Time: 2 hours   **Date: 16.06.2016**

Instructions to the Candidates

(i)   Answer All Questions

(ii) Write the Alphabet Corresponding to the Correct Answer in the Answer Sheet

1.
   1, 2, 5, 12, 27, 58, 121, (….)
   a. 246   b. 247
   c. 248   d. 249

2.
   The union of sets A and B is expressed as?
   a. A-B   b   A X B
   c. A U B   d   A/B

3.
   If A has m elements and B has n elements, then A x B has elements?
   a. 2n   b   m-n
   c. m+n   d   m x n

4.
   Ages of 'A' and 'B' are in the ratio of 2 : 3 respectively. Six years hence the ratio of their ages will become 8 : 11 respectively. What is B's present age?
   a. 28 years   b   18 years
   c. 27 years   d   25 years

5.
   A manufacturer sells three products i.e. A, B and C. Product A costs 100 and sells for 150, Product B costs 150 and sells for 180, Product C costs 100 and sells for 110. On which product, he has maximum percentage of profit?
   a. A   b   C
   c. none   d   B

6. Ultimate strength to cement is provided by
   a. Tricalcium silicate   b. Di-calcium silicate
   c. Tri-calcium aluminate   d. Tetra calcium alumino ferrite

7. The rocks formed by gradual deposition, are called
   a. sedimentary rocks   b. igneous rocks
   c. metamorphic rocks   d. none of these.

8. Sewer pipes are made of
   a. earthen ware   b. stone ware
   c. refractory clay   d. Terracotta

9. A stone is rejected if it absorbs water more than
   a. 5% b. 10%
   c. 15% d. 20%

10. Seasoning of timber is essential to remove
    a. knots from timber b. sap from timber
    c. twisted fibre from timber d. roughness of timber

11. As compared to uniaxial tension or compression, the strain energy stored in bending is only
    a. 1/2 b. 1/4
    c. 1/5 d. 1/3

12. The slenderness ratio of a vertical column of a square cross-section of 2.5 cm sides and 300 cm length, is
    a. 200 b. 240
    c. 360 d. 416

13. The shape of the bending moment diagram over the length of a beam, carrying a uniformly distributed load is always
    a. cubical b. circular
    c. linear d. parabolic

14. The minimum number of rivets for the connection of a gusset plate, is
    a. 3 b. 2
    c. 1 d. 4

15. An arch may be subjected to
    a. Shear force and thrust b. Thrust, shear force and Bending moment
    c. Bending moment & shear force d. Bending moment & axial force

16. The shear stress at any section of a shaft is maximum
    a. At the top of the surface b. At a distance r/2 from the centre
    c. At the centre of the section d. At a distance ¾ r from the centre

17. A simply supported beam carrying a uniformly distributed load over its whole span, is propped at the centre of the span so that the beam is held to the level of the end supports. The reaction of the prop will be
    a. Half the distributed load b. 3/8th the distributed load
    c. 5/8th the distributed load d. Distributed load

18. The range within which a load can be applied on a rectangular column, to avoid any tensile stress, is
    a. 1/5th of the base b. ½ of the base
    c. ¼ of the base d. 1/3rd of the base.

2

19.

The expected out turn of 2.5 cm cement concrete floor per manson per day

a. 5 sq.m
b 7.5sq.m
c. 10sq.m
d 2.5sq.m

20.

If the width of a simply supported beam carrying an isolated load at its centre is doubled, the deflection of the beam at the centre is changed by

a. 1/2
b. 4
c. 1/8
d. 2

21.

The deflection of any rectangular beam simply supported, is

a. Directly proportional to cube of its length
b. Directly proportional to its weight
c. Inversely proportional to its width
d. Inversely proportional to cube of its depth

22.

When a body is subjected to a direct tensile stress (σ) in one plane, then normal stress on an oblique section of the body inclined at an angle Ꮎ to the normal of the section is

a. σcosꞨ
b. σcos^2Ꮎ
c. σsinꞨ
d. σsin^2Ꮎ

23.

A beam of length L is pinned at both ends and is subjected to a concentrated bending couple of moment M at its centre. The maximum bending moment in the beam is

a. M/3
b. M
c. M/2
d. ML/2

24.

