A
SET

Booklet No. :

GG - 16

Geo Engineering & Geo Informatics

Duration of Test : 2 Hours **Max. Marks : 120**

Hall Ticket No.

Name of the Candidate : _____

Date of Examination : _____ **OMR Answer Sheet No. :** _____

_____ _____

Signature of the Candidate **Signature of the Invigilator**

INSTRUCTIONS

1. This Question Booklet consists of **120** multiple choice objective type questions to be answered in **120** minutes.
2. Every question in this booklet has 4 choices marked (A), (B), (C) and (D) for its answer.
3. Each question carries **one** mark. There are no negative marks for wrong answers.
4. This Booklet consists of **16** pages. Any discrepancy or any defect is found, the same may be informed to the Invigilator for replacement of Booklet.
5. Answer all the questions on the OMR Answer Sheet using **Blue/Black ball point pen only.**
6. Before answering the questions on the OMR Answer Sheet, please read the instructions printed on the OMR sheet carefully.
7. OMR Answer Sheet should be handed over to the Invigilator before leaving the Examination Hall.
8. Calculators, Pagers, Mobile Phones, etc., are not allowed into the Examination Hall.
9. No part of the Booklet should be detached under any circumstances.
10. The seal of the Booklet should be opened only after signal/bell is given.

1. A system of equations $x+2y+3z=0,\ x+4y+2z=0,\ 2x+6y+\lambda z=0$ has infinitely many solutions if $\lambda =$

(A) 1 (B) 5 (C) 0 (D) 2

2. If one of the eigen values of a square matrix A is 2, then an eigen value of the square matrix $B=A^2+I$ is

(A) 2 (B) 1 (C) 5 (D) 0

3. If a real valued function $f(x)=x^2-5x+6$ satisfies Rolle's theorem at $c\in[2,3]$, then $c=$

(A) 3/5 (B) 5/2 (C) 0 (D) 1

4. If $x=v+w,\ y=w+u$ and $z=u+v$ then $\dfrac{\partial(x,y,z)}{\partial(u,v,w)}=$

(A) –2 (B) 1 (C) 2 (D) –1

5. The value of $\int_c \vec{F}.d\vec{r}$ where $\vec{F}=x^2i-xy^2j$ from (0,0) to (1, 1) along $c: y^2=x$, is

(A) 1/5 (B) 1/15 (C) 1/3 (D) 2/15

6. The gradient of $\phi(x,y,z)=2x^2-y-z^2$ at (2,-1,1).

(A) $8i+j-2k$ (B) $2i-j+2k$ (C) $i+j-2k$ (D) $8i-j-2k$

7. The value of $\int_{(-a,0)}^{(a,0)} xdy+ydx$ along the upper half of the circle $c: x^2+y^2=a^2$ is

(A) $\dfrac{\pi}{4}$ (B) 1 (C) 0 (D) π

8. Any function ϕ satisfying $\dfrac{\partial^2\phi}{\partial x^2}+\dfrac{\partial^2\phi}{\partial y^2}=0$ is called

(A) non-periodic function (B) periodic function
(C) harmonic function (D) regular function

9. If $A_1, A_2, \ldots, A_n$ are exhaustive and mutual exclusive events of a sample space S. Let B be some event then according to Bayes theorem $P(A_i / B) =$

