MINISTRY OF EDUCATION (MOE)

Exit Exam Model/Civil Engineering

1. Limit state design is a process that involves, except

   A. identification of working loads and allowable stresses

   B. Structural design for the significant limit states

   C. The determination of acceptable levels of safety against occurrence of each limit state

   D. The identification of all potential modes of failure

2. Which of the following is NOT true about the design and analysis of rigid retaining walls?

   A. Usually cohesion-less soil is used as a backfill material in the back of the wall.

   B. The sum of moments produced by the active earth pressure must be less than the sum of moments produced by the different weights of the wall and backfill soil acting with the wall.

   C. The passive earth pressure below the dredge line provides resistance against sliding.

   D. The resultant force on the wall should pass through the first third of the base width of the wall.

3. One of the following is NOT a design criterion used in the design of caissons.

   A. External walls of a concrete caissons is designed to withstand lateral loads.

   B. External walls of a concrete caissons is designed to withstand vertical loads.

   C. Internal walls are designed to share vertical loads with external walls of the concrete caisson.

   D. Construction joints, if any, in concrete caissons can be placed anywhere along the height of the caisson.

4. The environmental factors influencing the strength of concrete at early age of development include, except

   A. Temperature conditions during curing

   B. Light conditions during curing

   C. Moisture conditions during curing

   D. Pressure conditions during steam curing

5. If the geometry of a potential embankment dam site is on a zigzagging river (S- shape layout) as shown in the figure below, what type of analysis do you recommend if internal tension cracks need to be investigated?

   A. Plane stress analysis using software

   B. Three-dimensional analysis manually

   C. Two-dimensional analysis manually

   D. Plane strain analysis using software

6. The soil state at which its mean effective stress is zero due to the seeping water is called

   A. Critical state.

   B. Consolidation.

   C. Static liquefaction.

   D. Densification.

7. What is the purpose of mixing water in concrete

   A. To increase the workability of fresh Concrete

   B. To increase the density of hardened Concrete

   C. To Increase the strength of hardened Concrete

D. To delay the hydration reaction with cement

8. The seismic force acting on a building structure does NOT depend on

A. The mass of the building

B. The lateral stiffness of the building

C. The structural system of the building

D. The shape of the building

9. One of the following is used for the computation of the volume of earthwork in a road project.

A. Simpson's 5/8 formula.

B. Prismoidal formula.

C. Spherical formula.

D. Triangular formula.

10. Which design and analysis approach do you recommend when you do not have material and site investigation works?

A. SIGMA/W component of Geoslope.

B. SEEP/W component of Geoslope.

C. Latest software based advanced methods.

D. Approximate graphical method.

11. The seismic force acting on a building structure does NOT depend on

A. The mass of the building

B. The lateral stiffness of the building

C. The structural system of the building

D. The shape of the building

12. All of the following outputs can be obtained when analyzing an embankment dam using SEEP/W component of Geoslope software except.

A. Discharge through the dam body.

B. Pressure head distribution along the base of the dam.

C. Flow net plot.

D. Deformation of the dam body.

13. Which one of the following does NOT contribute to the shear strength of beams without web reinforcement

A. Tensile resistance of the longitudinal bar

B. Aggregate interlock

C. Dowel action

D. Shear resistance due the uncracked part of the concrete

14. A sheet pile wall is driven into sandy silt and seepage takes place through the soil where the coefficient of permeability is 1.5 x 10-4 cm/s. Compute the volume of water per unit width of the wall that flows through the soil in one year using the flow net shown in the figure below.

A. 1.82m3

B. 0.182m3

C. 0.437m3

D. 159.65m3

15. The quality of a hardened concrete is commonly assessed through

A. Compressive strength at the age of 7days

B. Compressive strength at the age of 90days

C. Compressive strength at the age of 28days

D. Compressive strength at the age of 3days

16. The unit cost of concrete is commonly expressed in

A. $/m3

B. $/m2

C. $/kg

D. $/kg.m

17. All of the following criteria are considered in the external stability analysis of conventional retaining walls except.

