Hall Ticket No: [   ]

University of Hyderabad

ENTRANCE EXAMINATION 2010-2011

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

Date/Day: 05.06.2010, Saturday
Time: 2.00-4.00 P.M

Marks: 75

Instructions to the candidates:

1. All questions carry equal marks.
2. Write your Hall Ticket Number in 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 consist s 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 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. Seasons on Earth occur because of:
   (A) Disproportionate distribution of land mass in northern and southern hemispheres
   (B) Tilt of the Earth's axis of rotation
   (C) Changes in the specific heat of water and land mass and the wind circulation that is a consequence of the changes in the temperature
   (D) Changes in the circulation of Green house gases

2. Which of the following best describes the origin of ocean tides on Earth?
   (A) Tides are caused on the side of the Earth nearest to the Moon because the Moon's gravity attracts water and so water (than the land) is pulled up as it is less dense than rock
   (B) Tides are caused by the 23.5° tilt of the rotation axis to the ecliptic plane
   (C) Tides are caused by the difference in the force of gravity exerted by the Moon across the sphere of the Earth
   (D) Tides are caused primarily by the gravitational force of the Sun

3. Which of the following statement is false?
    (A) Green house gases are good because they keep the earth warm, but their increase causes global warming
    (B) Chloro-fluoro-carbons reduce ozone concentration in the atmosphere
    (C) Ozone in the troposphere protects life on the Earth by absorbing UV radiation
    (D) More oceanic water in the southern hemisphere helps to keep the global temperature at manageable levels

4. What process converts sediments to sedimentary rocks
    (A) Metamorphism
    (B) Metasomatism
    (C) Intrusion
    (D) Diagenesis

5. The portion of the sea enclosed within an Atoll
    (A) Bay
    (B) Coral lake
    (C) Fringing reef
    (D) Lagoon

6. The mohorovicic discontinuity is a
    (A) compositional boundary
    (B) Phase-change boundary
    (C) Compositional as well as phase change boundary
    (D) None of the above

7. Colour of thin film results from
    (A) Absorption of light
    (B) Interference of light
    (C) Scattering of light
    (D) Dispersion of light

8. The resultant of two equal forces acting at right angles to each other is 1414 dynes. The magnitude of each force is
    (A) 1414 dynes
    (B) 1000 dynes
    (C) 2828 dynes
    (D) 707 dynes

9. Bernouli's theorem states that the sum of gravitational head is constant. This means that
    (A) Energy is conserved
    (B) Mass of fluid is conserved
    (C) Momentum is conserved
    (D) Velocity is conserved

10. Critical angle for light passing from glass to air is minimum for
    (A) Red
    (B) Blue
    (C) Orange
    (D) Violet

11. A mass m is suspended by means of two springs of force constant k_1 and k_2 respectively. These springs are of equal length and are joined in parallel. When set into vibration, the period will be

(A) $2\Pi\sqrt{\dfrac{m}{k_1 + k_2}}$

(B) $2\Pi\sqrt{\dfrac{mk_1}{k_2}}$

(C) $2\Pi\sqrt{\dfrac{m}{k_1 - k_2}}$

(D) $2\Pi\sqrt{\dfrac{mk_1}{k_1 + k_2}}$

12. The energy corresponding to the highest energy level in the conduction band occupied by electrons at absolute zero is called
    (A) Conduction energy
    (B) Fermi energy
    (C) Valence energy
    (D) Excitation energy

13. The energy required to remove an electron from a gaseous atom in the ground state to form a gaseous ion is called
    (A) Ionisation
    (B) Ionization energy
    (C) Ionization potential
    (D) Electrons affinity

14. Modern periodic law states
    (A) The properties of elements depend upon the atomic weight
    (B) The properties of elements depend upon the atomic value
    (C) The properties of elements depend upon the electronic configuration
    (D) The properties of elements are periodic function of their atomic number

