

Code No: I- 54

Hall Ticket No:

ENTRANCE EXAMINATION 2015

M.Tech / Advanced P.G. Diploma in Mineral Exploration

Date: 12.02.2015

Time: 2.00-4.00 PM

Marks: 75

Instructions for the candidates:

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

1. According to Hooke's law of elasticity, within elastic limits, if the stress is increased, the ratio of stress to strain
 - A. increases
 - B. decreases
 - C. becomes zero
 - D. remains constant
2. Which rock type below is likely to possess the highest porosity?
 - A. sandstone
 - B. conglomerate
 - C. siltsone
 - D. shale

3. A liquid does not wet the surface of a solid if the angle of contact is
- A. Zero
 - B. An acute one
 - C. 45°
 - D. An obtuse one
4. Surface tension of liquid is independent of the
- A. Temperature of the liquid
 - B. Area of the liquid surface
 - C. Nature of the liquid
 - D. Impurities present in the liquid
5. In case there are too many extreme values in the data set, the most representative average value is
- A. Mean
 - B. Mode
 - C. Median
 - D. Variance
6. One way to measure the spread is to calculate the difference between the third and first quartile. This measure is called
- A. Range
 - B. inter quartile range
 - C. Standard deviation
 - D. Mid quartile
7. Value of $\cos 1^\circ \cdot \cos 2^\circ \cdot \cos 3^\circ \dots \dots \dots \cos 179^\circ =$
- A. 1
 - B. -1
 - C. 0
 - D. None of these
8. Geostationary Satellites are extensively used for:
- A. Ground surveys
 - B. Water bodies Surveys
 - C. Flood forecasting purpose
 - D. Meteorological applications
9. The alluvial aquifers which are underlain by tremendous volume of unconsolidated rock material are called as:
- A. Intermontane valleys
 - B. Extensive plains
 - C. Abandoned valleys
 - D. Water courses
10. Reynolds number is expressed as:
- A. $N_R = D/\mu$
 - B. $N_R = D \cdot \mu$
 - C. $N_R = \rho v D / \mu$
 - D. $N_R = \mu / \rho v D$
11. The half life of C-14 is
- A. 5500 years
 - B. 5570 years
 - C. 5670 years
 - D. 5775 years

12. Which of the following compounds has maximum pK_a value
- H_2O
 - H_2S
 - H_2Se
 - H_2Te
13. Which one of the following molecules does not have tetrahedral shape
- SO_4^{2-}
 - XeF_4
 - ClO_4^-
 - XeO_4
14. Which of the following mineral crystallizes in orthorhombic system
- Garnet
 - Orthoclase
 - Olivine
 - Rutile
15. The timing of eruption of Deccan basalts
- 50 Ma
 - 65 Ma
 - 83 Ma
 - 74 Ma
16. A positive magnetic anomaly indicates
- Body of magnetic ore
 - An intrusion of gabbro
 - Mafic rock masse
 - all of the above
17. The apparent resistivity sounding curve representing the resistivity structure $\rho_1 > \rho_2 < \rho_3$
- K type
 - H type
 - A type
 - Q type
18. Probability is usually measured on the scale between
- zero and 1
 - 1 and +1
 - 1 and Zero
 - 1 and 100
19. If the sum of all the forces acting on a moving object is zero, the object will
- slow down and stop
 - change the direction of its motion
 - accelerate uniformly
 - continue moving with constant velocity
20. What are the two most abundant elements in the Earth's crust?
- Iron and magnesium
 - Oxygen and silicon
 - Nitrogen and oxygen
 - Silicon and calcium
21. The period of geostationary artificial satellite is
- | | |
|-------------|-------------|
| A. 24 hours | B. 6 hours |
| C. 12 hours | D. 48 hours |

22. The Moment of inertia of a body does not depend upon
- A. Angular velocity of a body
 - B. Axis of rotation of the body
 - C. The mass of the body
 - D. The distribution of the body
23. Density of H_2O is maximum at
- A. $0^\circ C$
 - B. $-4^\circ C$
 - C. $-273^\circ C$
 - D. $4^\circ C$
24. Transform faults are characterized by
- A. Lateral slip of plates
 - B. Oblique slip of plates
 - C. Vertical slip of plates
 - D. None of above
25. The largest onland oil and gas field in India is
- A. Bombay high
 - B. Daman
 - C. Gandhar
 - D. Ankleshwar