A. Bearing capacity

B. Sliding

C. Nail pullout

D. Overturning

18. Which one of the following does NOT describe a category of constructed facilities

A. Institutional and Commercial Building Construction

B. River Basins

C. Infrastructure and heavy construction

D. Residential Housing Construction

19. Which one is NOT a common cause failure of dams?

A. Hydraulic failure.

B. Traffic over crest

C. Structural failure.

D. Seepage failure.

20. Steel tension member is the most efficient structural element, but its efficiency may be seriously affected by

A. Buckling

B. Elongation

C. Yielding

D. End connections

21. Static wind loading is different from earthquake loading because it depends on

A. The stiffness of the structure

B. The geometry/shape of the building

C. The soil type of the foundation

D. The mass of the structure

22. One of the following tasks is NOT covered in quantity surveying

A. Preparation of Specification

B. Preparation of approximate (preliminary) cost estimate at the very early stage of the project

C. Taking measurements of civil works

D. Preparation of construction drawing

23. Concrete undergoes time dependent volume change, which may cause stresses, cracking, or deflections that affect the in-service behavior of reinforced concrete structures, these include except

    A. Shrinkage

    B. Hydration

    C. Creep

    D. Thermal expansion or contraction

24. Sight distance at intersections may be used for the following except.

    A. Enable stopped vehicle to cross a main road.

    B. Enable approaching vehicle to change the speed.

    C. Enable parking at road intersections.

    D. Enable approaching vehicle to stop.

25. A singly reinforced concrete section has dimensions width = 300mm, gross depth = 600mm and effective depth d=550mm. Calculate the neutral axis depth at balanced failure

    A. 275mm

    B. 400mm

    C. 350mm

    D. 250mm

26. One of the following is NOT technique used to produce schedule

    A. CPM (Critical Path Method)

    B. PERT (program evaluation and review technique)

    C. Bar charts

D. Work break down

27. A 600 mm-diameter and 20 m-long concrete bored pile is constructed using the continuous flight auger technique. The pile passes through 8 m of gravelly sand followed by 8 m of stiff clay, with the bottom 4m founded in very dense sand. A pile load test was carried out on this pile and the load test data (pressure versus settlement) are summarized in the figure below. Adopting a factor of safety of 2.0, estimate the allowable load on the pile.

A. 11 MPa

B. 12 MPa

C. 34 MPa

D. 5.5 MPa

28. A soil sample 10 cm in diameter is placed in an inclined tube 1 m long. A constant supply of water is allowed to flow into one end of the soil at A, and the outflow at B is collected by a beaker as shown in the figure. The average amount of water collected is 1 cm3 for every 10 seconds. If the void ratio is 0.6, determine the seepage velocity and the hydraulic conductivity.

A. 0.034 cm/s, 10.8 x10-4 cm/s

B. 0.0013 cm/s, 10.8 x10-4 cm/s

C. 0.0034 cm/s, 10.8 x10-4 cm/s

D. 0.1cm /s, 10.8 x10-4 cm/s

29. Is the property of bitumen that permits to undergo great deformation or elongation.

A. Viscosity.

B. Ductility.

C. Flexibility.

D. Stiffness.

30. When two highways or streets cross each other at a different grade, with no connections, the arrangement is referred to as

A. Interchange.

B. Channelization.

C. Grade separated intersection.

D. At-grade intersection.

31. The purpose of limiting bridge deflection is to avoid

A. Failure of the bridge

B. Fatigue effects resulting from excessive vibrations

C. Excessive deformation stresses in secondary members or connections

D. Undesirable psychological reactions by pedestrians and/or passengers

32. An effective and efficient procurement method ensures the following rights, except

A. The Right profit

B. The Right Quantity

C. The Right Quality

D. The Right Counterpart

33. _____is a layer of natural soil prepared to receive the stress from sub-base layer.

A. Asphalt.

B. Surface course.

C. Base course.

D. Od. Subgrade.

34. One of the following is NOT an environmental issue related to soil boring during site investigation.

A. A collapse of struts in cofferdams can cause life lose.

B. Deep excavation can cause damage on nearby buildings.

C. Pneumatic caissons are less health hazard than other types of caissons.

D. Construction of sheet pile walls can affect aquatic life.

35. What is the purpose of drawing flow net?

A. To draw flow lines.

B. To estimate the amount of water flowing.

C. To draw equipotential lines.

D. To decrease the amount of water seeping.

36. One of the following is a mechanism used to reduce the negative impact on environment due to construction activities.

