Set: Msc. Practice Test - Set D

1. Only those students who maintain 2.5 grade point averages are allowed to participate in school sports. Amy is captain of the school's tennis team, so she must have at least a 2.5 GPA. Which of the following statements best summarizes the main point of the above argument?
a. Amy wouldn't be captain of the tennis team if her GPA were lower.
b. Amy is a good tennis player.
c. Amy has earned at least the minimum GPA required to participate on a school sports team.
d. Students who don't maintain a 2.5 GPA can't participate in sports.

2. Companies can attract a great number of new customers by discounting prices on their products. However, discounted prices usually lead to lower profit margins on sales. Therefore, companies that already have low profit margins and cannot decrease their prices any further will not be able to attract a great number of new customers. The argument above is flawed because it fails to consider that
a. It is possible for companies to attract a great number of new customers without significantly discounting prices on their products.
b. More customers do not necessarily mean greater profits for the company.
c. A great many new customers may be attracted by means other than price reduction.
d. It is possible to attract some new customers without discounting prices.

3. The new heart scans offer patients significant benefits. They can be completed in a fraction of the time required for an angiogram, with no recovery time necessary. Furthermore, the scans are more sensitive and can identify problem areas that an angiogram might not perceive. However, heart scans use more radiation than most diagnostic procedures, and can cause undue concern over and treatment for the harmless abnormalities often picked up by such sensitive technology. Which of the following conclusions is best supported by the statements above?
a. A heart scan could result in indirect harm by causing a patient to undergo risky, unnecessary procedures.
b. Patients should not be concerned about heart abnormalities that appear in a heart scan.
c. A heart scan is safer than an angiogram procedure.
d. The heart scan is a more expensive procedure than the angiogram.

4. Calorie restriction, a diet high in nutrients but low in calories, is known to prolong the life of rats and mice by preventing heart disease, cancer, diabetes, and other diseases. A six-month study of 48 moderately overweight people, who each reduced their calorie intake by at least 25 percent, demonstrated decreases in insulin levels and body temperature, with the greatest decrease observed in individuals with the greatest percentage change in their calorie intake. Low insulin level and body temperature are both considered signs of longevity, partly because an earlier study by other researchers found both traits in long-lived people. If the above statements are true, they support which of the following inferences?
a. Calorie restriction produces similar results in humans as it does in rats and mice.
b. Calorie intake is directly correlated to insulin level in moderately overweight individuals.
c. Some individuals in the study reduced their calorie intake by more than 25 percent.
d. Individuals with low insulin levels are healthier than individuals with high insulin levels.

5. Parent: The city education department is unable to distinguish between annoyances and important problems. For instance, prohibiting students from having cell phones is an overreaction. If a student uses one and thus interferes with instruction, confiscate it. All in all, we need educational leadership that can solve problems, not create them. Which of the following is an assumption made by the parent?

a. Students have no need for cell phones in school.
b. Students need to have cell phones because some of them have no stay-at-home parent.
c. Students having cell phones does not constitute an important problem for the city schools.
d. Faculty and staff should be allowed to possess cell phones.

6. If the sum of first n natural numbers is 1/5 times the sum of their squares, then the value of n is
a. 7
b. 5
c. 4
d. 6

7. One of the solutions of $\sum_{k=0}^{4} \binom{4}{k}(x)^{4-k}(-2)^k = 1$
a. 1
b. 4
c. 0
d. 2

8. Find the 5th term of the sequence $a_n = 2(n - 1)^2 - 3$
a. 47
b. 53
c. 29
d. -3

9. Use the binomial theorem to expand $(2x-y)^4$
a. $16x^4 - 8xy + y^4$
b. $16x^4 - y^4$
c. $16x^4 - 32x^3y + 24x^2y^2 - 8xy^3 + y^4$
d. $16x^4 - 8x^3y + 12x^2y^2 - 8xy^3 + y^4$

