



Bahir Dar University

Bahir Dar Institute of Technology (BiT)

Faculty of Civil and Water Resources Engineering

**Model Exam of Exit Exam for Civil
Engineering**

Exam Date: Megabit 8/2015 E.C

Time allowed: 2hrs

Student's Full Name: _____

ID No.: _____ **Section:** _____ **Signature:** _____

General Instructions:

- 1. Turn off your Mobile before you start the exam*
- 2. Any attempt to cheat will lead to disciplinary measures stated in the legislation.*
- 3. Write your Full Name, ID No, Section and put your signature both on the cover page of your question paper and answer sheet.*
- 4. Write your answers in CAPITAL LETTERS only.*
- 5. Don't encircle the answer on the question paper.*
- 6. Make sure that the exam contains 9 (nine) Pages and 108 questions.*

1. Which gradation of aggregate is desirable for making concrete, as the space between larger particles is effectively filled by smaller particles to produce a well-packed structure?
 - A. Well-graded aggregate
 - B. Gap-graded aggregate
 - C. Poorly graded aggregate
 - D. All of the above
2. Which type of slump indicate even dropping and a well-proportioned concrete:
 - A. Collapse slump
 - B. Shear slump
 - C. True slump
 - D. A & C
3. What is a type of admixture used to delay the rate of strength development in concrete?
 - A. Accelerator
 - A. Plasticizer
 - B. Retarder
 - C. D. All
4. The property of concrete depends on:
 - A. The quality of the constituent
 - B. Quality of the workmanship
 - C. Proportion of the concrete mix
 - D. Curing
 - E. All
5. What are the main purposes of water in concrete production?
 - A. Chemical reaction with cement
 - B. Workability
 - C. Filler material
 - D. A & C
 - E. A & B
6. In a normal condition what is the preferred method of procurement of goods, works, and services by PPA?
 - A. Direct procurement
 - B. Restricted Bidding
 - C. Open Bidding
 - D. Request for Quotations
7. Which one of the following is an *incorrect* statement?
 - A. PERT is used where times cannot be estimated with confidence
 - B. CPM is used where times can be estimated with confidence
 - C. PERT is Event oriented, but CPM is activity oriented
 - D. In PERT and CPM calculation there always be one critical path
8. Which type of organizational structure is effective for companies producing one or two product lines in mass production?
 - A. Traditional
 - B. Geographical
 - C. Product
 - D. Matrix
9. How much time in an hour does it take to plaster a 200 m² wall using 4 masons and assuming each mason can do 10 m² in an hour?
 - A. 10

- B. 40
C. 20
D. 5
10. Which one of the following is the correct bidding procedure for design works of public projects?
- Bidding Period and Receipt of Proposals - Selection of Bidders - Preparation and Issue of RFP Documents - Proposal Opening - Proposal Evaluation - Proposal Acceptance, Contract Award, and Placement
 - Selection of Bidders - Preparation and Issue of RFP Documents - Bidding Period and Receipt of Proposals - Proposal Opening - Proposal Evaluation - Proposal Acceptance, Contract Award, and Placement
 - Proposal Opening - Proposal Evaluation - Bidding Period and Receipt of Proposals - Selection of Bidders - Preparation and Issue of RFP Documents - Proposal Acceptance, Contract Award, and Placement
 - Preparation and Issue of RFP Documents - Selection of Bidders - Bidding Period and Receipt of Proposals - Proposal Opening - Proposal Evaluation - Proposal Acceptance, Contract Award, and Placement
11. The foundation in which a cantilever beam is provided to join two footings, is known as
- Strip footing
 - Strap footing
 - Combined footing
 - Raft footing
 - None of these
12. The member which is placed horizontally to support common rafter of a sloping roof, is
- Purlin
 - Cleat
 - Batten
 - Strut
13. For providing a raft foundation, the following activities are involved
- Ramming the foundation bed
 - Excavation of the soil up to required depth
 - Laying the reinforcement over the foundation bed
 - Curing the cement concrete placed over reinforcement
 - Pouring the cement concrete over the reinforcement.