A. Paving walkways with white color concrete apron

B. Use of cast-in-situ concrete piles over precast concrete piles.

C. Stabilizing expansive soils with granular material.

D. Damping excavated expansive soils during road construction in a very far place.

37. Which one of the following is NOT the purpose of painting

A. To prevent cracking

B. To provide a decorative finish

C. To protect the surface from weathering effects of the atmosphere

D. To protect the decay of wood and corrosion of metals

38. Compute the statical moment in the slab panel A shown in figure below. The flat slab supports a total factored load of 20kN/m2.

    A. 375 kNm

    B. 392 KNm

    C. 90 kNm

    D. 75 kNm

39. All of the following describe Level of Service E except.

    A. Levels of basic elements of comfort and Convenience are very poor.

    B. Traffic flow conditions are best described as unstable.

    C. Traffic movement is on a 'stop-go' basis.

    D. The capacity of the highway has been reached.

40. A7 m-high smooth, vertical wall retains a horizontal surface granular backfill with unit weight of 18 KN/m3 and a friction angle of 30°. Find the magnitude and location of the resultant active thrust from the base.

    A. 147 kN/m, 2.33 m

    B. 42 kN/m, 3.00 m

    C. 63 KN/m, 2.33 m

    D. 126 kN/m, 2.33 m

41. There is a plan to construct a high-rise bulding on cast-in-situ pile foundation with about 50 m length. Geotechnical site investigation at the site dictates that ground water is located at shallower depth and the top 10 m layer of the site is sand soil followed byclayey sand. Using these data, which of thefollowing is NOT true?

A. As there will be flow of water to the bore hole, it is a good idea to reduce the water cement ratio during the concrete production.

B. As the piles are cast-in-situ piles, the quality of construction of the piles can be reduced.

C. Caution must be made while pouring the Concrete as concrete segregation can happen.

D. Use of casings during the construction of the piles is a must.

42. The base shear computed using the equivalent static lateral force method of analysis is not dependent on

A. The fundamental period of the building

B. Spectral acceleration of the seismic action

C. Total mass of the building

D. The area of the building

43. Advantages gained by using timber as building structure material is

A. High strength to weight ratio

B. High resistance to warping, bending and cracking

C. High resistance to decay

D. High fire resistance

44. Which one of the following parameters contribute less to the shear strength of reinforced concrete beams

A. Shear reinforcement amount

B. Compression reinforcement ratio

C. Concrete strength

D. Longitudinal reinforcement ratio

45. What is NOT the purpose of valuation

A. For Security of loans or mortgage

B. Acquisition

C. To get over valued loan

D. For buying or selling

46. _____ is combinations of ramps and grade separations designed as a system of interconnecting roadways to separate the turning and through movements at the junction of two or more roads.

A. Át-grade intersection

B. Interchange.

C. Channelization.

D. Grade separated intersection

47. The mean wind velocity Vm(z) at a height z above the terrain does not depend on

A. Air density

B. Terrain roughness

C. Orography

D. Basic wind velocity

48. The following is NOT considered as the main sources of dampness in buildings during service

A. Rain travel from wall tops

B. Rain Beating Against External Walls

C. Water used for concrete curing

D. Moisture rising up the walls from the ground

49. is the bearing capacity of soil that takes into account a required factor of safety for shear and settlement.

A. Allowable bearing capacity.

B. Net ultimate bearing capacity.

C. Ultimate bearing capacity.

D. Safe bearing capacity.

50. _____ is the separation or regulation of conflicting traffic movements into definite paths of travel by traffic islands or pavement markings to facilitate the safe and orderly movements of both vehicles and pedestrians.

A. At-grade intersection

B. Grade separated intersection

C. Channelization.

D. Interchange.

51. For the purpose of accelerating the consolidation process in a 6 m-thick clay layer, a surcharge of 3 m- high compacted fill with a bulk unit weight of 22.0 kN/m3 is applied. The coefficient of volume compressibility of the clay is 1.5 MPa-1. Estimate the final consolidation settlement as the result of the application of the surcharge.

A. 396 mm

B. 216 mm

C. 324 mm

D. 594 mm

52. Which one of the following does NOT contribute to the total settlement in soils?

A. Tertiary consolidation settlement.

B. Secondary settlement.

C. Primary consolidation settlement.

D. Immediate settlement.

53. How will the design of an asphalt concrete pavement with an untreated granular base of 300 mm thickness monograph ary if it is required to accommodate 3 million ESALs without failing in fatigue cracking or rutting. Consider the subgrade resilient modulus to be 80 MPa, and the MAAT is 7 0C. AI Thickness Design Nomograph.

