Hall Ticket No:

University of Hyderabad

ENTRANCE EXAMINATION 2011-2012

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

Date/Day: 06.06.2011, Monday
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. For each question, there are four answers and the answers are to be indicated with capital letters of alphabets viz., A, B, C and D.
4. The question paper consists of Part 'A' and Part 'B'.
5. **There is negative marking. Every 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 both the question paper booklet and 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.

PART-'A'

1. 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
2. The energy of a photon is inversely proportional to its
   A) wavelength
   B) frequency
   C) speed
   D) phase

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3. A source of waves and an observer are moving relative to each other. The observer will detect a steadily increasing frequency if
   A) he moves toward the source at a constant speed
   B) the source moves away from him at a constant speed
   C) he accelerates toward the source
   D) the source accelerates away from him

4. As the angle between two concurrent forces decreases, the magnitude of the force required to produce equilibrium
   A) decreases
   B) increases
   C) remains the same
   D) None of the above

5. 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

6. Acoustic impedance is defined as
   A) seismic velocity x density
   B) seismic velocity + density
   C) seismic velocity / density
   D) seismic velocity – density

7. The particle motion in an 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

8. Which of the following is not a mineral?
   A) olivine
   B) limestone
   C) calcite
   D) quartz

9. The average thickness of the continental crust is about
   A) 35-40 km
   B) 100-200 km
   C) 1000-2000 km
   D) 5-10 km

10. In correct order from the center outward, Earth includes which layers?
    A) core, inner mantle, outer mantle, crust
    B) inner core, outer core, mantle, crust
    C) inner core, crust, mantle, hydrosphere
    D) core, crust, mantle, hydrosphere

11. Which planet in the solar system is nearly equal in size to Earth
        A) Mars
        B) Mercury
        C) Uranus
        D) Venus
12. Which law of the planetary motions is called the law of Orbital Harmony
        A) Kepler's second Law
        B) Newton's Law of gravitation
        C) Kepler's third Law
        D) Kepler's 1st Law
13. Asteroid belts are found between these planets
        A) Earth and Mars
        B) Jupiter and Saturn
        C) Mars and Jupiter
        D) Venus and Earth
14. The shear modulus measures
        A) the resistance to flow of a liquid
        B) the resistance to change in shape
        C) the resistance to change in volume of a liquid
        D) the resistance to change in volume of a solid
15. A correlation between college entrance exam grades and semester examinations was found to be -5.08. On the basis of this you would tell the university that
        A) the entrance exam is a good predictor of success.
        B) there is some problem in the correlation calculation.
        C) the exam is a poor predictor of success.
        D) students who do best at entrance will make the worst students.
16. If you toss a fair coin a large number of times, assuming the tosses are independent, which of the following is true?
        A) Once the number of flips is large enough, the number of heads will always be exactly half of the total number of tosses.
        B) The proportion of heads will be about 1/2 and this proportion will tend to get closer to 1/2 as the number of tosses increases.
        C) As the number of tosses increases, any long run of heads will be balanced by a corresponding run of tails so that the overall proportion of heads is exactly 1/2.
        D) All of the above
17. What is meant by the term "95% confident" when constructing a confidence interval for a mean?
        A) if we took repeated samples, approximately 95% of the samples would produce the same confidence interval.
        B) If we took repeated samples, approximately 95% of the confidence intervals calculated from those samples would contain the sample mean.
        C) If we took repeated samples, the sample mean would equal the population mean in approximately 95% of the samples.
        D) If we took repeated samples, approximately 95% of the confidence intervals calculated from those samples would contain the true value of the population mean.

18. The value of Sin30 .Cos60 + Cos30.Sin 60
    A) 0
    B) 1
    C) ½
    D) -1/2

19. The distance between 2 points A (2,-3) and B (3,4) is
    A) $2\sqrt{5}$
    B) $5\sqrt{2}$
    C) 50
    D) None

20. The derivative of Cosx with respect to Cotx is
    A) Cotx
    B) Cosx
    C) Sinx
    D) Cosecx

21. Which of the following statement(s) is true?

    P: Matrix inversion is possible if the matrix is non-singular
    Q: A matrix is said to be non-singular if determinant is zero.
    A) P alone
    B) Q alone
    C) Both P and Q
    D) Neither P Nor Q

22. The relation between Arithmetic mean A, Geometric mean G and Harmonic mean H is given by
    A) G=A+H
    B) G=AH
    C) G^2=AH
    D) $G=AH^2$

23. In an isothermal change, an ideal gas obeys
    A) Boyles law
    B) Charles law
    C) Gay-Lussac's law
    D) None of these