(A) $\frac{P(B / A_i)P(A_i)}{\sum P(B / A_i)P(A_i)}$ (B) $P(B / A_i)P(A_i)$

(C) $\frac{P(A_i \cap B)}{P(A_i)}$ (D) $P(A_i \cap B)P(A_i)$

10. If the mean and variance of a binomial distribution are 3 and 2 respectively, the probability distribution is

(A) $C_x^9(2/3)^x(1/3)^{9-x}$ (B) $C_x^9(1/3)^x(2/3)^{9-x}$

(C) $C_x^{12}(1/3)^x(2/3)^{12-x}$ (D) $C_x^6(1/4)^x(3/4)^{6-x}$

11. Radius of the earth is about _____ km.

(A) 5,950 (B) 7,500 (C) 6,400 (D) 12,800

12. The outer gaseous atmosphere of the earth extends to about _____ km.

(A) 700 (B) 300 (C) 900 (D) 1,000

13. Correct order from the center of the earth towards outer surface.

(A) Core, inner mantle, outer mantle, crust

(B) Inner core, mantle, hydrosphere

(C) Inner core, crust, mantle, hydrosphere

(D) Inner core, outer core, mantle, crust

14. As per the radioactive dating, the age of the earth is about

(A) 3,000 billion years (B) 5,000 million years

(C) 4,600 million years (D) 3,800 million years

15. Moho discontinuity is in between

(A) Crust and mantle (B) Inner core and outer core

(C) Mantle and core (D) Below the ocean crust

16. The orbital motion of the earth around the sun is about
(A) 30 km/sec (B) 40 km/sec (C) 15 km/sec (D) 43 km/sec

17. The Albedo of the Earth – Atmospheric System under clear sky conditions
(A) 20% (B) 17% (C) 35% (D) 30%

18. For each 400 feet increase in altitude flowering is
(A) Retarded four calendar days (B) Advanced four calendar days
(C) Advanced six calendar days (D) Retarded six calendar days

19. Solar constant value is
(A) 3.4×10^3 watts/m^2 (B) 1.4×10^3 gram.cal/cm^2 /min
(C) 1.94 gram.cal/cm^2 /min. (D) 1.7×10^3 watts/m^2

20. The layer between Stratosphere and Mesosphere is
(A) Troposphere (B) Mesopause (C) Exosphere (D) Stratopause

21. Choose the option which does not fit the pattern.
(A) Hypothesis (B) Theory (C) Fact (D) Observation

22. Which one of the following statements is not correct ?
(A) Sedimentary rocks may weather to igneous rocks.
(B) Metamorphic rocks may melt to magma.
(C) Magmas crystallize to form igneous rocks.
(D) Igneous rocks can undergo metamorphism.

23. All of the following provide evidence or clues to the composition of earth's interior, except for
(A) Diamond-bearing rocks
(B) Slivers of crustal and mantle rocks now exposed at earth's surface
(C) Comets
(D) Meteorites

24. Chloroplasts are the bodies of containing _____ coloring matter
(A) Violet (B) Red (C) Blue (D) Green

25. The percentage of incoming radiation in visible portion
(A) 7% (B) 44% (C) 37% (D) 48%

26. The average annual rainfall of India is
(A) 1300 mm (B) 1520 mm (C) 1050 mm (D) 1150 cms

27. The number of major crustal plates are
(A) 5 (B) 7 (C) 9 (D) 10

28. To-day the valid Isostasy hypothesis is
(A) Pratt's hypothesis (B) Airy's hypothesis
(C) Dutton's hypothesis (D) Alfered Wegener hypothesis

29. Seismic P-waves transmission through the earth core indicates that inner core is
(A) Liquid state (B) Plastic (C) Solid state (D) Gaseous

30. The altitude of INSAT series satellites is around
(A) 700 kms (B) 1000 kms (C) 24000 kms (D) 36000 kms

31. The direction of winds during the cyclone in the Northern hemisphere is
(A) Clockwise (B) Anti-clockwise
(C) Vertical (D) Horizontal

32. Homosphere is extended nearly upto
(A) 30 kms (B) 48 kms (C) 65 kms (D) 88 kms

33. Which of the following geomorphic concept is correct ?
(A) The same physical processes and laws that operate today operate throughout the geologic time.
(B) Simple geomorphic evolution is more common than simplicity.
(C) Glaciation directly affected more than 10,000,000 square miles.
(D) The climatic conditions are the same since the origin of the earth.

34. Which of the following statement is correct ?
(A) Weathering is the process of aggradation.
(B) Erosion is the process of degradation.
(C) Volcanism is the exogenetic process.
(D) Gradation is the epigenetic process.