10. The sum of the integers from 1 to 100 which are not divisible by 3 or 5 is
a. 2317
b. 4735
c. 4289
d. 2632

11. The number of ways in which is distinct objects can be put in two different boxes so that neither of the box is empty is:
a. 2^n-2
b. 2^{n+1}
c. 2^n
d. 2^n-1

12. Number of diagonals in a polygon of n sides are:
a. 12
b. 6

c. 9

d. 18

13. A school committee consists of 2 teachers and 4 students. The number of different committees that can be formed from 5 teachers and 10 students is

a. 15

b. 10

c. 8

d. 2100

14. Five different books (A, B, C, D and E) are to be arranged on a shelf. Books C and D are to be arranged first and second starting from the right of the shelf. The number of different orders in which books A, B and E may be arranged is

a. 5!

b. 2!

c. 3!

d. 3!* 2!

15. Number of ways in which 4 letters can be posted in 3 boxes is:

a. 3^4

b. 3!.4!

c. 3x4

d. 4^3

16. The value of C(n,0) is

a. C(n,n)

b. 0

c. ?

d. n

17. The point of discontinuity of the function $f(x) = \dfrac{x+1}{x-1}$

a. x = -1 and x = 1

b. x =-1

c. x = 0

d. x = 1

18. $\lim\limits_{x \to 1} \dfrac{log x}{x-1}$

a. log1

b. -1

c. e

d. 1

19. $\lim\limits_{x \to 0} \dfrac{tan x - sin x}{x^3}$

a. 1
b. -1
c. 2
d. 1/2

20. $y = 1 + \dfrac{1}{x} + \dfrac{1}{x^2} + \dfrac{1}{x^3} + \text{.........} + \infty$ with $|x| > 1$ then dy/dx =

a. $-\dfrac{y^2}{x^2}$

b. $\dfrac{y^2}{x^2}$

c. $\dfrac{1}{(1-x)^2}$

d. $\dfrac{x^2}{y^2}$

21. $\lim\limits_{x \to \infty} x^2 \sin\dfrac{1}{x}$

a. 0

b. ∞

c. 1

d. none of these

22. $\lim\limits_{x \to 0} \dfrac{1 - \cos mx}{1 - \cos nx}$

a. $\dfrac{m^2}{n^2}$

b. $\dfrac{m}{1-n}$

c. $\dfrac{1-n}{m^n}$

d. $\dfrac{m}{n}$

23. $\lim\limits_{x \to 0} \dfrac{1 - \cos x}{\sqrt{1+x} - 1}$

a. 0

b. -1

c. 1/2

d. 1

24. $\lim\limits_{x\to 3} \dfrac{x-3}{x^2-2x-3}$

a. 1/4
b. 1
c. 0
d. none of the above

25. $\lim\limits_{x\to 0} \dfrac{a^x - 1}{x} =$

a. 1
b. 0
c. log a
d. a loga

26. $\lim\limits_{x\to 0} \dfrac{1-\cos x}{x}$

a. nonexistent
b. none of these
c. 2
d. 1

27. The value of $\lim\limits_{x\to 1} \dfrac{a^{x-1}-1}{\sin\pi x}$ if a>1

a. $-\dfrac{1}{\pi}$
b. $-\dfrac{1}{\log a}$
c. $\dfrac{-\pi\log a}{\pi\cos\pi x}$
d. $\dfrac{\pi\cos\pi x}{\log a}$