The correct sequence is

- 1, 2, 3, 4, 5
 - 2, 1, 3, 5, 4
 - 5, 4, 3, 2, 1
 - 3, 2, 5, 1, 4
14. The brick laid with its breadth parallel to the face of a wall, is known as
- Header
 - Stretcher
 - Closer
 - None of these
15. Pick up the incorrect statement from the following:

- A. The function of foundation is to distribute the load of super structure over a large bearing area
 - B. No timbering is required for shallow trenches
 - C. Black cotton soil is very good for foundation bed
 - D. Shallow foundations can be constructed on made-up soil
 - E. Grillage foundation is classified as a shallow foundation
16. Which one of the following is not considered as a Main Parties on a construction project?
- A. Client
 - B. Consultant
 - C. Contractor
 - D. Insurance Companies
 - E. Public Sector Agencies
 - F. None
17. A project in which the design and construction services are contracted by a single entity known as
- A. Design-Bid-Build (DBB)
 - B. Design-Build (DB)**
 - C. CM at risk
 - D. Build-Operate-Transfer (BOT)
18. What is a dispute resolution method which is used in construction industry?
- A. Negotiation
 - B. Mediation/Adjudication
 - C. Arbitration
 - D. Litigation
 - E. All**
19. Selection of Consultants can be made by:
- A. Based on Quality & Cost
 - B. Quality Based Selection
 - C. Selection based on fixed budget
 - D. Selection Based on Least Cost
 - E. All**
20. What is the depreciation of existing machinery or asset due to new and better invention, design of equipment of processes?
- A. Depreciation
 - B. Obsolescence**
 - C. Valuation
 - D. Reversionary Value
21. What is the main difference between working stage and limit stage of a structural element under flexure?
- A. The type of load applied
 - B. The shape of cross section
 - C. The assumption of material behavior and safety factor
 - D. The location of neutral axis
 - E. The amount of reinforcement
22. How does the neutral axis of a beam change when it is subjected to bending?
- A. It moves toward the compression side
 - B. It moves toward the tension side
 - C. It stays at the centroid of the cross-section
 - D. It depends on the material and shape of the beam
 - E. It depends on the magnitude and direction of bending

23. What is the role of reinforcement in the tension part of the cross-section before cracking?
- A. It prevents cracking from occurring
 - B. It distributes cracking over the cross section
 - C. It reduces compression zone gradually
 - D. It yields under tensile stress
 - E. It has no effect before cracking
24. What happens to the reinforcement in the tension part of the cross-section when cracking occurs?
- A. It stops resisting tensile stress
 - B. It starts resisting tensile stress
 - C. It increases tensile stress in concrete
 - D. It decreases tensile stress in concrete
 - E. It has no relation to tensile stress in concrete
25. Which of these statements best describes the difference between section analysis and section design of reinforced concrete rectangular beam?
- A. Section analysis is about finding loads and section design is about resisting them
 - A. Section analysis is about defining dimensions and section design is about meeting requirements
 - B. Section analysis is about understanding the behavior of the beam and section design is about creating a suitable cross-section
 - C. Section analysis is about evaluating alternatives and section design is about choosing one
 - D. None of the above
26. What is the main difference between section analysis and section design of reinforced concrete rectangular beam in terms of inputs and outputs?
- A. Section analysis takes loads and dimensions as inputs and gives stresses and strains as outputs, while section design takes requirements and materials as inputs and gives dimensions and reinforcement as outputs
 - B. Section analysis takes dimensions and reinforcement as inputs and gives loads and deflections as outputs, while section design takes materials and loads as inputs and gives requirements and stresses as outputs
 - C. Section analysis takes stresses and strains as inputs and gives loads and dimensions as outputs, while section design takes dimensions and reinforcement as inputs and gives materials and requirements as outputs
 - D. Section analysis takes requirements and materials as inputs and gives dimensions and reinforcement as outputs, while section design takes loads and dimensions as inputs and gives stresses and strains as outputs
 - E. None of the above
27. Which of these statements is true about the fundamental assumptions in flexural theory of reinforced concrete analysis and design?
- A. They are based on linear elasticity and compatibility of strains
 - B. They are based on nonlinear plasticity and equilibrium of forces
 - C. They are valid for both ultimate and serviceability states
 - D. They are valid only for ultimate state but not for serviceability state
 - E. None of the above
28. Which one is less significant in design of most reinforced columns under gravity load?
- A. Moment
 - B. Shear
 - C. Compression force

