Multiple Choices

1. All are true about C-25 concrete work except:
   A. The minimum compressive strength is 25Mpa
   B. The average compressive strength [28 days] of the tested sample should be at least 25 Mpa
   C. The maximum compressive strength [28 days] of the tested sample should be at least 30Mpa
   D. None
2. Which of the ff factor has a major influence on the ductility of reinforced concrete members:
   A. Effective depth
   B. Steel Grade
   C. Concrete Grade
   D. Width
3. One of the statement **<u>is incorrect</u>** about reinforced concrete
   A. Reinforced concrete is a compressive material
   B. Reinforced concrete is homogenous
   C. Concrete is relatively strong in compression, it is weak in tension
   D. Steel reinforcement is strong in compression and in tension
   E. \All
   F. None
4. Which one **<u>is correct</u>** about torsion Design for reinforced concrete?
   A. If the structural scheme is regular and symmetrical in layout and uses reasonable member sizes it will not be serious design issue
   B. In building floor, torsion may need to be considered for edge beam
   C. In building, , torsion may need to be considered, for members that sustain large unbalanced loading
   D. Concrete members are relatively tolerant of torsion
   E. All
   F. None
5. Which of the ff is true about analysis of structure?
   A. It is determination of the effect of Different load on structure
   B. It is determination of capacity of a structure
   C. It is a determination of proper structure which resist and transfer the load Effective safety
   D. All
   E. a & b
   F. b & c
   G. a & c

6. Which of the ff is true about influence line diagram for shear for shear force diagram of a structure?
   A. Both show the shear effect of a load all over the member
   B. Shear force diagram shows the point shear effect of a load on a structure
   C. Influence line diagram for shear force represents the shear effect of a moving load throughout a member
   D. Shear force diagram represent the effect of fixed loads at all point along the axis of the member
   E. All
   F. C & D
   G. None
7. Which of the ff is not true about statically indeterminate structure?
   A. They arestiffer and have the tendency of redistributing moment
   B. It is economically costly to construct their joint & support
   C. They are computational difficulty and are subjected to differential settlement
   D. They are more susceptible to maximum deflection and stresses than statically determinate structure
   E. All
   F. None
8. The assumption in the theory of bending of beams is :
   A. Material is homogeneous
   B. Material is isotropic
   C. Young’s modulus is same in tension as well as compression
   D. Each layer is independent to expand or to contract
   E. All of the above
9. 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
10. What would be your recommendation if there is feeling of the cantilever reinforced concrete beam is too long and seems to fail?
   A. Provide support at the free end of the beam with column
   B. Provide support at the midpoint of the beam with column
   C. Provide a steel plate extending up to the end at the bottom face of the beam
   D. Provide a steel plate extending up to the end at the top face of the beam
   E. Hogging the free end with cable to the support
   F. None of the above

11. Which one the ff is false about the concrete?
    A. The strength of the concrete got rapidly at the early time of its age
    B. 28 days concrete strength is taken as design value, as the concert gets nearly its full strength
    C. The concrete gets more than half of its design strength at 14 days of its casting
    D. The quality of concrete depends on the quality of its ingradients, workmanship and its curing
    E. None of the above
12. Which one of the ff is false?
    A. A one way slab and a cantilever slab transfer its load predominantly in one direction
    B. Coefficient method of slab analysis is used to only rectangular shape panels without any opening and supported at least in three side of its edges
    C. The primary design action effect on the beam is bending and that is why we call it flexural member
    D. The presence of the axial force reduces its bending capacity for pure homogenous material
    E. None of the above
13. Which one of the ff is false?
    A. When the section fail for diagonal compression due to shear, it is better to increase the rather than providing stirrup
    B. When the section fail for diagonal tension due to shear, it is better to increase the rather than providing stirrup
    C. The minimum rectangular reinforced concrete column dimension is 150mm X 150mm
    D. As structural redundancy increase, we can make more protective for progressive failure
    E. None of the above
14. Which one the ff is true?
    A. Additional eccentricity in the column analysis account modeling and construction imperfection
    B. We call the frame to be sway, if additional of moment due to lateral deflection is significant
    C. With constant length of the column, the slenderness of the column decrease as we increase its cross section

D. The minimum number of reinforcement for circular column should be six
E. All of the above
F. All except D

15. Which one the ff is false?
A. The slab act as distributing element for the lateral load so that we assign a diaphragm for frame analysis in structural analysis software
B. The maximum moment redistribution for reinforced concrete structural element in Ethiopian codal recommendation is 30%
C. The analysis and design of staircase is the same as that of slab except in detailing
D. The types of loading and its magnitude needs to be considered to determine the analysis approach
E. All of the above
F. None of the above

16. Which of the ff is false?
A. A reinforced concrete column with closely spaced stirrup does have a better capacity of resistance for shear and enhance the concrete capacity
B. We make a section to be ductile either increasing by the depth or it to be doubly reinforced
C. The maximum strain for concrete fiber under pure compression is 0.35%
D. If the steel fails simultaneously as that of the concrete, the reinforcement provided is balanced
E. None of the above