28. $\lim\limits_{x\to 0} \dfrac{\tan 2x - x}{3x - \sin x} =$

a. 3/2
b. 1/2
c. 1
d. 1/3

29. $\lim\limits_{x\to\infty} \dfrac{2x^2 + 1}{(2-x)(2+x)}$

a. -2
b. 1
c. -4

d. 2

30. $\lim\limits_{x \to 0} \dfrac{(1+x)^{1/5} - (1-x)^{1/5}}{x}$

a. -1/3
b. -3/5
c. 2/5
d. 1/5

31. $\lim\limits_{x \to 0} \dfrac{y^2}{x}$ where $y^2 = ax^2 + bx^2 + cx^3$

a. a+b+c
b. a
c. 0
d. 1

32. If the roots of the equation $x^2 + px + q = 0$ are tan 22 and tan 23 then
a. P-q=-1
b. P+q=-1
c. P-q=1
d. P+a=1

33. The value of k for which the equation $3x^2 - (7-k)x + 9 = 0$ has roots numerically equal but opposite in sign is
a. K=-7
b. K=-9
c. K=7
d. K=3

34. If (a-2) and (b-2) are the roots of the equation $x^2 + px + q = 0$ where a and b are the roots of the equation $x^2 - 3x + 2 = 0$ then the values of p and q are
a. 2,3
b. 2,0
c. 1,0
d. 2,1

35. if ?,? be the roots of the equation (x-a) (x-b)=c, c is not equal to 0 then the roots of the equation (x-?)(x-?)+c=0 are
a. a,b
b. c,a
c. ?,?
d. b,c

36. In the equation $ax^2 + bx + c = 0$ if a is not equal to b,b=0 then the roots are:
a. Reciprocals of each other
b. Reciprocals but opposite in sign
c. Equal in magnitude but opposite in sign

d. Equal

37. The value of for which the equation $x^2-3x+a=0$ and $x^2+ax-3=0$ have a common root is:
a. 1
b. 3
c. 2
d. -2

38. If the roots of the equation $x^2+x+1=0$ are ? and ? then the value of $?^2+?^2=$
a. 2
b. -1
c. 0
d. 1

39. If one of the root of the equation $x^2-px+q=0$ be in the ratio 2:3 then
a. $4q^2=9p^2$
b. $2p^2=9q$
c. $3q^2=25p$
d. $6p^2=25q$

40. If one root of the equation $ax^2+bx+c=0$ is four times the other then
a. $4a^2=25bc$
b. $4b^2=25ca$
c. $2a^2=25bc$
d. $2b^2=25ac$

41. one root of the equation $x^2+p^1x+q^1=0$ is common, then the common root is:
a. $\dfrac{p^1-p}{q^1-q}$
b. $\dfrac{p+p^1}{q-q^1}$
c. $\dfrac{2p}{q-q^1}$
d. $\dfrac{q-q^1}{p^1-p}$

42. One root of the equation $2x^2+5x+(4-k)=0$ has one root equal to zero then k=
a. 6
b. -1
c. 4
d. 5

43. $(AB)^t = ?$
a. AB
b. A^tB^t
c. BA

d. B^tA^t

44. X can do a piece of work in 40 days. He works at it for 8 days and then Y finished it in 16 days. How long will they together take to complete the work?
a. 26 days
b. 15 days
c. 20 days
d. 13.333 days

45. The least perfect square, which is divisible by each of 21, 36 and 66 is:
a. 214434
b. 213444
c. 231444
d. 214344

46. If a = b and b = c, then a = c. This property is called ?
a. Symmetric
b. Reflexive
c. Trichotomy
d. Transitive

47. A can lay railway track between two given stations in 16 days and B can do the same job in 12 days. With help of C, they did the job in 4 days only. Then, C alone can do the job in:
a. 9.4
b. 9.6
c. 10
d. 9.2

48. If the number of elements in a set S are 5. Then the number of elements of the power set P(S) are ?
a. 32
b. 6
c. 16
d. 5

49. Which from the following set has closure property w.r.t multiplication ?
a. {-1, -1}
b. {0, -1}
c. {1, -1}
d. {-1}

50. The logical form of (A ? B)' = A' ? B' is?
a. ~p ? ~q = ~(p ? q)
b. ~(p ? q) = ~p ? ~ q
c. ~p ? ~q = ~(p ? q)
d. ~(p ? q) = ~p ? ~ q