24. The most abundant element in the universe is
    A) Hydrogen
    B) Helium
    C) Oxygen
    D) Silicon

25. The ion that cannot be precipitated by both HCl and H_2S
    A) Pb^{2+}
    B) Ag^+
    C) Cu^+
    D) Sn^{2+}

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PART-'B'

26. The tectonic plates
    A) are the outermost shell of the solid Earth
    B) are a rigid, solid layer about 100 km thick
    C) includes the crust and the uppermost mantle
    D) all of the above

27. At mid-ocean ridges, two plates arc
    A) moving towards each other.
    B) moving away from each other.
    C) sliding along each other.
    D) stationary.

28. In a regression analysis, interpretation of r = 0.5 is that the following part of the Y-variation is associated with variation in X:
    A) most
    B) one quarter
    C) half
    D) very little

29. If we obtain a negative r (Pearson r: coefficient of correlation) this means that:
    A) individuals scoring high on one variable tend to score low on the other variable.
    B) individuals scoring high on one variable tend to score high on the other variable.
    C) there is no relationship between the two variables.
    D) the relationship is in the opposite direction to the one predicted.

30. According to Plate Tectonics theory, most active volcanoes occur
    A) on continents
    B) in large tectonic plates
    C) along plate boundaries
    D) randomly over continents.

31. What mineral is the hardest known substance in nature?
    A) graphite
    B) native gold
    C) diamond
    D) muscovite

32. Visible quartz and potassium feldspar grains are the main constituents in a
    A) granite
    B) gabbro
    C) basalt
    D) rhyolite

33. If the matrices A and B are of order 3x4 and 4x2 respectively then the order of the matrix (AB) is
    A) 3x3
    B) 3x4
    C) 4x3
    D) 3x2

34. If $y = 3x^2 + 5x - 7$ then dy/dx at $x = -1$ is
       A) -1
       B) 1
       C) 4
       D) -8

35. The derivative of sinx.cosx with respect to x is
       A) 2Cos2x
       B) 2Sin2x
       C) Sin2x
       D) Cos2x

36. Which of the following minerals would crystallize early from a cooling silicate magma?
       A) biotite
       B) quartz
       C) olivine
       D) muscovite

37. Magma generation in subduction zones are mainly caused by
       A) releasing of water and volatiles from the subducting plate
       B) pressure release in the subducting plate
       C) temperature increase in the surrounding mantle
       D) all above

38. Which of the following tend to increase the explosive potential of a magma body beneath a volcano.
       A) High viscosity and dissolved gas
       B) High viscosity; low dissolved gas content
       C) Low silica content, low viscosity
       D) Low viscosity; low dissolved gas content

39. Eruptions dominated by basaltic lava flows typically form what type of volcanoes?
       A) composite
       B) stratospheric
       C) cinder cone
       D) shield

40. If a person observes the top of a tower of height 100 mts from a point P on the ground at an elevation of 30^0, then the distance of P from the foot of the tower is
       A) 1.732
       B) 17.32
       C) 173.2
       D) 0.1732

41. If we write the equations: $3x-4y+5=0$ and $-2x+7y=4$ in the matrix form AX=B then the matrix B^T is equal to
       A) [5 -4]
       B) [-5 4]
       C) [4 -5]
       D) [-4 5]

42. Arithmetic mean and Median of a data set are 4 and 5 respectively then the Mode of the distribution is
    A) 2
    B) 7
    C) 8
    D) 11

43. What is the effect of rise in temperature on the pH of pure water?
    A) decreases
    B) increases
    C) no effect
    D) either increases or decreases

44. Why do magmas rise toward Earth's surface?
    A) Magmas are more viscous than solid rocks in the crust and upper mantle.
    B) Most magmas are richer in silica than most crustal and upper mantle rocks.
    C) Magmas, being melts and having gases, are less dense than the adjacent   solid rock.
    D) magmas have higher content of pyroxenes than the surrounding rocks.