- D. Tension force
 - E. B&D
29. Which best describes the tension failure control zone of the interaction diagram of RC column
- A. Very large eccentricity of the axial force
 - B. The failure is triggered by yielding of the tension steel
 - C. The cause of failure is bending moment only
 - D. A & B
 - E. All
30. The interaction diagrams for reinforced concrete columns
- A. The resistance of column for axial load and moment
 - B. The resistance of column for shear force and moment
 - C. The interaction diagram is linear
 - D. The interaction diagram does not depend on the material strength
31. Which one of the following measures will have less improvement on the shear strength of flat slab?
- A. Increasing column dimension
 - B. Increasing concrete strength
 - C. Increase the grade of flexural reinforcement bars
 - D. Increase slab thickness
32. Which one is the best expression about aim of serviceability limit state design?
- A. The functioning of structural members under normal use
 - B. The comfort of people
 - C. the appearance of the structures
 - D. All
 - E. None
33. Which one is the best description about the expression S-400 steel grade
- A. The maximum tensile strength of steel
 - B. The ultimate tensile strength of steel
 - C. The yield strength of the steel
 - D. All
 - E. None
34. Which one is not true about partial safety factors in design of reinforced concrete structures as per ES EN 1992?
- A. The reduction safety factor for reinforcement steel in tension is the same as the steel in compression.
 - B. A safety factor for dead load is less than that of live loads.
 - C. The partial safety factor for concrete under tension is greater than a concrete under compression.
 - D. All
 - E. None
35. Diagonal compression capacity of concrete in reinforced concrete beam under shear force is depending on
- A. On the tensile strength of concrete
 - B. On the compression strength of concrete
 - C. On the tensile strength of reinforcement bars
 - D. All
36. Which of the following is a disadvantage of Steel?

- A. Speed of erection/construction
 - B. Reusable
 - C. High strength per unit mass
 - D. Fire and corrosion resistance
 - E. Architectural flexibility/imaginative
37. Which of the following is added to steel to increase resistance to corrosion?
- A. Copper
 - B. Carbon
 - C. Manganese
 - D. Sulphur
38. Which of the following is the property of high-carbon steel?
- A. Reduced strength
 - B. High toughness
 - C. Reduced ductility
 - D. High weldability
39. What is the net section area of a steel plate 40cm wide and 10mm thick with one bolt if the diameter of the bolt hole is 18mm?
- A. 38.2 cm^2
 - B. 24 cm^2
 - C. 5.78 cm^2
 - D. 4.65 cm^2
40. Which of the following is true about bracket connections?
- A. They are used to give an aesthetic appearance to the structure
 - B. These connections are used to accommodate less number of bolts
 - C. Fabrication cost is low
 - D. More rigid than any other connection
41. Which of the following criteria should be considered for establishing the moment resistance of flexural members?
- A. Local buckling
 - B. Lateral-torsional buckling
 - C. Shear strength including shear buckling
 - D. Local strength at points of loading or reaction
 - E. All
42. Which of the following load combination is not recommended as per ES EN 1990?
- A. Dead load + imposed load
 - B. Dead load + wind load + earthquake load
 - C. Dead load + imposed load + wind load
 - D. Dead load + imposed load + earthquake load
43. Which is true about the dynamic effect in bridge structures?
- A. As the weight of the vehicle goes up, the apparent dynamic amplification goes down.
 - B. Multiple vehicles produce a lower dynamic amplification than a single vehicle of the same weight.
 - C. Vehicles with more axles result in a lower dynamic amplification.
 - D. The dynamic load allowance factor for culverts and other buried structures is somehow lower than to bridge superstructures.
 - E. All
44. Which one of the following statements contains incorrect concepts?
- A. The larger the thickness of an elastomer layer, the smaller its shape factor will be