15. The structure for H_2O or H_2S is
    (A) Linear
    (B) Triangular
    (C) V-shaped
    (D) Tetrahedral

16. The number of unpaired electrons is related to magnetic moment by the relation

(A) $\mu B = n\sqrt{n+2}$

(B) $\mu B = \sqrt{n(n+2)}$

(C) $\mu B = \dfrac{\sqrt{n+2}}{n}$

(D) $\mu B = \sqrt{\dfrac{n+2}{n}}$

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17. Silver halides are used in photographic plates. The chemical reaction is by influence of
   (A) Contact
   (B) Heat
   (C) Light
   (D) Water

18. Penetrating power is greatest in case of
   (A) α-rays
   (B) β-rays
   (C) γ-rays
   (D) X-rays

19. The focus of the parabola $(y-1)^2 = 8(x-3)$ is
   (A) (2,0)
   (B) (1,3)
   (C) (5,1)
   (D) (5,3)

20. Geometric mean of the series 1,2,8,16 is
   (A) 2
   (B) 4
   (C) 8
   (D) 16

21. $\int \dfrac{x^3}{\sqrt{1-x^8}} dx =$
   (A) $Sin^{-1} x^4 + C$
   (B) $\frac{1}{4} Sin^{-1}x^4 + C$
   (C) $-\frac{3}{4} Sin^{-1}x^4 + C$
   (D) $Cos^{-1} x^4 + C$

22. The minimum value of $5 Sinx - 12 Cosx + 3$ is
   (A) -1
   (B) -4
   (C) 8
   (D) -10

23. Circum Centre of the triangle formed by the vertices (1,4), (8,3) and (1,3) is
   (A) (1,3)
   (B) (3,4)
   (C) (9/2,7/2)
   (D) (1/2,5/2)

24. The general solution of $(x+2y^3) \dfrac{dy}{dx} = y$ is

(A) $\dfrac{x}{y} = y^2 + c$

(B) $\dfrac{y}{x} = y^2 + c$

(C) $\dfrac{x}{y} = x^2 + c$

(D) $\dfrac{y}{x} = x^2 + c$

25. Value of $[\,\bar{a} - \bar{b} \quad \bar{b} - \bar{c} \quad c - \bar{a}\,]$ is
    (A) 0
    (B) $[\bar{a}\ \bar{b}\ \bar{c}]$
    (C) $2\,[\bar{a}\ \bar{b}\ \bar{c}]$
    (D) $[\bar{a}\ \bar{b}\ \bar{c}]^2$

PART – B

26. The scientist who discovered neutron:
   (A) Rutherford
   (B) Millikan
   (C) Bohr
   (D) Chadwick

27. A solution of a pH of 11 is
   (A) More alkaline than a solution of pH 8
   (B) Less alkaline than a solution of pH 8
   (C) More acidic than a solution of pH 8
   (D) Neither acidic nor alkaline

28. At the magnetic poles, the angle of dip is
   (A) 90°
   (B) 0°
   (C) 180°
   (D) 270°

29. When milk is churned, the cream separates from it due to
   (A) Cohesive force
   (B) Centrifugal force
   (C) Frictional force
   (D) Gravitational force

30. The mass of earth is of order of
   (A) 10^{27} gm
   (B) 10^{20} gm
   (C) 10^{23} gm
   (D) 10^{35} gm

31. Mach number is used in connection with the speed of
   (A) Spacecraft
   (B) Aircraft
   (C) Sound
   (D) Ships

32. According to Kepler's law of planetary motion the square of periods of planets are proportional to
   (A) The mean distances from the sun
   (B) The square of the masses of the planets
   (C) Squares of their mean distances from the sun
   (D) The cube of their mean distances from the sun

33. A bullet of mass 150 gm strikes a target at 600 m/s velocity which is reduced to 150m/s. The loss of energy is
   (A) 3000 J
   (B) 8437 J
   (C) 18400 J
   (D) 5400 J