45. Which of the following is NOT a process of physical (mechanical) weathering?
    A) Frost wedging
    B) unloading
    C) thermal expansion
    D) dissolution

46. If $Secx + Tanx = 2$ then the value of $Sinx$ is
    A) 3/5
    B) 4/5
    C) 5/3
    D) 4/3

47. $\displaystyle \lim_{x \to \infty} \frac{(3x^2+5x-11)}{(7x^2+4x-1)}$

    A) 0
    B) 3/7
    C) 3
    D) ∞

48. The value of $Sin(90-x)Cos(180-x)+Tan(180+x)Cot(180+x)$ is
    A) 0
    B) 1
    C) Sin^2x
    D) Cos^2x

49. If $x-aCos\theta$ and $y=bSin\theta$ then locus of (x,y) is
    A) a circle
    B) Ellipse
    C) Parabola
    D) Hyperbola

50. Which of the following silicate minerals are most resistant to chemical weathering?
   A) quartz
   B) olivine
   C) hornblende
   D) potassium feldspar

51. Which of the crystal systems has four crystallographic axes?
   A) monoclinic
   B) triclinic
   C) hexagonal
   D) tetragonal

52. What is the average specific gravity of the continental crust?
   A) 1.5
   B) 2.5
   C) 3.5
   D) 4.5

53. The dominant elements of the crust in the order of decreasing abundances are
   A) Si, O, Al
   B) O, Si, Al
   C) Si, Fe, Mg
   D) Si, Al, Fe

54. If only density increases with increasing depth within the earth, the velocity of a P wave should
   A) stay the same
   B) increase
   C) decrease
   D) zero

55. Sometimes chlorine gas is passed through water for its purification. What will be the pH value of such a sample of water?
   A) 7
   B) < 7
   C) > 7
   D) 8

56. A bright nail is placed in a beaker containing aqueous copper sulphate solution. The nail is taken out after 20 minutes. The deposit formed on iron nail is of
   A) copper sulphate
   B) iron sulphate
   C) copper metal
   D) copper oxide

57. What is the mass per cent of the solvent in a true solution in which the mass per cent of the solute is 20?
   A) 20
   B) 60
   C) 80
   D) 100

58. Name one method which is used to measure the concentration of a solution
  A) mass number
  B) Avogadro's number
  C) mass percentage
  D) all of these

59. Which boundary marks a change from 100% solid to 100% liquid?
  A) mantle ... outer core
  B) lithosphere ... asthenosphere
  C) crust ... mantle
  D) none of these

60. Which of the following can trigger a tsunami?
  A) undersea earthquakes
  B) undersea landslides
  C) the eruption of an oceanic volcano
  D) all of these

61. The dip of the fault plane along wrench faults is
  A) horizontal
  B) vertical
  C) inclined
  D) none

62. If A and B are independent events, then which of the following is true?
  A) $P(A\ OR\ B) = P(A) + P(B) - P(A)*P(B)$
  B) $P(A\ AND\ B) = 0$
  C) A and B are mutually exclusive events.
  D) $P(A\ OR\ B) = 0$

63. A standard normal distribution has
  A) the mean equal to the variance
  B) mean equal 1 and variance equal 1
  C) mean equal 0 and variance equal 1
  D) mean equal 0 and standard deviation equal 0

64. The core of anticlinal fold consists of
  A) older rocks
  B) younger rocks
  C) sediments
  D) metamorphic rocks

65. Normal faults are generated by
  A) horizontal stresses
  B) vertical stresses
  C) inclined stressed
  D) none

66. What can be said about a set of data when its standard deviation is small?
  A) the data are far apart.
  B) all of the data have the same value.
  C) the mean of the data can never be zero.
  D) the data are close together.

67. Which of the following processes represents a decomposition reaction?
    A) reproduction
    B) excretion
    C) digestion
    D) circulation

68. Which of the following statement is correct about universal indicator?
    A) It is a mixture of HCl and NaOH
    B) It is a solution of methyl orange in alcohol
    C) It is a solution of phenolphthalein in alcohol
    D) it is a mixture of many indicators

69. The basic structure of zeolite is
    A) Si-Al-O tetrahedral
    B) alumino silicate of $(Si,Al)O_4$ tetrahedra
    C) quartz-tridymite-crystobollite
    D) tridymite type with 32 oxygen atoms

70. Arranging in the ascending order of wavelength, which one is
    A) blue, green, red
    B) orange, green, red
    C) blue, yellow, green
    D) orange, yellow,green

71. Which compound is a saturated hydrocarbon?
    A) Ethane
    B) Ethene
    C) ethyne
    D) Ethanol

72. To kill cancer cells in the body which one of the following radioactive element is used
    A) $^{60}_{27}Co$,   B) $^{24}_{11}Na$

    C) $^{131}_{53}I$ D) $^{14}_{6}C$

73. 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

74. Which of the following burns in Nitrogen gas?
    A) Cu
    B) Mg
    C) Zn
    D) Fe

75. Alkali feldspars are essentially of
    A) $NaCaAlSi_3O_8$
    B) $AlSiO_2$
    C) $NaAlSiO_4$
    D) $NaKAlSi_3O_8$