- B. The thickness of the cover layers shall not exceed the thickness of the internal layers
 - C. If an elastomeric bearing fails for compressive stress check, it means that the limits the shear stress and strain in the elastomer are exceeded and we may reduce length and width of the pad to satisfy compressive stress requirements
 - D. Delamination of elastomer layers in a steel reinforced elastomeric bearing is resisted by the internal steel reinforcement layers
45. Which one of the following statements contains correct concepts about multiple presence factor?
- A. Multiple presence factor is used to account simultaneous occurrence of heavy axle vehicles on adjacent lanes
 - B. The multiple presence factor gets smaller as the number of occupied lanes increases.
 - C. The probability of single lane loaded case for a multi lane bridge is 120%.
 - D. The probability of three adjacent lanes loaded with heavy axle vehicles is smaller than the probability of two adjacent lanes loaded.
 - E. All
46. It is necessary to select an ideal bridge site at which the bridge can be made economically. As construction of a bridge requires a heavy investment, the bridge site should be selected wisely. A poor bridge site may increase the project's cost, making it susceptible to damage, in the long run, thus decreasing the life span of bridges. Which of the following are the factors that require attention while selecting a bridge site?
- A. The river reach should be straight.
 - B. The river banks should be stable.
 - C. The width of the river channel should be minimum as possible.
 - D. There should not be the necessity for extensive river training works.
 - E. All
47. After site selection, give the factor affecting span selection?
- A. Economic span: costs of super structure increases as the number of span increases but the cost of sub structure decreases as the number of span decreases.
 - B. Hydraulic requirement: the bridge should be capable of to pass the flood during design flood.
 - C. Location of piers should be located in such manner that they can provide the required linear water way and piers should be placed parallel to the flow and at minimum velocity of flow in order to have minimum obstruction and scour respectively
 - D. Free board: to allow transportation of debris
 - E. Grade requirement: is governed by capacity of heaviest vehicle to climb, vertical curve and sight distance
 - F. All
48. What are the advantages of continuous reinforced concrete bridge construction over multiple simple span reinforced concrete bridges?
- A. Less number of bearings than simply supported bridges since on line of bearings are used over the piers
 - B. Reduced width of pier, thus less flow obstruction and less amount of material
 - C. Requires less number of expansion joints due to which both the initial cost and maintenance cost become less. The rigidity quality over the bridge is thus improved
 - D. Lesser depth of girder, hence economical supports
 - E. All
49. What factors must be considered in bridge type selection?
- A. Geometric conditions of the Site
 - B. Subsurface conditions of the Site

- C. Aesthetics
 - D. Economics and ease of maintenance
 - E. All except B
 - F. All
50. What is the purpose of a shear wall?
- A. To resist lateral loads
 - B. To resist vertical loads
 - C. To provide additional support for beams
 - D. To provide additional support for columns
51. How does the height of a building affect wind loads in ES EN 1991-1-4?
- A. Wind loads increase with height up to a certain point, and then decrease
 - B. Wind loads decrease with height up to a certain point, and then increase
 - C. Wind loads increase proportionally with height
 - D. Wind loads decrease proportionally with height
52. How is the terrain category defined in ES EN 1991-1-4?
- A. Based on the type of ground cover
 - B. Based on the height of surrounding buildings
 - C. Based on the topography of the surrounding area
 - D. Based on the proximity to the sea or large bodies of water
53. What is the design seismic action in ES EN 1998-1?
- A. Maximum seismic action expected in a structure's lifetime
 - B. Seismic action for a standard design earthquake
 - C. Seismic action for a moderate design earthquake
 - D. Seismic action for a rare design earthquake
54. How is the response spectrum used in ES EN 1998-1?
- A. To determine the maximum displacements and accelerations that a structure can sustain during an earthquake
 - B. To determine the seismic hazard in a region
 - C. To determine the building code requirements for seismic design
 - D. To determine the level of seismic retrofitting needed for an existing structure
55. What is the ductility class in ES EN 1998-1?
- A. A classification of structures based on their ability to withstand seismic loads
 - B. A classification of steel reinforcement based on its ductility properties
 - C. A classification of soil types based on their response to seismic waves
 - D. A classification of design earthquake scenarios based on their severity
56. What is a lateral load in structural design?
- A. A vertical load applied to a structure
 - B. A load applied perpendicular to the direction of gravity
 - C. A load that causes a structure to sway or tilt
 - D. A load that causes a structure to compress or expand
57. To what the velocity of flow is proportional, according to the Darcy's law?
- A. effective stress
 - B. hydraulic gradient
 - C. cohesion
 - D. adhesion