34. The length of second's pendulum on the surface of the earth is 1 meter. The length of the second's pendulum on the moon, where g is 1/6th the value of "g" on the surface of the earth is
    (A) 1/6 m
    (B) 6 m
    (C) 36 m
    (D) 3 m

35. A solution of washing soda in water is
    (A) Acidic
    (B) Neutral
    (C) Bleaching
    (D) Alkaline

36. Enamelware has a coating of
    (A) Red lead
    (B) Borosilicates
    (C) Tin
    (D) Glass

37. Two electric bulbs have 40 watt and 60 watt rating at 220 volts their resistances are in the ratio
    (A) 3/2
    (B) 3/8
    (C) 4/3
    (D) 9/4

38. ¾ of a radioactive material decays in 2.5 days. How long will it take for 15/16 of the material to decay
    (A) 7.5 days
    (B) 5 days
    (C) 10 days
    (D) 15 days

39. Energy in a Atomic bomb is produced by the process of
    (A) Nuclear fusion
    (B) Nuclear fission
    (C) Combination of hydrogen atoms
    (D) Combination of electrons and protons

40. "Gober gas" contains mainly
    (A) Carbon dioxide
    (B) Acetylene
    (C) Ethylene
    (D) Methane

41. According to Moseley's method for determination of atomic number of an element (Z) is given by the relation
    (A) $v = a(Z - b)$
    (B) $v^2 = a(Z - b)$

(C) $\sqrt{\upsilon} = a(Z - b)$

(D) $\sqrt{\upsilon} = (Z - b)$

where ν is the frequency of line in the spectrum, a is the proportionality constant and b is the constant for all lines in the given series.

42. Units of rate of reaction in
   (A) Moles litre $^{-1}$
   (B) Moles litre $^{-1}$ sec^{-1}
   (C) Moles sec $^{-1}$
   (D) None of these

43. The phenomenon of ejection of electrons from a metal surface by the action of light is called
   (A) Compton effect
   (B) Photoelectric effect
   (C) Zeeman effect
   (D) None of these

44. Richter's scale indicates
   (A) Intensity of magnetic field
   (B) Gravity
   (C) Intensity of Earthquakes
   (D) None of the above

45. Transition elements are
   (A) s block elements
   (B) p block elements
   (C) d block elements
   (D) d or f-block elements

46. Castner- Kellner cell is used for the manufacture of
   (A) Li
   (B) LiOH
   (C) NaOH
   (D) NaCl

47. Chile saltpetre is a compound of
   (A) NaCl
   (B) $NaNO_3$
   (C) Na_2CO_3
   (D) $NaHCO_3$

48. Chromite is an ore of
   (A) Fe
   (B) Cr
   (C) Mn
   (D) Ni

49. Nitrolim, a fertilizer is a mixture of
    (A) Calcium cyanide and graphite
    (B) Calcium cyanamide and graphite
    (C) Calcium carbide and graphite
    (D) Calcium cyanamide and calcium cyanide

50. Electromagnetic radiation with maximum wavelength is
    (A) Ultraviolet
    (B) Radiowave
    (C) X-ray
    (D) Infrared

51. Dry ice is so called because
    (A) It does not wet the surface
    (B) It does not melt
    (C) At atmospheric pressure solid CO_2 changes directly into gas and liquid phase is not found
    (D) It is gaseous in nature

52. Balmer series of lines are visible in
    (A) U.V spectra
    (B) I.R spectra
    (C) Visible spectra
    (D) Hydrogen spectra

53. Lakes formed by cut-off meanders are called
    (A) Kayals
    (B) Playas
    (C) Oxbow lakes
    (D) Tarns

54. Which of the crystal systems has four crystallographic axes?
    (A) Monoclinic
    (B) Triclinic
    (C) Hexagonal
    (D) Tetragonal

