------- of the surface of the Earth
    A. 51%
    B. 61%
    C. 71%
    D. 81%

64. Which of the following rock characterize deep water environments?
    A. Marl
    B. Sand stone
    C. Loess
    D. Carbonaceous shale

65. How did seismologists determine the magnitude of an earthquake?
    A. using the distances from epicentre and amplitudes of S-waves
    B. using the locations of hypocentre and epicentre, and crustal deformation
    C. using the effects of earthquake on life and property loss
    D. based on seismic wave velocities in solid and fluid media within the earth

66. The great mass extinction event occurred during
    A. Permian
    B. Jurassic
    C. Cambrian
    D. Eocene

67. ---------- is isolated elevation rising 100 m or more from the sea floor and with small summit area and are virtually all volcanic origin.

    A. Sill

    B. Seamount

    C. Ridge

    D. Trench

68. Under the cyclonic atmospheric circulation in Northern Hemisphere, one would expect Ekman ---------- and ----------.

    A. upwelling and convergence

    B. upwelling and divergence

    C. downwelling and convergence

    D. downwelling and divergence

69. The band of longwave radiation energy that passes from earth surface through in the atmosphere transparently, and the exception within the band due to ozone absorption, are, respectively

    A. 6.3-15 µm, 11.5 µm

    B. 0.4-6.3 µm, 4 µm

    C. 8-16 µm, 55 µm

    D. 8-12 µm, 9.6 µm

70. The characteristic mineral of lower mantle

    A. Rutile

    B. Anatase

    C. Perovskite

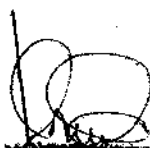   D. Spinel

University of Hyderabad

Entrance Examinations - 2019

School/Department/Centre   : Physics/Earth, Ocean and Atmospheric Sciences

Course/Subject   : Ph.D./Earth, Ocean and Atmospheric Sciences (Code No. V-65)

Q.No.	Answer	Q.No.	Answer	Q.No.	Answer	Q.No.	Answer
1	C	26	D	51	D	76	
2	B	27	D	52	D	77	
3	C	28	C	53	B	78	
4	B	29	D	54	B	79	
5	D	30	C	55	C	80	
6	A	31	A	56	C	81	
7	B	32	B	57	D	82	
8	C	33	B	58	A	83	
9	C	34	B	59	A	84	
10	D	35	D	60	B	85	
11	C	36	A	61	A	86	
12	B	37	C	62	C	87	
13	C	38	A	63	C	88	
14	A	39	A	64	D	89	
15	B	40	B	65	A	90	
16	B	41	C	66	A	91	
17	A	42	A	67	B	92	
18	A	43	D	68	B	93	
19	A	44	A	69	D	94	
20	C	45	C	70	C	95	
21	A	46	A	71		96	
22	C	47	B	72		97	
23	C	48	D	73		98	
24	D	49	D	74		99	
25	D	50	C	75		100	

Note/Remarks : Ph. D. (Earth, Ocean and Atmospheric Sciences) entrance examination consists of 70 MCQs.