- E. None of these
58. What would be the seepage velocity, if discharge velocity is 4×10^{-7} cm/s and the porosity is 33%?
- A. 18.12×10^{-7} cm/s
 - B. 12.12×10^{-7} cm/s
 - C. 6×10^{-7} cm/s
 - D. 3×10^{-7} cm/s
 - E. None of these
59. Which of the following soils has more plasticity index?
- A. Sand
 - B. Silt
 - C. Clay
 - D. Gravel
60. During seepage through an earth mass, the direction of seepage is
- A. Parallel to equipotential lines
 - B. Perpendicular to the streamlines
 - C. Perpendicular to equipotential lines
 - D. Along the gravity direction
61. A flow net is drawn to obtain
- A. Seepage quantity, coefficient hydraulic conductivity, and uplift pressure
 - B. Seepage quantity, coefficient of permeability, and uplift pressure
 - C. Seepage quantity, exit gradient, and uplift pressure
 - D. Exit gradient, Seepage quantity, and coefficient permeability
62. A sample of clay and a sample of sand have the same specific gravity and void ratio. Their permeability would differ because
- A. Their porosities would be different
 - B. Their degree of saturation would be different
 - C. Their densities would be different
 - D. The size range of their voids would be different
63. Which one of the following methods is more suitable for the determination of permeability of a clayey soil?
- A. Constant head method
 - B. Falling head method
 - C. Horizontal test method
 - D. In-situ pump method
64. In a tri-axial compression test when drainage is allowed during the first stage (i.e. application of cell pressure) only and not during the second stage (i.e. application of deviator stress at constant cell pressure), the test is known as
- A. Consolidated drained test
 - B. Unconsolidated undrained test
 - C. Consolidated undrained test
 - D. Unconsolidated drained test
65. Followings are the principal reason for compacting soil **except**

- A. Compaction reduces the void ratio thus making it easier for water to flow through soil
 - B. to increase the strength and stability of soil
 - C. Compaction reduces the void ratio thus making loose soil become dense
 - D. Compaction can prevent the buildup of large water pressures
66. Which of the following statements is **NOT correct**?
- A. Loose sand exhibits contractive behavior upon shearing.
 - B. Dense sand when sheared under undrained condition, may lead to generation of negative pore pressure
 - C. Soils exhibits contractive behavior leads to generation of negative pore water pressure up on shearing
 - D. Soils exhibits dilative (expansion) behavior leads to generation of negative pore water pressure up on shearing.
67. Select **incorrect** Statement,
- A. In a direct shear box test, the plane of shear failure is predetermined
 - B. Unconfined compression test can be carried out on all types of soils
 - C. Better control is achieved on the drainage of the soil in a tri-axial compression test
 - D. Stress distribution on the failure plane in the case of tri-axial compression test is uniform
68. Terzaghi's bearing capacity factors N_c , N_q and N_r are functions of
- A. angle of internal friction only
 - B. cohesion only
 - C. both cohesion and angle of internal friction
 - D. none of the above
69. Rankine's theory of earth pressure assumes that the back of the wall is
- A. Vertical and smooth
 - B. Plane and smooth
 - C. Vertical and rough
 - D. None of the above
70. The shear strength of a soil
- A. decreases with decrease in normal stress
 - B. is directly proportional to the angle of internal friction of the soil
 - C. is inversely proportional to the angle of internal friction of the soil
 - D. decreases with increase in normal stress
71. The pressure distribution between the base of the foundation and the ground for a rigid foundation constructed on cohesion-less soil
- A. Maximum at the edge
 - B. Maximum at the center
 - C. Uniform distribution at base
 - D. Maximum at either edge
72. What type of sample is obtained from the settling tank in wash boring?
- A. Non representative disturbed sample
 - B. Undisturbed sample
 - C. Representative disturbed sample
 - D. A and B