The maximum twisting moment a shaft can resist, is the product of the permissible shear stress and

a. Modulus of rigidity
b. Polar moment of inertia
c. Moment of inertia
d. Polar modulus

25.

For a simply supported beam with a central load, the bending moment is

a. Least at the centre
b. Least at the support
c. Maximum at the supports
d. Maximum at centre.

26.

A reinforced concrete beam is assumed to be made of

a. Heterogeneous material
b. Homogeneous material
c. Isotropic material
d. None of the above.

27.

The maximum bending moment due to a moving load on a simply supported beam, occurs

a. At the supports
b. Under the load
c. At the midspan
d. Anywhere on the beam

28.

Pick up the incorrect statement

a. Welding takes more time than riveting
b. Welding joints provide rigidity
c. Welded joints have better finish
d. Welded joints develop strength of parent metal.

29.

The law which states, "within elastic limits strain produced is proportional to the stress producing it", is known as

a. Hooke's law
b. Bernoulli's law
c. Stress law
d. Poisson's law

30.

Which of the following turbine is preferred for 0 to 25 m head of water?

a. Kaplan turbine
b Francis turbine
c. Pelton turbine
d none

31.

The maximum number of jets, generally, employed in an impulse turbine without jet interference are

a. 2
b 6
c. 5
d 7

32.

Multi-stage centrifugal pumps are used to

a. Pump viscous fluids
b Give high discharge
c. Produce high heads
d All the above

33.

Which of the following pump is preferred for flood control and irrigation applications?

a. Centrifugal pump
b Reciprocating pump
c. Mixed flow pump
d Axial flow pump

34.

A centrifugal pump will start delivering liquid only when the pressure rise in the impeller is equal to the

a. Velocity head
b Kinetic head
c. Manometric head
d Static head

35.

When a canal and a drainage approach each other at the same level, the structure so provided, is

a. Level crossing
b aqueduct
c. Inlet and outlet
d syphon

36. Groynes are generally built

   a. Inclined downstream upto 30˚
   b. Inclined upstream upto 30˚
   c. Perpendicular to the bank
   d. All the above

37. In a canal syphon, the flow is

   a. Pipe flow
   b. Under atmospheric pressure
   c. Under negative pressure
   d. With critical velocity

38. The thickness of a micron, is

   a. 10^{-3} m
   b. 10^{-6} m
   c. 10^{-12} m
   d. 10^{-9} m

39. If Q is load factor, S is shape factor and F is factor of safety in elastic design, the following:

   a. Q = S+F
   b. Q = S -F
   c. Q = F- S
   d. Q = S * F

40. The point of contraflexure is the point where

   a. B.M changes sign
   b. B.M is maximum
   c. B.M is minimum
   d. S.F is zero

41. A rainfall may be classified as acidic if its pH value is less or equal to

   a. 4
   b. 5
   c. 7
   d. 6

42. Self-cleansing velocity is

   a. Velocity of water in pressure filter
   b. Velocity of dry weather flow
   c. Velocity of water at flushing
   d. Velocity at which no accumulation remains in drains

43. Irrigation canals are generally aligned along

   a. Contour line
   b. Straight line
   c. Ridge line
   d. Valley line

44 In a sarda type fall the rectangular crest may be used for discharge upto
   a   14 cumecs
   b   6 cumecs
   c   10 cumecs
   d   20 cumecs

45 For the survival of fish in a river stream, the minimum dissolved oxygen is prescribed

   a. 5 PPM
   b. 4 PPM
   c. 10 PPM
   d. 3 PPM

46

The technique for establishing and maintaining priorities among the various jobs of a project, is known

- a. Slotting technique for scheduling
- b. Short interval scheduling
- c. Event flow scheduling technique
- d. Critical ratio scheduling

47

The artificial activity which indicates that an activity following it, cannot be started unless the preceding activity is complete, is known as

- a. Event
- b. Dummy
- c. Free float
- d. Constant

48

If D is the duration, ES and EF are the earliest start and finish, LS and LF are latest start and latest finish time, then the following relation holds good

- a. LF =LS +D
- b. LS = LF -D
- c. D=EF-ES
- d. All

49

Critical Path Net Work helps an engineer

- a. To concentrate his attention on critical activities
- b. To be cautious for avoiding any delay in critical activities to avoid delay of whole project
- c. To divert the resources from non-critical advanced activities to critical activities
- d. all