35. Ventifact is an erosional feature of
(A) Glacier (B) Fluvial action (C) Oceans (D) Air

36. Which of the following is correct with respect to stream erosion ?
(A) Deflation, attrition and abrasion
(B) Abrasion, attrition and chemical action
(C) Abrasion, attrition, hydraulic action
(D) Abrasion, attrition and plucking

37. The snow line altitude in Himalayas is in the range of
(A) 3000 m-3500 m (B) 6200 m-7000 m
(C) 4200 m-5700 m (D) >7000 m

38. U-shaped valleys with steep walls and flat floor are produced by
(A) Glacier action (B) Aeolian action
(C) Fluvial action (D) Sea action

39. Glacier moraine melts and the debris deposited in the form of a ridge across the valley is called
(A) Ground moraine (B) Lateral moraine
(C) Medial moraine (D) Terminal moraine

40. Wave cut bench is a erosion feature of
(A) Glacial action at sea coast (B) Artificial cut by human
(C) Action of sea on a rocky coast (D) Action of river near coast

41. The seafloor between coast and deep sea can be divided into
(A) 3 zones (B) 6 zones (C) 4 zones (D) 7 zones

42. Karst topography is observed frequently in the following geological formations
(A) Sand stone (B) Shales (C) Khondalites (D) Lime stone

43. The formation that absorb water and will not yield or allow very little amount of water is called
(A) Aquifer (B) Aquiclude (C) Aquitard (D) Aquifuge

44. Soils derived from the
(A) Water bodies (B) Oceans and seas
(C) Rocks (D) Vegetation

45. Black cotton soils are derived from the
(A) Granite rock (B) Basaltic rock
(C) Lime stone rock (D) Coal deposits

46. Resistivity of a formation saturated with salt water will be in the range
(A) <5 ohm-m (B) 10-50 ohm-m
(C) 50-100 ohm-m (D) >100 ohm-m

47. Seismic wave velocity in the hard rock will be in range of
(A) 0.1 to 0.5 km/sec (B) 2.1 to 4.0 km/sec
(C) 4.0 to 6.0 km/sec (D) 1.5 to 2.5 km/sec

48. The instrument that used to pick up the seismic wave from the earth surface is called
(A) Seismograph (B) Microphone
(C) Seismic timer (D) Geophone

49. When the two limbs of the fold are not mirror image to the other, then it is called
(A) Symmetrical fold (B) Plunging fold
(C) Irregular fold (D) Asymmetrical fold

50. When the hanging wall goes up with respect to foot wall it is called
(A) Gravity fault (B) Thrust fault (C) Normal fault (D) Slip fault

51. The point on the earth's surface vertically above the focus point of an earthquake is
(A) Focus point (B) Epicentre (C) Hypocentre (D) Anticentre

52. Porosity is highest in the following formation:
(A) Gravel (B) Sand (C) Silt (D) Clay

53. _____ is the process by which rocks breakdown in place to produce soils and sediments.
(A) Weathering (B) Lithification
(C) Subduction (D) Metamorphism

54. What is watershed ?
(A) It is an administrative boundary where all the water is collected at a common point.
(B) It is a small area from which all precipitation, rainfall and snow fall flows to a common stream.
(C) It is only a water collection area other than any human activity.
(D) It is an area whose catchment is more than 5000 sq.km.

55. Which of the following are the peninsular rivers
(A) Ghaghra, Gandak (B) Krishna, Pennar
(C) Brahmaputra and tributaries (D) Kosi, Sarada

56. Choose the option which does not fit the pattern.
(A) Gravity dam (B) Arch dam (C) Earth dam (D) Check dam

57. The first method used in preparation of EIA
(A) Adhock method (B) Checklist method
(C) Set's method (D) Matrix method

58. Deforestation lead to Global warming by releasing
(A) Oxygen (B) Carbon dioxide
(C) Ozone (D) Nitrogen

59. Biological Oxygen Demand (BOD) measures the water pollution
(A) Organic matter (B) Inorganic matter
(C) Chemical matter (D) Physical matter