73. If the number of blows required for the penetration of a split-spoon sampler into the soil deposit for the first three 150mm consecutive intervals are 10, 12 and 20 respectively. What will be the standard penetration number (N)?
- A. 32
 - B. 30
 - C. 22
 - D. None
74. Which one of the following statements is true?
- A. Plate load test is commonly used to determine the bearing capacity of pile foundations
 - B. Soil samples collected using a hand auger can be used only for conducting unconfined compression tests
 - C. Standard penetration test N value is defined as the average blow counts required for the last 0.3 m of driving.
 - D. Field vane test results can be used for the short-term stability analysis of geotechnical structures.
 - E. None of above
75. For the design of a strap footing, the following assumption is not made
- A. The strap is perfectly rigid
 - B. The soil pressure varies linearly
 - C. The interior footing is centrally loaded
 - D. The strap is not subjected to any direct soil pressure
76. Which one is not the function of the foundation?
- A. Distributing the structural load over a large bearing area
 - B. To load the bearing surface at a uniform rate to prevent unequal settlement
 - C. Preventing the lateral movement of the supporting material
 - D. Securing a level and firm bed for building operation
 - E. Increasing instability of the structure as a whole
77. The type of retaining wall whose stability is totally dependent on its own mass
- A. Gravity walls
 - B. Cantilever walls
 - C. Counterfort walls
 - D. Buttress type of walls
78. Based on the function, piles can be classified intotypes.
- A. 4
 - B. 6
 - C. 8
 - D. 3
79. Which of the following piles is used to compact loose granular soil?
- A. Friction piles
 - B. End bearing piles
 - C. Compaction piles
 - D. Tension piles
80. The piles that are used for protecting structures from ships and floating object is
- A. Anchor piles

- B. Fender piles
 - C. Compaction piles
 - D. Batter piles
81. The maximum load which can be carried by a pile is defined as its:
- A. Ultimate load carrying capacity
 - B. Ultimate bearing resistance
 - C. Ultimate bearing capacity
 - D. All of the mentioned
82. The efficiency of pile group depends upon:
- A. Characteristic of pile and Spacing of pile
 - B. Bearing capacity of soil
 - C. All of the mentioned
 - D. None of the mentioned
83. The bearing capacity of a single pile in clay is mainly due to:
- A. Adhesion
 - B. Shear strength of soil
 - C. Allowable load
 - D. Ultimate load
84. The downward drag acting on a pile due to the movement of the surrounding is called:
- A. Skin friction
 - B. Negative skin friction
 - C. Frictional force
 - D. None of the mentioned
85. comprises Situation definition, problem definition, search for solutions, analysis of performance, evaluation of alternatives, choice of project, and specification and construction.
- A. Four-stage Modeling
 - B. Feasibility Study
 - C. Transportation planning process
 - D. Travel Forecasting
86.expressed as the number of persons or vehicles per unit time that can be expected to travel on a given segment of a transportation system under a set of given land-use, socioeconomic, and environmental conditions.
- A. Traffic flow
 - B. Travel Demand
 - C. Capacity
 - D. Traffic Volume
87. What are the factors influencing travel demand?
- A. the location and intensity of land use
 - B. the socioeconomic characteristics of people living in the area
 - C. the extent, cost, and quality of available transportation services
 - D. All
88. Which one is **true** about Gravity Model?
- A. Cannot address changes in travel impedance
 - B. Requires a well-calibrated impedance measure based on time and cost for various commodities
 - C. Does not require information about impedances between travel zones