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

56. Flat topped seamounts are known as
    (A) Submarine volcanoes
    (B) Guyots
    (C) Groynes
    (D) Terraces

57. What is "ash"?
    (A) Derived from sedimentary rocks
    (B) Derived from rivers
    (C) Derived from sea water
    (D) Derived from volcanoes

58. The polar wandering theory
    (A) Supports the continental drift theory
    (B) Shows polar migration path of different continents
    (C) Traces of coherent movement paths of major continents
    (D) Explains the contraction theory

59. Kohinoor diamond was found at
    (A) Panna
    (B) Golconda
    (C) Khetri
    (D) Krishna gravels

60. Seismicity associated with mid oceanic ridges is
    (A) Shallow focus
    (B) Intermediate focus
    (C) Deep focus
    (D) Randomly focused

61. Reef building corals flourish best in the zone lying between
    (A) 40°N and 40°S latitudes
    (B) 60°N and 60°S latitudes
    (C) 80°N and 80°S latitudes
    (D) 30°N and 30°S latitudes

62. The most abundant light element present in the core is
    (A) Either S or O
    (B) Either S or Al
    (C) Potassium
    (D) Sodium

63. In India, the broadest continental shelf is found in
    (A) Gujarat
    (B) Maharastra
    (C) Tamilnadu
    (D) A.P

64. Which of the following planets have the least density
    (A) Earth
    (B) Mars
    (C) Saturn
    (D) Pluto

65. If $\tan(\theta - 60) + \tan(\theta + 60) = 0$, then $\theta =$
    (A) 30
    (B) 60
    (C) 90
    (D) 45

66. $\int\limits_0^{\pi/2} Sin^3x \cdot Cos^4 x \, dx =$

    (A) $\dfrac{1}{35}$

    (B) $\dfrac{2}{35}$

    (C) $\dfrac{7}{35}$

    (D) $\dfrac{4}{35}$

67. From the top of a cliff, the angle of depression of a boat is found to be 30^0. The height of the cliff is 50m. What is the distance of the boat from the foot of the cliff?
    (A) $50 \sqrt{3}$ m
    (B) $25 \sqrt{3}$ m
    (C) $\dfrac{25}{\sqrt{3}}$ m
    (D) $\dfrac{50}{\sqrt{3}}$ m

68. $\log_b a . \log_c b . \log_a c =$
    (A) Zero
    (B) 1
    (C) abc
    (D) $(abc)^2$

69. The points (5, 1), (-3, 7), (8, 5) forms a -------- triangle.
    (A) Right angle
    (B) Equilateral
    (C) Scalene
    (D) Isosceles

70. The slope of the line joining the points A(2,-3), B(-5,2) is
    (A) 5/7
    (B) 7/5
    (C) -7/5
    (D) -5/7

71. The angle between the planes $2x - y + z = 11$ and $x + y + 2z = 3$ is
   (A) 45^0
   (B) 30^0
   (C) 0^0
   (D) 60^0

72. A large quantity of data from a geological exploration can best be summarized pictorially by means of:
   (A) The range
   (B) A histogram
   (C) The frequency table
   (D) Mean and variance

73. $\frac{d}{dx}\left(Sin^{-1}\sqrt{x}\right) =$

   (A) $\dfrac{1}{2\sqrt{x - x^2}}$

   (B) $\dfrac{1}{2\sqrt{x + x^2}}$

   (C) $-\dfrac{1}{2\sqrt{x - x^2}}$

   (D) $-\dfrac{1}{2\sqrt{x + x^2}}$

74. Consider the following data:
   1, 8, 3, 3, 6, 6
   The mean and median for this data are:
   (A) 5 and 6
   (B) 4.5 and 4.5
   (C) 4 and 3
   (D) 4.5 and 3

75. In a group of 10 scores, the largest score is increased by 30 points. What effect will this have on the mean of the scores?
   (A) It will be increased by 10 points
   (B) It will remain unchanged
   (C) It will be increased by 3 points
   (D) It will increase by 30 points

-- Paper ends ---