51. In a loaded beam, the point of con-traflexture occurs at a section where
a. bending moment is maximum
b. bending moment is minimum
c. shearing force is maximum
d. bending moment is zero or changes sign

52. A cable loaded with 0.5 tonne per horizontal metre span is stretched between supports in the same horizontal line 400 m apart. If central dip is 20 m, the minimum tension in the cable, will be
a. 500 tonnes at the centre
b. 200 tonnes at the left support.
c. 200 tonnes at the right support
d. 200 tonnes at the centre

53. Two particles have been projected at angles 64° and 45° to the horizontal. If the velocity of projection of first is 10 m/sec, the velocity of projection of the other for equal horizontal ranges is
a. 9.3 m/sec
b. 7.3 m/sec
c. 6.3 m/sec.
d. 8.3 m/sec

54. For perfectly elastic bodies, the value of coefficient of restitution is
a. 1.0
b. zero
c. between 0 and 1
d. 0.5

55. According to Unwin's formula, the diameter d of a rivet of plate of thickness t is :
a. $d = (\sqrt{t}) + 1.5$
b. $d = (\sqrt{5})t$
c. $d = 6.05(\sqrt{t})$
d. d = 1.5 t + 4

56. The ratio of strengths of solid to hollow shafts, both having outside diameter D and hollow having inside diameter D/2, in torsion, is
a. 1/2
b. 1/16
c. 15/16
d. 1/4

57. The maximum twisting moment a shaft can resist, is the product of the permissible shear stress and
a. modulus of rigidly
b. polar modulus
c. moment of inertia
d. polar moment of inertia

58. The normal and tangential components of stress on an inclined plane through ?° to the direction of the force, will be equal if ? is

a. 30°

b. 90°

c. 60°

d. 45°

59. There are two hinged semicircular arches A, B and C of radii 5 m, 7.5 m and 10 m respectively and each carries a concentrated load W at their crowns. The horizontal thrust at their supports will be in the ratio of

a. 1 : 1 1/2 : 2

b. none of these

c. 2 : 1 1/2 : 1

d. 1 : 1 : 2

60. A three hinged arch is generally hinged at its supports and

a. none of these

b. at one quarter span

c. at the crown

d. any where in the rib

61. The Mohr's straight theory is based on the following fact :

a. Material fails essentially by shear

b. All the above

c. Failure criterion is independent of the intermediate principal stress

d. Ultimate strength of the material is determined by the stress in the plane of slip

62. The factor which affects the compaction, is

a. All the above

b. moisture content

c. compacting content

d. type of soil

63. Pick up the correct statement from the following:

a. When stress decreases, coefficient of permeability decreases

b. When stress decreases void ratio, co-effi-cients of per-meability and volume change decrease

c. When stress decreases, void, ratio decreases

d. When stress decreases, coefficient of volume change decreases

64. The capillary rise of water

a. decreases as the size of the soil particles decreases

b. depends upon the force responsible

c. increases as the size of the soil particles increases

d. is less in wet soil than in dry soil.

65. The ratio of volume of air voids to the volume of total voids, is known as
a. porosity
b. air content
c. percentage voids
d. percentage air voids

66. 'Talus' is the soil transported by
a. gravitational force
b. glacier
c. wind
d. water

67. The water content of soil is defined as the ratio of
a. volume of water to volume of given soil
b. weight of water to weight of solids of given mass of soil
c. weight of water to weight of air in voids
d. volume of water to volume of voids in soil

68. If the unit weight of sand particles is 2.696 g/cc. and porosity in loose state is 44%, the critical hydraulic gradient for quick sand condition, is
a. 0.97
b. 0.93
c. 0.95
d. 0.91

69. The ratio of settlement at any time 't' to the final settlement, is known as
a. consolidation index
b. co-efficient of consolidation
c. degree of consolidation
d. consolidation of undisturbed soil.