- D. Requires a calibrated utility function that is rare in freight forecasting
89. Which one is different?
- A. Logit model
 - B. Cross-classification
 - C. Growth Factor Models
 - D. Net present worth (NPW)
90. Which of the following statement is not correct?
- A. When the density on the highway reaches its maximum, the flow reaches its ultimate maximum
 - B. When the density on the highway is zero, the flow will also be zero.
 - C. When the density on the highway approaches to zero, the speed of vehicle on the highway will approach to free-flow speed.
 - D. At the maximum flow rate, the space mean speed is half of free flows speed.
 - E. None
91. Geometric design of highways was significantly affected by:
- A. Width of the vehicle
 - B. Length of the vehicle
 - C. Height of the vehicle
 - D. Speed of the vehicle
 - E. None
92. Which one of the following is correct about super elevation runoff length?
- A. Ends within the tangent runout when transition curve is not provided
 - B. Starts where the transition curve starts and ends at one-third from the Point of curvature
 - C. Starts and ends within the transition curve when transition curve is provided
 - D. Starts and ends within the horizontal curve if transition curve is not provided
 - E. All
93. Based on AASHTO's Policy for geometry design of highways and streets, which of the following statement/s is incorrect about design vehicle?
- A. The design vehicle should be the largest that is likely to use the highway with considerable frequency
 - B. The design vehicle should be the smallest vehicle that is likely to use the highway with higher frequency
 - C. When parking lot or a series of parking lots are the main traffic generators, the passenger car may be used as a design vehicle
 - D. For the design of intersections at local streets and park roads, a single-unit truck may be used as a design vehicle
 - E. None
94. The provision of traffic signals at intersections
- A. reduces right angled and rear end collisions
 - B. increases right angled and rear end collisions
 - C. reduces right angled collisions but may increase rear end collisions
 - D. reduces rear end collisions but may increase right angled collisions
 - E. None

95. Among the following laboratory test which one is used to measure the resistance to flow of bitumen materials?
- A. Penetration test
 - B. Ductility test
 - C. Viscosity test
 - D. Flash point test
96. Rutting is the main structural failure in flexible pavements. Which of the following is not the cause for rutting failure?
- A. Insufficient layer thickness provision
 - B. The strength of subgrade soil is weak.
 - C. Aging of bitumen and high-speed traffic
 - D. High temperature condition and traffic loading
 - E. C and D
 - F. A and B
97. In marshal mix design, as the bitumen content increases
- A. VFA (Void filled with asphalt) decreases.
 - B. Air void decreases
 - C. Flow decreases.
 - D. A and B
 - E. C and B
98. Among the following laboratory tests which one is used to measure the strength of subgrade soils
- A. Resilient modulus (Mr.) test
 - B. CBR (Californian bearing ratio) test
 - C. Los Angeles abrasion test
 - D. Plasticity test
 - E. A and B
 - F. B and D
99. Which of the following is not the importance of providing subbase or base course materials in rigid pavements?
- A. To protect pumping effect
 - B. To improve the drainage
 - C. To control shrinkage and swelling effect
 - D. To protect thermal cracking
 - E. None
100. Which of the following is not the advantage of flexible pavement over rigid pavements?
- A. It has low initial investment cost
 - B. It has good skid resistance
 - C. It has longer design period
 - D. It tolerates variation of temperature
 - E. None
101. Which one the following the purpose of tack coat in pavement?
- A. Promotes bond between base course and surface courses

- B. To provide a bond between binder course and wearing course
 - C. As drainage and filter layer for fine materials
 - D. All
102. Among the dams built in Ethiopia, which one do you think is exceptional for its purpose?
- A. Legedadi
 - B. GERD
 - C. Aba Samuel
 - D. Genale Dwa III
 - E. All
103. The elementary profile of dam is
- A. Rectangle
 - B. Right angled triangle
 - C. Trapezoidal
104. The most suitable material for the central impervious core of a zoned embankment type dam is
- A. Clay
 - B. Silty Clay
 - C. Clay mixed with fine sand
105. Transverse Joints in concrete gravity dams are
- A. Horizontal construction joints at each lift height
 - B. Vertical construction joints of full height and width
 - C. Diagonal construction joints for torsion
 - D. None
106. If the minimum stress developed at the base of the dam is negative, then the nature of stress is
- A. Shearing
 - B. Tensile
 - C. Bending
 - D. Compressive
107. A temporary dam constructed to exclude water from a specific area is
- A. Cofferdam
 - B. Debris Dam
 - C. Storage Dam
 - D. Diversion Dam
108. In which of the following dam the weight of water is carried by a deck of RCC or by arches that share the weight burden?
- A. Earth dams
 - B. Rock fill dams
 - C. Gravity dam
 - D. Timber dam
109. Cracks developed in the body of dam section can be avoided by:
- A. Construction joints
 - B. Contraction joints
 - C. Transverse Joints

D. Longitudinal joints