17. Drops are provided in flat slab to resist
A. Bending moment C. Shear
B. Thrust D. Torsion

18. Effective stress on a soil
A. Increases void ratio of the soil D. a and b
B. Increases porosity of the soil E. none
C. Increases permeability of the soil

19. Which of the ff statement is/are true?
A. The porosity of the soil of can never be greater than one

B. Unit weight of wet soil is less than unit weight of dry soil
C. Consolidation settlement of sand is greater than of clay
D. Negative pore water pressure can exist
E. A and b

20. The maximum water content at which a reduction in water content does not cause a decrease in volume of a sol mass, is known
A. Liquid limit
B. Plastic limit
C. Shrinkage limit
D. Consistency limiy
E. none

21. In a flow, net which of the ff is true
A. Stream and equipotential line intersect at oblique
B. Flow rate in each flow channel is the same
C. The head drop is different in each potential drop
D. The head along each stream line is constant
E. B and D

22. The total stress, pore-water pressure and effective stress at the bottom of Lake Tana, 9m depth are
A. 90,90 and 0 respectively
B. 90,0 and 90 respectively
C. 0,90 and 90 respectively
D. none

23. For soil layer with double drainage and thickness H, the drainage path is equal to
A. H/2
B. 2H
C. H^2
D. none

24. Which one of the ff is/ are incorrect about the maximum shear stress, Ʈmax, in case Mohr's circle?
A. Ʈmax=radius of the Mohr's
B. Ʈmax=Cu (if Φu=0)
C. Ʈmax=$\frac{\sigma1+\sigma2}{2}$
C. Ʈmax=$\frac{\sigma1- \sigma2}{2}$

25. In active state of plastic equilibrium in a non-cohesive soil with horizontal ground surface and smooth vertical retaining structure,
A. The major principal stress and the major principal plane are horizontal
B. The major principal stress and the major principal plane are vertical
C. The major principal stress is vertical and the major principal plane are horizontal
D. The major principal stress is horizontal and the major principal plane are vertical
E. None

26. The bearing capacity of a soil doesn't depend on

A. Magnitude of applied load
B. Shear strength parameters of the soil
C. Size of the footing
D. Depth of the footing
E. a and c

27. The main difference (s) between Terzaghi's and Meyerhof's bearing capacity theories is/are based on
A. Type of loading
B. Shape of the footing
C. Cohesion of the soil
D. All
E. a and b

28. When a column is near or right next to a property limit, a square or rectangular footing eccentricity loaded under the column would extent into the adjoining property. If the adjoin property is a public side walk or alley, local building codes may permit such a footing to project into public property. But when the adjoin property is privacy owned, the footing must be constructed with in the property. In such case, without considering costs of foundation which types of foundation is used as an alternative?
A. Cantilever or strap footing
B. Combined footing
C. Mat or raft foundation
D. All of the above alternatives are possible

29. Which of the ff statement is not true?
A. Topographic map used to select a site for dam construction
B. Plan shows a 3D Earth in 2D paper showing the topography by contour lines
C. Using topography map, we can determine the volume of water reserved by a dam
D. Inter-visibility between two points can be determined using topographic maps

30. Which of the ff errors can be neutralize by setting the level midway between the two station?
A. Error due to curvature only
B. Error due to refraction and curvatutre
C. Collimation error
D. b and c

31. Which of the ff methods/instrument are not used to establishing control points?
A. Traversing
B. GPS
C. Photogrammetry
D. Triangullation

32. Which of the ff statement is false?
A. Overturning of vehicle on a curve can be avoided by using transition curve
B. Different grades are joined together by a vertical curve
C. Circular curve can be set out by coordinate method

D. The circular curve will be shifted outwardly when we insert transition curve between the straight and the circular curve

33. Benchmarks in road construction are established by

A. Level C. Photogrammetry E. A and B
B. Total station D. All

34. One of the ff is powerful tool that is used to manage spatial data and non spatial data

A. GPS C. Photogrammetric
B. Remote Sensing D. GIS

35. One of the ff statement is true about geometric design of a given highway section

A. The designer should taker for maintaining of the maximum radius in horizontal curve
B. The designer should taker for maintaining of the maximum gradient in vertical alignment design
C. In a given section of highway, if there is a problem of overturning of vehicles the solution for this problem is increasing the design speed of the section
D. a and b
E. b and c

36. which one of the ff is true about transition curve

A. It provides a natural, smooth path
B. It provides a length for attaining superelevation
C. It facilities pavement widening on curve
D. It enhance the appearance of the highway E. All of the above

37. Which of the ff components of track structure will yield first in ballasted track railway line?

A. Rail B. Ballast C. Sleeper D. Fastener

38. For the Addis Ababa LRT (Light Rail Transit) project there about 22 station. As a Railway Engineer, which of the ff types of station is a must?

A. Passing station C. Intermediate station
B. Overtaking station D. Marshalling station

39. In selecting route for the construction of railroad, which of the ff factors highly affect the overall cost of the project?