60. Earth's peak emission radiation is at wave length
(A) 0.5 µm (B) 0.9 µm (C) 9.7 µm (D) 10.8 µm

61. Mapping of turbidity in surface water bodies is enlightened using
(A) 0.6 µm & IR (B) 0.45 µm & IR (C) Red & IR (D) IR & Microwave

62. What is the scale of photograph taken from a height of 300 m with camera focal length of 15 cm ?
(A) 1:10,000 (B) 1:30,000 (C) 1:20,000 (D) 1:15,000

63. If 16 flight lines are run perpendicular to an area of 30 km wide, their spacing on photographical map on scale 1:50,000 will be
(A) 2 cm (B) 4 cm (C) 1 cm (D) 3 cm

64. If the image of a triangulation station of RL 500m is 4cm from the principal point of a vertical photo taken from an altitude of 2000m above datum, the displacement will be
(A) 2 mm (B) 6 mm (C) 8 mm (D) 10 mm

65. Which of the following statement is correct ?
(A) One degree of longitude has greatest value at equator.
(B) One degree of longitude has greatest value at poles.
(C) One degree of longitude has the same value at everywhere.
(D) One degree of longitude decrease from equator to pole.

66. Select small scale from the following.
(A) 1:50,000 (B) 1:5,00,000 (C) 1:000,000 (D) 1:10,000

67. Find the scale of a map, when the distance between two buildings apart by 1000 m and the same distance on the map is 4 cm.
(A) 1:40,000 (B) 1:10,000 (C) 1:25,000 (D) 1:4,000

68. Two objects A & B is of equal height of about 100 m are placed diametrically opposite on either side of the nadir point at 5 km and 8 km distances. Which of the following statement is correct ?
(A) Height displacement of A and B will be towards each other.
(B) Height displacement of B will be less than that of A.
(C) Height displacement of A and B is equal.
(D) Height displacement of A will be less than that of B.

69. Sun synchronous satellite rotation path is
(A) Polar orbit (B) Equatorial orbit
(C) West to east (D) 45° inclined

70. Polar satellites altitude range between _____ km above the earth's surface.
(A) 34000-35000 (B) 2400-3000
(C) 500-900 (D) 1500-2000

71. Polar orbit satellites are meant for mapping and monitoring of
(A) Earth resources (B) Communication
(C) GPS (D) Atmosphere

72. Expand INSAT
(A) Inter National Satellite (B) Indian Satellite Technology
(C) Indian National Satellite (D) International Satellite Technology

73. One of the following satellite is Geostationary satellite
(A) IRS-1D (B) INSAT-4A (C) LANDSAT-5 (D) CARTO SAT

74. Expand MSS
(A) Multi Spectral System (B) Multispectral Scanner System
(C) Minimum Space System (D) Multi Spectral Searching

75. Satellite remote-sensing data is acquired through
(A) Photography (B) Scanning & digitisation
(C) Video system (D) Filming

76. Expand RBV
(A) Radar Beam Vision (B) Radio Beam Videocon
(C) Return Beam Videocon (D) Radio Beam Video

77. Expand GSLV
(A) Global Satellite Launching Vehicle (B) Geo Satellite Launching Vehicle
(C) Geo Stationary Landing Vehicle (D) Geosynchronous Satellite Launch Vehicle

78. GSLV/ PSLV launching centre is located in India at
(A) Tumba (B) Ahmedabad (C) Sriharikota (D) Bangalore

79. Satellite Data Receiving Station in India is at
(A) Saharanpur (B) Kolkata (C) Hyderabad (D) Shadnagar

80. Expand NASA
(A) National Atmospheric Space Agency
(B) National Aeronautics and Space Administration
(C) National Atmospheric Science Agency
(D) National Academic Space Administration

81. At present in our country crop area, vigor, and crop yield estimations arrived by
(A) Field verification
(B) Satellite remote-sensing
(C) Aerial photography
(D) Satellite remote-sensing & few field verifications