50

A Milestone chart

- a. Depicts the delay of jobs, if any
- b. Points outgoing ahead of Schedule of jobs
- c. None of these
- d. Show the interdependencies of various jobs

51

A CPM family includes

- a. Critical path methd
- b. Minimum cost expenditure
- c. all
- d. Critical path scheduling

52

Site order book is used for recording

- a. Names of the casual labour
- b. Construction measurements
- c. Instructions by executive engineers
- d. Issue of store equipments

53

Critical path lies along the activities having total float

- a. Zero
- b. Negative
- c. Positive
- d. Same

54
The first method invented for planning projects, was

a. Milestone chart
b. Bar chart method
c. Critical path method(CPM)
d. PERT

55
Completion of an activity on CPM network diagram, is generally known

a. Event
b Node
c. connector
d all

56
In chain surveying field work is limited to

a. Both linear and angular
b. Angular measurements only
c. Linear measurements only
d. All the above

57
The radius of curvature of the arc of the bubble tube is generally kept

a. 25m
b. 10m
c. 100m
d. 50m

58
The limiting length of an offset does not depend upon

a. Scale of plotting
b. Indefinite features to be surveyed
c. Method of setting out perpendiculars
d. Accuracy of the work

59
Pick up the correct statement from the following :

a. Levelling screws are used to tilt the instrument so that its rotation axis is truly vertical.
b. Standing on the tripod is the levelling head or trib arch
c. Tangent screw enables to give small movement under conditions of smooth and positive control
d. All of these

60
An imaginary line joining the points of equal elevation on the surface of the earth, represents

a. Contour surface
b. Contour gradient
c. Contour line
d. Level line

61
The sensitiveness of a level tube decreases if

a. Radius of curvature of its inner surface is increased
b. Length of vapour bubble is increased
c. Diameter of the tube is increased
d. Both viscosity and surface tension are increased

62

True meridians are generally preferred to magnetic meridians because

a. These converge to a point
b. These change due to change in time
c. These remain constant
d. None of these

63

The main principle of surveying is to work

a. From higher to lower level
b. From whole to the part
c. From part to the whole
d. From lower to higher level

64

The cleaning of slow sand filter is done by

a. reversing the direction of flow of water   passing air through the filter
c. passing a solution of alum and lime through the filter   scraping off the top layers of sand and admitting water

65

The method of finding out the difference in elevation between two points for eliminating the effect of curvature and refraction, is

a. Fly levelling
b. Differential levelling
c. Reciprocal levelling
d. Precise levelling

66

Stoke's law states that the velocity at which a grain settles out of suspension, the other factors remaining constant, is dependent upon

a. Size of grain
b. Shape of grain
c. Weight of grain
d. Shape, size and weight of grain

67

According to Highway Research Board of U.S.A. practical land width, is

a. 3m
b 2.7m
c. 3.3m
d 3.6m

68

The minimum water content at which the soil just begins to crumble when rolled into threads 3 mm in diameter, is known

a. Permeability limit
b. Plastic limit
c. Shrinkage limit
d. Liquid limit

69

Traffic surveys are carried out

a. To determine the facilities of traffic regulation
b To know the type of traffic
c. To design proper drainage
d all

70

The maximum shear stress occurs on the filament which makes an angle with the horizontal plane equal to

a 60⁰
b 30⁰
c 90⁰
d 45⁰

71

Buoyant unit weight equals the saturated density

a. Multiplied by unit weight of water   b. Plus unit weight of water

c. Minus unit weight of water   d. Divided by unit weight of water

72

In distribution pipes, drain valves are provided at

a   lower point   b   higher point

c   junction points   d   anywhere.