A. Number of tunnel and bridge D. Number of switches and turnout
B. Cost of track structure
C. Cost of subgrade work

40. Which of the ff determine the opening direction of a turnout?
   A. The frog and guard rail C. The rail road switch
   B. The pontes D. The wing rail
41. Which of the ff is used to keep the stability of tunnel and to ensure the safe operation of train?
   A. Tunnel portal C. Tunnel trunk
   B. Ventilation facilities D. a and c
42. A cement which cannot set and harden in water
   A. Non hydraulic cement C. Calcareous cement
   B. Hydraulic cement D. all E. none
43. The cement production which consumes more energy and does not need frequent lab test in cement plant is
   A. OPC C. Wet process
   B. PPC D. Dry process E. none

44. A chemical found in cement which is used to resist corrosion in reinforced concrete is
   A. $Ca(OH)_2$ C. c-s-h jell
   B. C_3A D. all E. none
45. 10% of cement is added to the mix when mixing mortar/concret
   A. By hand C. Compacted by vibrator
   B. By mixer D. If the concrete is roller compacted concrete
46. Which one of the ff article is correct
   A. Order without diversity can result in chaos
   B. Diversity without order can produce monotony
   C. Order without diversity can result in monotony
   D. Diversity with order can produce chaos
   E. All
47. The articulation of the importance or significance of a form or space in relation to the other forms and space of the organization is
   A. Datum B. hierarchy C. rhythm D. repetition E. all
48. A line, plane or volume of reference which organize random patterns of elements through its regularity, continuity and constant presences is called
   A. Repetition B. rhythm C. symmetry D. axis E. none
49. The distance measured horizontally from the face of the nosing of one riser to the face of the noising off the other riser is termed as
   A. Flight B. Going C. Thread D. Well E. B & C

50. A word used to describe the material that is spread over irregular and course textured wall and the ceiling surface to provide a smooth level is

A. Pointing B. Plastering C. Jointing D. Rendering E. none

51. For an external solid wall which is exposed to weather which solution is appropriate

A. Plastering and painting
B. Cladding and rendering
C. Gypsum plaster and painting
D. White washing and painting
E. All

52. The order of the section of a given ground floor can be

A. Concrete, mortar, flooring
B. Compacted soil, lean concrete, mortar, flooring
C. Compacted soil, lean concrete, hard core, concrete
D. Structural concrete, hard core, mortar, PVC
E. None

53. The criteria for selection of the roof covering is

A. Shape of the roof and nature of the building
B. The economical background of the client
C. The ease to draw the roof plan
D. a & b

54. Steady flows occurs when

A. The direction and magnitude of the velocity at all points is identical
B. The velocity of successive fluid particle, at any point, is the same at successive period of time
C. The magnitude and direction of the velocity do not change from point to point in the fluid
D. The fluid particle move in a plane or parallel planes and the streamline pattern are identical in each plane
E. Velocity, depth, pressure etc change from point to point in the fluid flow

55. What kind of water surface profile do you normally expect behind sluice gate in ta mild slope open channel?

A. M3
B. S2
C. M1
D. M2
E.H1

56. You are expected to design a cross drainage work in your project having the ff data at the crossing os a canal and dranaige

Canal data

Full supply discharge	32M^/s
Full supply level	R.L.213.5m
Canal bed level	R.L.212m
Canal water depth	1.5
High flood discharge	300M^/s
High flood level	R.L.210m
Ground level	R.L.215.5m
High flood depth	20

Drainage

Having the above data which structure do you propose?

A. Aqueduct C. Level crossing
B. Super passage D. All

57. The outflow from a reservoir will depend on
A. The inflow hydrograph C. the discharging capacity of the spillway weir
B. The storage capacity of the reservoir D. All of the three above

58. The resistance to floe because of internal friction is called viscous resistance and the property, which enables the fluid resistance to relative motion between adjacent layer, is
A. Dynamic viscosity C. Vapour pressure
B. Kinematic viscosity D. Surface vapour

59. What is the driving force in pipe flows?
A. Gravity C. Slope provided
B. Pressure difference D. a & c

60. Which one of the ff dam is best suitable for narrow, deep and weak foundation condition?
A. Gravity dam C. Arch dam
B. Earth fill dam D. Buttress dam

61. Which of the ff option is not true of runoff?

A. Runoff is high when infiltration is high
B. Runoff is low when infiltration is high
C. Runoff is affected by soil characterstics
D. Runoff is high when infiltration is low

62. Which of the ff describes a “Theissen polygon ”

A. Polygons created by drawing straight line at equal distance between points (such as rain gauge locations)
B. A specially localized area of the catchment that contribute infiltration excess overland floe when the remainder of the catchment does not
C. Contour of equal rainfall across an area
D. A network of rainfall gauges

63. The basic principle of unit hydrograph theory are

A. Linearity and time variance
B. Non linearity and time variance
C. Linearity and time invariance
D. none

64. A unit-hydrograph has

A. One unit of peak discharge
B. One unit of time-base of direct runoff
C. One unit of rainfall duration
D. One unit of direct runoff