82. Microwave remote-sensing is very much useful for mapping
(A) Land use (B) Soil (C) Water bodies (D) Forest timber

83. Basic source of Tsunami origin will be
(A) Tornadoes (B) Earthquakes (C) Landslides (D) Floods

84. Oceansat satellite data will be useful in identifying potential
(A) Phytoplankton (B) Mangroves
(C) Oil resources (D) Ocean minerals

85. Deforestation and afforestation could be well monitored with remote-sensing data of
(A) One season (B) Pre & post monsoon
(C) One year data (D) Time sequential data of 5 to 10 years

86. Structural features- Faults/fracture lineaments are potential zones of groundwater
(A) Delta areas (B) Hard rock terrain
(C) Forest areas (D) Deserts

87. Development of vegetation/mangroves over the beach sands reduces the impact of
(A) Storm surge and Tsunamis (B) Floods from the rivers
(C) Earthquakes (D) Volcanic activity

88. Highest Potential zones for landslides in India
(A) Western ghats (B) Eastern ghats
(C) Aravalli (D) Himalayas

89. Thermal imaging is used in identifying
(A) Forest fires & coal seems fire (B) Forest timber
(C) Snow covered areas (D) Flood zone mapping

90. Which one of the following statements is not correct ?
(A) GIS technology is the same as traditional mapping.
(B) GIS technology is a tool box for processing maps and fundamental concepts for spatial measurement.
(C) GIS technology contains analytic capabilities for overlying maps.
(D) GIS technology capable to study the environmental surroundings.

91. The range measurements in GPS are made with
(A) 3L- band frequencies (B) 2L- band frequencies
(C) 2C- band frequencies (D) 3C- band frequencies

92. Geographical Information Science (GISc) can be defined as
(A) The use of this to solve physical problems
(B) The science behind GIS
(C) The application of GIS to a range of scientific discipline
(D) The epistemological study of GIS

93. By definition GIS must include
(A) A method of data storage, retrieval and representation
(B) A method of storing demographic and geographic information
(C) A method of scanning maps to produce raster files
(D) A system of data generation

94. The major areas of study in geography are
(A) Physical geography and geology
(B) Human geography and physical geography
(C) Physical geography and cartography
(D) Area geography and place geography

95. The following are the critical elements of GIS, except
(A) Data capture (B) Data management
(C) Networking (D) Data display

96. Attributes are almost best classified by
(A) Quantities (B) Natural breaks
(C) Equal intervals (D) Unique values

97. When we select from set in Arc-view, the logical (Boolean) equivalent is
(A) OR (B) NOT (C) AND (D) Exclusive OR

98. A buffer operation performed on a point selects area shape like
(A) A rectangle (B) A square (C) A triangle (D) A circle

99. Typical data input or data capture functional capabilities for GIS do not include
(A) Scanning (B) Editing
(C) File compression (D) Mosaicing

100. In chain surveying field-work is limited to
(A) Linear measurements only (B) Both linear and angular measurements
(C) Angular measurements only (D) All the above

101. The main principle of surveying is to work
(A) From whole to the part (B) From part to whole
(C) From higher level to lower (D) From lower to higher level

102. The most reliable method of plotting a theodolite traverse, is
(A) By independent co-ordinates of each station
(B) By plotting included angles and scaling off each traverse leg
(C) By consecutive co-ordinates of each station
(D) By the tangent method of plotting

103. Closed contours of decreasing values towards their centre, represent
(A) A saddle or pass (B) Depression
(C) Dome (D) A river bed

104. The accuracy of measurement in chain surveying, does not depend upon
(A) Length of the offset (B) Scale of plotting
(C) General layout of the chain lines (D) Importance of the features

105. In chain surveying tie lines are primarily provided
(A) To take offsets for detail survey (B) To increase the number of chain lines
(C) To check the accuracy of survey (D) To avoid long offsets from chain line