70. The maximum value of effective stress in the past divided by the present value, is defined as over consolidation ratio (OCR). The O.C.R. of an over consolidated clay is
a. 1
b. less than 1
c. more than 1
d. None of these.

71. Pick up the incorrect statement from the following
a. Compaction has no effect on the structure of a soil
b. Permeability decreases with increase in the dry density of a compacted soil
c. A wet side compacted soil is more compressible than a dry side compacted soil
d. None of the these

72. The fluid generally used for grouting is

a. clay suspension
b. cement and water mix
c. sodium silicate
d. all the above.

73. Pick up the correct statement from the following :
a. the minimum design velocity of sewer pipes is taken as 0.8 m/sec
b. all the above
c. the sewer pipes of sizes greater than 0.4 m diameter are designed as running 2/3rd or 3/4th full at maximum discharge
d. the sewer pipes of sizes less than 0.4 m diameter are designed as running full at maximum discharge

74. In sewers designed with self cleansing velocity,
a. the bottom is scoured
b. both silting and scouring occur at the bottom
c. the bottom is silted
d. neither silting nor scouring occurs at the bottom

75. Pick up the correct statement from the following :
a. Hydrogen sulphide gas in excess, may cause corrosion of concrete sewers
b. 4 ppm of Dissolved Oxygen (D.O.) is ensured before discharging the treated sewage in river
c. Solubility of oxygen in sewage is 95% of that of distilled water
d. All the above

76. The presence of free ammonia in sewage, is detected by
a. adding pottassium permanganate
b. boiling
c. phenol-di-sulphuric acid
d. adding sulphuric acid

77. For evaporation and measurement of settlable solids, the apparatus used, is
a. a breaker
b. a jar
c. a test tube
d. an Imhoff cone.

78. The spacing of bars of perforations of fine screens used for the treatment of sewage, is
a. 3 to 5 mm
b. 8 to 10 mm
c. 5 to 8 mm
d. 2 to 3 mm

79. The rate of accumulation of sludge in septic tanks is recommended as
a. 30 litres/person/month
b. 25 litres/person/month.
c. 30 litres/person/year
d. 25 litres/person/year

80. For efficient working of a sewer, it must be ensured that
a. minimum velocity of 0.45 m/sec, is maintained at its minimum flow
b. a maximum velocity of 0.90 m/sec, is maintained at its maximum flow
c. neither (a) nor (b)
d. both (a) and (b)

81. Pick up the correct statement from the following :
a. Inlets having horizontal openings, are called horizontal inlets
b. Inlets are generally provided at an interval of 30 m to 60 m along straight roads
c. Inlets are provided on the road surface at the lowest point for draining rain water
d. All the above

82. Bio-chemical oxygen demand (BOD) for the first 20 days in generally referred to
a. carbonaceous demand
b. initial demand
c. first stage demand
d. all of these.

83. The settlement of a particle in sedimentation tank, is affected by
a. size and shape of solid
b. velocity of flow
c. all the above
d. viscosity of water

84. The design period in years for pumping plants, is
a. 5 to 10
b. 3 to 5
c. 1
d. 2 to 3

List of Answers:
1. c	2. c	3. a	4. c	5. c	6. a	7. a	8. c	9. c	10. d	11. a	12. c
13. d	14. c	15. a	16. a	17. d	18. d	19. d	20. a	21. b	22. a	23. a
24. a	25. c	26. b	27. a	28. b	29. a	30. c	31. b	32. a	33. c	34. c
35. a	36. c	37. c	38. b	39. d	40. b	41. d	42. c	43. d	44. d	45. b
46. d	47. d	48. a	49. c	50. b	51. d	52. a	53. a	54. a	55. c	56. c
57. b	58. d	59. d	60. d	61. b	62. a	63. b	64. b	65. b	66. a	67. b
68. c	69. c	70. c	71. a	72. d	73. b	74. d	75. d	76. b	77. d	78. d
79. c	80. d	81. d	82. d	83. c	84. a					