73

The compression index of a soil

a. Increases with an increase in liquid limit   b. Decreases with an increase in liquid limit

c. Decreases with an increase in plastic limit   d. Is not related with plastic limit

74

Pick up the clay soil group which does not swell when wet from the following :

a. Mite group   b. Vermiculite group
c. Montrorillonite group   d. Kaolinite group

75   Bishop's simplified method of slices satisfies

a   Only the moments equilibrium   b   Only the vertical force equilibrium

c   Only the horizontal force equilibrium   d   All the static equation ,except the horizontal force equilibrium

76

The momentum correction factor (β) for the viscous flow through a circular pipe is

a. 2   b. 1.25
c. 1.50   d. 1.33

77

The phenomenon occuring in an open channel when a rapidly flowing stream abruptly changes to a slowly flowing stream causing a distinct rise of liquid surface, is

a. Hydraulic jump   b. Water hammer
c. None of these   d. Critical Discharge

78   A piezometer opening in pipes measures
a   velocity head   b   Static pressure
c   total pressure   d   Negative static pressure

79

The ratio of the percentagge error in the discharge and percentage error in the measurement of head over a triangular notch, is

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

80

Non-over flow double curvature concrete arch, is provided in

a. Nagarjuna sagar dam
b. Bhakra dam
c. Hirakud dam
d. Iddiki dam

81

The radius of gyration of the water line of a floating ship is 4 m and its metacentric height is 72.5 cm. The period of oscillation of the ship, is

a. 2π
b. 4π
c. π
d. 3π

82

The total pressure force on a plane area is equal to the area multiplied by the intensity of pressure at its centroid, if

a. Area is inclined
b. All of the above
c. Area is horizontal
d. Area is vertical

83

A short tube mouthpiece will not run full at its outlet if the head under which the orifice works, is

a. None of these
b. Less than 12.2m of the water
c. More than 12.2m of water
d. Equal of 12.2m of water

84

The ratio of the inertia and gravitational force acting in any flow, ignoring other forces, is called

a. Euler number
b. Froude number
c. Reynolds number
d. Weber number

85

If jet of water coming out from a nozzle with a velocity 9.81 m/s, the angle of elevation being 30°, the time to reach the highest point is

a. 0.50s
b. 0.25s
c. 1.0s
d. 1.5s

86

Unit Hydrograph theory was enunciated by

a. W.W.Horner
b. Le-roy .K.Shermen
c. Merril Bernard
d. Robert.E.Horten

87

The deficiency in rain catch due to vertical acceleration of air forced upward over the gauge, is

a. Greater for large drops
b. Greater for lighter rain
c. Greater for heavy rain
d. Lesser for small rain drops

88

An isobar is a curve

a. Joints points of equal horizontal stress
b Joints points of equal vertical stress
c. Joints points of zero vertical stress
d Joints points of zero horizontal stress

89
The standard height of a standard rain gauge, is

a. 10cm
b. 20cm
c. 30cm
d. 40cm

90
The surface Run-off is the quantity of water

a. Required to fill surface depressions
b. Absorbed by soil
c. Intercepted by buildings and vegetative cover
d. That reaches the stream channels

91
If a gauge is installed perpendicular to the slope, its measurement is reduced by multiplying

a. Tangent of the angle of inclination with vertical
b. Calibration coefficient of the gauge
c. Cosine of the angle of inclination with vertical
d. Sine of the angle of inclination with vertical

92
Consumptive use of a crop during growth, is the amount of

a. transpiration
b. evaporation
c. interception
d. all

93
If y is the depth of water at any section, then the mean velocity is

a. 0.2y
b. 0.6y
c. 0.3y
d. 0.5y

94
The earthen embankments constructed parallel to the river banks at some suitable distance for flood control, are known as

a. River walls
b. Levees
c. Dikes
d. Both dikes and levees

95
For predicting floods of a given frequency, the best reliable method is

a. Gumbel analytical method
b. Unit hydrograph method
c. California method
d. None of these

96 The columns whose slenderness ratio is

a. short columns
b. long columns
c. weak columns
d. medium columns

97 The stopping sight distance depends up on

a. Total reaction time of driver
b. Speed of vehicle
c. Efficiency of brakes
d. All of the above

98

Airport elevation is the reduced level above M.S.L. of

a. Highest point of the landing area
b Control tower

c. none
d Lowest point of the landing area

99 Distemper is used to coat
a. external concrete surfaces
b interior surfaces not exposed to weather
c. woodwork
d compound walls

100 Ratio of bearing capacity of double Under Reamed (U.R.) pile to that of single U.R. pile is nearly
a. 2
b 1.5
c. 1.2
d 1.7