106. Which of the following Symbol is allowed in variable declaration ?
(A) | (pipeline) (B) * (asterisk) (C) _ (underscore) (D) – (hyphen)

107. In which of the following data types, the amount of memory required is equal to memory of largest member ?
(A) Structure (B) Union
(C) Structure and Union (D) None of the above

108. A switch case without break statement will generate
(A) Exception (B) Error (C) No error (D) None of the above

109. An array is
(A) sequence of values (B) pointer to first value in the sequence
(C) (A) and (B) (D) only (A)

110. Consider the following statement and what will happen on compiling this code snippet ?

```
int i;
for(i=0;i<100;i++);
{printf('Decaprio');}
```

(A) Will generate error (B) Will raise exception
(C) No error and exception (D) None of the above

111. A NULL pointer is

(A) Pointer pointing to nothing (B) Pointer pointing to negative value
(C) Pointer pointing to garbage value (D) All the above

112. What is the output of the following code snippet ?

```
main()
{
int x;
x=5.0 %2;
printf("%d",x);
}
```

(A) 2.5 (B) 1 (C) Error (D) 1.0

113. Which of the following keyword is used for unconditional branching ?

(A) goto (B) break (C) continue (D) (B) and (C)

114. What is the output of the following output ?

```
int a=5;
printf("%d", a++ * ++a);
```

(A) 6 (B) 36 (C) 30 (D) 25

115. A pointer is holding an address of a variable. Later the variable is released or freed. Such a pointer is called

(A) Dangling pointer (B) Null pointer
(C) Void pointer (D) None of the above

116. Suppose a newly-born pair of rabbits, one male, one female, are put in a field. Rabbits are able to mate at the age of one month so that at the end of its second month a female can produce another pair of rabbits. Suppose that our rabbits never die and that the female always produces one new pair (one male, one female) every month from the second month on. How many pairs will there be in one year ?

(A) 89 (B) 144 (C) 34 (D) 55

117. A function calling itself until condition is satisfied

(A) Nested function call (B) Recursion

(C) Conditional Branching (D) None of the above

118. What is the output file generated by linker ?

(A) Header file (B) Executable file

(C) Library file (D) None of the above

119. What does the following code snippet do ?

```
int main()
{
int a=10,b=20;
a^=b^=a^=b;
printf("%d,%d",a, b) ;
return 1;
}
```

(A) Computes exponents of each other

(B) Does not affect the values of a and b

(C) Swap the values of a and b

(D) None of the above

120. What will be the output of the following program ?

```
#include <stdio.h>
void main(){
unsigned char c=290;
printf("%d",c)      ;
}
```

(A) 290 (B) error (C) 34 (D) garbage value

SPACE FOR ROUGH WORK

GEO ENGINEERING & GEO INFORMATICS
SET-A

Question No	Answer	Question No	Answer
1	B	61	B
2	C	62	C
3	B	63	B
4	C	64	D
5	D	65	A
6	D	66	C
7	C	67	C
8	C	68	C
9	A	69	A
10	B	70	C
11	C	71	A
12	A	72	C
13	D	73	B
14	C	74	B
15	A	75	B
16	C	76	C
17	B	77	D
18	A	78	C
19	C	79	D
20	D	80	B
21	C	81	D
22	B	82	D
23	C	83	B
24	D	84	A
25	B	85	D
26	C	86	B
27	B	87	A
28	B	88	D
29	C	89	A
30	D	90	A
31	B	91	B
32	D	92	B
33	C	93	A
34	B	94	B
35	D	95	C
36	C	96	B
37	C	97	C
38	A	98	D
39	D	99	C
40	C	100	A

41	C	101	A
42	D	102	A
43	B	103	B
44	C	104	C
45	B	105	D
46	A	106	C
47	C	107	B
48	D	108	C
49	D	109	C
50	B	110	C
51	B	111	A
52	D	112	C
53	A	113	A
54	B	114	C
55	B	115	A
56	D	116	B
57	A	117	B
58	B	118	B
59	A	119	C
60	C	120	C