PART-B

26. Which process is mainly responsible for development of the karst topography?
- A. Physical Process
 - B. Chemical Process
 - C. Biological Process
 - D. Frost action
27. Runoff is expressed as:
- A. m^2/s
 - B. m^3/s
 - C. m/s
 - D. $m/s/s$
28. Which body is in equilibrium?
- A. a satellite moving around Earth in a circular orbit
 - B. a cart rolling down a frictionless incline
 - C. an apple falling freely toward the surface of Earth
 - D. a block sliding at constant velocity across a tabletop
29. On the surface of Earth, a spacecraft has a mass of 2.00×10^4 kilograms. What is the mass of the spacecraft at a distance of one Earth radius above Earth's surface?
- A. 5.00×10^3 kg
 - B. 4.90×10^4 kg
 - C. 2.00×10^4 kg
 - D. 1.96×10^5 kg
30. A particle that is composed of two up quarks and one down quark is a
- | | |
|------------|-------------|
| A. meson | B. proton |
| C. neutron | D. positron |

31. Corundum occurs in association with
- Norites
 - Peridotites
 - Nepheline syenite
 - Syenites
32. The characteristic rock type of continental rift setting
- Alkaline basalt
 - Boninite
 - Tholeiite
 - Lherzolite
33. If a test was generally very easy, except for a few students who had very low scores, then the distribution of scores would be
- Positively skewed
 - negatively skewed
 - Not skewed at all
 - Normal
34. Two events are mutually exclusive if
- They occur together
 - they cannot occur together
 - both have equal probability of occurrence
 - None of these
35. Which of the following has the highest boiling point?
- $\text{CH}_3\text{COCH}_2\text{CH}_3$
 - CH_3COCH_3
 - CH_3CHO
 - $\text{CH}_3\text{COCH}_2\text{CH}_2\text{CH}_3$
36. Which one of the following molecules does not have tetrahedral shape
- SO_4^{2-}
 - XeF_4
 - ClO_4^-
 - XeO_4
37. Equation of line passing through (-2,3) and parallel to $x-3y+17=0$ is
- $3x+y+3=0$
 - $x-3y+3=0$
 - $3x+y+11=0$
 - $x-3y+11=0$
38. The value of $\text{cosec } 3\pi/4$ is
- $\sqrt{2}$
 - $-\sqrt{2}$
 - 2
 - 2
39. A ladder is placed against a wall of height 18 m. If the top of the ladder makes an angle 60° with the wall then the height of the ladder is
- 36 m
 - $12\sqrt{3}$
 - $18\sqrt{3}$
 - 48

40. Which type of field is present near a moving electric charge?
A. an electric field, only
B. a magnetic field, only
C. both an electric field and a magnetic field
D. neither an electric field nor a magnetic field
41. The energy of a photon is inversely proportional to its
A. wavelength
B. frequency
C. speed
D. phase
42. If the sum of all the forces acting on a moving object is zero, the object will
A. slow down and stop
B. change the direction of its motion
C. accelerate uniformly
D. continue moving with constant velocity
43. As an object falls freely, the kinetic energy of the object
A. decreases
B. increases
C. remains the same
D. None of the above
44. The world's largest shield volcano is
A. Fuji
B. Ol Doinyo Lengai
C. Krakatoa
D. Mauna Lao
45. 'D' layer in mantle is located at the depth of
A. 660 km
B. 2900 km
C. 250 km
D. 400 km
46. Which of the following rock characterize deep water environments?
A. Marl
B. Sand stone
C. Loess
D. Carbonaceous shale
47. The sum of the cubes of first 9 natural numbers is
A. 45
B. 2025
C. 91125
D. 13125
48. If one root of the equation $px^2 - 14x - 8 = 0$ is six times the other then $p =$
A. 4
B. 5
C. 2
D. None
49. Which form(s) of energy can be transmitted through a vacuum?
A. light only
B. sound only
C. both light and sound
D. neither light nor sound

