AASTU_Civil Engineering_Model Exit Exam 2_June 2023

Thematic Area: Structural Engineering

Course Name: Reinforced Concrete I

1. Select the behavior of Stress-Strain curve for low concrete grade
A. Sharper the peak of the curve
B. High failure strain
C. Less failure strain
D. The Behavior cannot be affected by the strength of the concrete
Answer: C

2. Which of the following design philosophy uses factor of safety for materials and loads?	
A. Working Stress Method	B. Ultimate Load Method
C. Limit state Design Method	D. Working Stress & Ultimate Load Method
Answer: C	

3. A RC beam with 250 mm width and 400mm effective depth is provided with 8 mm – 2 legged stirrups at 150 mm c/c spacing at a particular section. Calculate the shear resistance at that particular section. If the shear capacity of the concrete is 30.58kN and steel having f_{yd} = 300MPa is used.	
A. 51kN	B. 28kN
C. 81kN	D. 111kN
Answer: D	

4. Which type of beam is selected when the depth of the beam is limited by the architect	
A. Singly reinforced	B. T beam
C. Doubly reinforced	D. Inverted L beam
Answer: C	

5. When moment redistribution at the interior supports of a slab is done the sum of distribution factors of all the members meeting at any joint is always	
A. Zero	B. Equal
C. Less than 1	D. Equal to 1
Answer: D	

6. As per EBCS which one of the following statements is not correct about the curtailment of positive reinforcement in a continuous member?
A. Minimum two bards should extend throughout.
B. At least one third bards should extend into the support for a ¾ rd development of length.
C. Cut-off bars shall extend for a distance not less than effective depth of the member beyond theoretical cut-off point.
D. Cut-off bars shall extend for a distance not less than 12 times the bar diameter beyond theoretical cut-off point.

Answer: B

Course Name: Reinforced Concrete II

7. The length between points of inflection of columns is	
A. Span length	B. Face to face length
C. Center to center length	D. Effective buckling length
Answer: D	

8. Second order effect is considered for	
A. Braced columns	B. Slender column
C. Short columns	D. Circular column
Answer: B	

9. Which of the following is NOT advantage of applying flat slabs?	
A. Maximum depth	B. Flexibility in design layout
C. Increased speed of construction	D. Flat soffit
Answer: A	

10. Plastic hinges will not be formed at a points of	
A. Maximum shear	B. Supports
C. Under concentrated loads	D. Maximum bending moment
Answer: A	

11. Which one of the following is applicable when the shape of slabs is irregular, there is presence of openings and having varied support conditions?	
A. Direct Design Method	B. Strip Method
C. Equivalent Frame Method	D. Yield Line Method
Answer: D	

Course Name: Steel & Timber Structures

12. Which one of the following is not the reason behind commonly using rolled steel I-sections as beams?	
A. large moment of inertia with less cross-sectional area	B. large moment of resistance as compared to other section
C. greater lateral stability	D. Low Mass to volume ratio
Answer: D	

13. For structural collapse and structural component failure during design of steel structures, which limit state category is applied?

A. Load factor method	B. Ultimate limit state
C. Permissible stress design method	D. Serviceability limit state
Answer: B	

14. The most economical section for a column, is	
A. rectangular	B. solid round
C. flat strip	D. tubular section
Answer: D	

15. Web crippling generally occurs at the point where	
A. bending moment is maximum	B. shearing force is minimum
C. concentrated loads act	D. deflection is maximum
Answer: C	

16. Select the true statement about beam-column members	
A. They only resist flexural actions	B. Are inclined members
C. They only resist axial actions	D. They resist both Flexural ad axial actions
Answer: D	

17. Strength of bolt is
A. minimum of shear strength and bearing capacity of bolt
B. maximum of shear strength and bearing capacity of bolt
C. shear strength of bolt
D. bearing capacity of bolt
Answer: A

Course Name: Fundamentals of Bridge Design

18. What design state must be considered to limit crack growth under repetitive loads to prevent fracture during the design life of the bridge?	
A. Service limit state	B. Extreme event limit state
C. Fatigue and Fracture limit State	D. Strength limit state
Answer: C	