A. The thickness will be between 130 mm and 200 mm.

B. The thickness will be 200 mm

C. The thickness will be greater than 200 mm.

D. The thickness will be 130 mm.

54. Pitched roofs are NOT preferred in areas where

A. Rainfall/snow fall is very heavy

B. Terrace is required

C. There're slopping top surfaces

D. There is limited width and simple shape

55. All of the following criteria are considered in the external stability analysis of conventional retaining walls except.

A. Nail pullout

B. Siding

C. Bearing capacity

D. Overturning

56. What is NOT the primary objective a surveillance programme?

A. To minimize the possibility of catastrophic failure of the dam.

B. To assist in the scheduling of routine maintenance.

C. To review performance

D. To control the amount of water discharging.

57. Which of the following is NOT true about a mass diagram in a road project?

A. Balance line is any horizontal line, cutting off a loop of the mass curve, and is equal to the fill.

B. If the final point on the mass diagram is a positive amount, it indicates a net shortage of earthwork for the project.

C. The final point on a mass diagram for a given project gives the overall net amount of earthwork for the entire project.

D. The maximum and minimum points on the mass diagram occur at or near to the grade points on the profile.

58. The process each manager follows during life cycle of a project is known as

A. Manger life cycle

B. Project Management life cycle

C. Project administration

D. Project management

59. A project closeout does not constitute

A. Project Acceptance

B. Contract closeout

C. Project completion

D. Project planning

60. While designing a retaining wall, what remedial measure do you consider if the factor of safety against sliding falls down below the requirement?

A. Increase the height of the wall.

B. Decrease the base width of the wall.

C. Decrease the height of the wall.

D. Increase the base width of the wall.

61. The advantage gained in using reinforced concrete over steel in the construction of bridges is

A. Less prone to cracking

B. High resistance to cracking

C. Less affected by corrosion

D. Less material usage

62. Minimum concrete cover is provided in RC members to provide except

A. Increased fire resistance

B. Increased bond strength

C. Increased durability such as protecting the reinforcement from corrosion

D. Increased flexural strength

63. A square footing is required to carry a dead load of 500 kN and live load of 400 kN column load in a medium-dense sand which has an ultimate bearing capacity of 350 kPa. Adopting a

factor of safety of 1.5 for the bearing capacity, analyze and estimate the plan dimensions of the footing.

A. BxL will be 1.5x 1.5 m2.

B. BxL will be 2 x 2 m2.

C. BxL will be 1.6 x 1.6 m2.

D. BxL will be 1.3 x 1.3 m2.

64. One of the following is NOT a negative environmental issue that happens during civil engineering operation.

A. Salvage excavated topsoil for landscaping.

B. Land sliding during excavations.

C. Construction of masonry retaining walls intercepts drainage lines.

D. Depletion of construction material.

65. Which one of the following construction materials has the highest carbon-foot print (carbon foot-print refers to release of carbon dioxide to the atmosphere)

A. Steel

B. Concrete

C. Earth blocks

D. Timber

66. The factored load acting on the slab in figure is 10kN/m2. Calculate the maximum strip moment along strip A-A

A. 40kNm/m

B. 45kNm/m

C. 20kNm/m

D. 10KNm/m

67. For effective (in terms of safety and economy) design of footings, the resultant force from the structure should pass through

A. The heel of the footing.

B. The kern.

C. The toe of the footing.

D. The first third.

68. One of the following design methods is NOT usually used for the structural design of flexible rigid pavement.

A. The Asphalt Institute

B. NCHRP

C. American Association of State Highway and Transportation Officials

D. The Portland Cement Association

69. Which of the following is NOT true about the design and analysis of sheet pile retaining walls?

A. Anchored sheet pile walls are used in waterfront structures.

B. Water pressure due to the water below the dredge line should be ignored during the analysis.

C. If the depth of excavation is 5 m, one can use cantilever sheet pile wall

D. Sheet pile walls have high salvage values than conventional rigid retaining walls.

70. Which type of formwork material has the highest number of reuse cycles

A. Plywood

B. Steel

C. Aluminum

D. Timber