50. Determinant of $n \times n$ unit matrix is
- A. 0
 - B. 1
 - C. 2
 - D. n
51. If (7,2) and (1,6) are two vertices of a triangle and its centroid is (4,6) then the third vertex is
- A. (4,5)
 - B. (4,8)
 - C. (4,10)
 - D. (3,10)
52. Ophiolites corresponds to
- A. Abducted slices oceanic crust and mantle in orogenic belts
 - B. Basaltic eruptions in island arc
 - C. Ultramafic intrusions in continental rift
 - D. Basaltic eruptions in Ocean islands
53. Rutile crystallizes in
- A. Isometric system
 - B. Tetragonal system
 - C. Orthorhombic system
 - D. Monoclinic system
54. The composition of the upper mantle is known because
- A. samples of mantle rock have been analyzed by scientists
 - B. meteorites are believed to be similar to the mantle
 - C. some caves on Earth extend into the mantle
 - D. none of these
55. Which is true of the continental shelf?
- A. it is a shallow submarine platform at the edge of continents
 - B. it slopes very gently seaward
 - C. it has variable width
 - D. all of these
56. Which is characteristic of mid-ocean ridges?
- A. shallow focus earthquakes
 - B. high heat flow
 - C. basalt eruptions
 - D. all of these
57. The oldest seafloor on Earth is not more than
- A. 200 million years old
 - B. 2 billion years old
 - C. 20 million years old
 - D. 2 million years old
58. The point within the Earth where seismic waves originate is
- A. the epicenter
 - B. the fault scarp
 - C. the origin
 - D. the focus
59. The minimum number of seismic stations needed to locate an earthquake is
- A. 8
 - B. 2
 - C. 3
 - D. 1

60. Folding occurs when rocks behave as
- brittle solids
 - fluids
 - ductile solids
 - none of these
61. Anticlines
- form in rocks those are resistant to folding
 - form in rocks as a result of brittle deformation
 - are up warped folds
 - are down warped folds
62. The decline in the level of the water table around a pumping well is known as
- the porosity parameter
 - the permeability gradient
 - the cone of depression
 - the sphere of influence
63. The mean and standard deviation of Standard normal distribution are
- Zero and one
 - one and zero
 - zero and zero
 - one and one
64. Approximately what percentage of scores fall within one standard deviation of the mean in a normal distribution?
- 30%
 - 90%
 - 99%
 - 68%
65. If the Correlation Coefficient shows zero value
- There is no relationship between the two variables
 - There is a perfect relation between the variables
 - There is no linear relationship between the two variables
 - none of these
66. The first seismic waves to arrive at a seismic station are
- P-waves
 - S-waves
 - Love waves
 - Rayleigh waves
67. What is the magnitude of the electrostatic force between two electrons separated by a distance of 1.00×10^{-8} meter?
- 2.56×10^{-22} N
 - 2.30×10^{-12} N
 - 2.30×10^{-20} N
 - 1.44×10^{-1} N
68. Compared to the mass and charge of a proton an antiproton has
- the same mass and the same charge
 - greater mass and the same charge
 - the same mass and the opposite charge
 - greater mass and the opposite charge

69. Greenhouse gases absorb outgoing long wave radiation from the Earth. This radiation has a wavelength of (in μm):
- A. 0.001
 - B. 0.01
 - C. 0.1
 - D. 10
70. The period of geostationary artificial satellite of earth is
- A. 6 hours
 - B. 12 hours
 - C. 24 hours
 - D. 365 days
71. The escape velocity of projection from the earth is approximately ($R = 6400 \text{ km}$)
- A. 7 km/sec
 - B. 112 km/sec
 - C. 12.2 km/sec
 - D. 1.1 km/sec
72. When body is raised to a height equal to radius of earth, the Potential energy change is
- A. MgR
 - B. $\frac{MgR}{2}$
 - C. $2 MgR$
 - D. none of these
73. If by applying a force, the shape of a body is changed, then the corresponding stress is known as
- A. Tensile stress
 - B. Bulk stress
 - C. Shearing stress
 - D. Compressive stress
74. What is the most common chemical element in the universe?
- A. Hydrogen
 - B. Oxygen
 - C. Nitrogen
 - D. Helium
75. Crystals are formed when lava
- A. cools slow
 - B. cools fast
 - C. doesn't cool
 - D. None of the above