19. Which one of the following is not a requirement for bridge site selection
A. reasonably straight approach roads
B. minimum disturbing influence of larger tributaries
C. permits parallel crossing as possible
D. well defined banks
Answer: C

20. For Which loads do you consider dynamic load allowance factor	
A. Design Truck	B. Design lane load
C. Pedestrian load	D. Dead load of wearing surface
Answer: A	

21. Which is true about loading on Bridge?
A. Wind load consideration in Small and low bridge
B. Add dynamic effect to Pedestrian load
C. Avoid dynamic effect to Design Truck load
D. Wind load consideration in Longer span bridge
Answer: D

22. The governing action effect which is observed only in Box-Girder bridge is	
A. Bending Moment	B. Torsion
C. Shear Force	D. Axial Force
Answer: B	

23. What is the roll of Bearing in bridge structure?
A. Accommodate relative movements between superstructure and substructure
B. It is a wall constructed on both sides of the abutment to support it
C. As a communication Route
D. Retains lateral earth pressure
Answer: A

Course Name: Structural Design

24. Which one of the following is NOT the behavior of a beam cross section having larger plastic moment and elastic moment ratio?	
A. Longer warning before collapse	B. High ductility
C. Greater deflection at collapse	D. Low Ductility
Answer: D	

25. Which statement is not true about a strong band
A. It is an internal beam usually having the same depth as the remainder of the slab
B. Contains less concentration of reinforcement
C. It is a strip at unsupported edge
D. It acts as a support at the edge of opening
Answer: B

26. Which of the following factors does not influence earthquake resistance design?

A. geographical location of structure	B. wind of location
C. site soil	D. strength of structure
Answer: B	

27. Structures should be designed such that: -
A. Minor and frequent earthquakes can collapse the structure
B. Moderate earthquakes can cause damage to the structure
C. Major earthquakes should not cause any damage to the structure and the structure should be functional
D. Minor earthquake should not cause any damage to the structure and the structure should be functional
Answer: D

28. Identify the correct wind load transferring system of a building?	
A. Truss- Purlins-Roof-Girder	B. Roof-Truss-Purlins-Girder
C. Roof-Purlins-Truss-Girder	D. Roof-Girder-Purlins-Truss
Answer: C	

29. Which of the following load combination is not possible?
A. Dead load + imposed load + wind load
B. Dead load + imposed load + earthquake load
C. Dead load + wind load + earthquake load
D. Dead load + imposed load
Answer: C

Thematic Area: Highway Engineering

Course Name: Highway Engineering I

30. The following criteria should not be considered when selecting the Highway alignment and locating the route.
A. The alignment should be economical
B. The alignment between two terminal control points should be short
C. Obstructions such as cemeteries, places of worship, and archaeological and historical monuments should be steered through.
D. The location should pass through agricultural land and national parks.
Answer: D

31. Road is designed for a speed of 80 km/h on a horizontal curve with a superelevation of 8%. If the coefficient of side friction is 0.1, Determine the minimum radius of the curve in meters required for safe vehicular movement.	
A. 280	B. 340
C. 320	D. 179
Answer: A	

32. An existing road has a 200m long vertical curve, which connects an initial grade of +2.0% & a final grade of -3.0% intersecting at PVI station 2+100 an elevation of 2500. With these given parameters, which of the following is NOT true about the point of vertical curvature (PVC) and point of vertical tangency (PVT)?	
A. The station of PVC is 2+000	B. The elevation of PVC is 2498.0m
C. The Station of PVT is 2+200	D. The elevation of PVT is 2502.0m
Answer: D	

33. An existing road has a 200m long vertical curve which connects an initial grade of -2.0% & a final grade of +3.0% intersecting at PVI station 2+100 and elevation of 2500. With these given parameters, which of the following is NOT true about the point of vertical curvature (PVC) and point of vertical tangency (PVT)?	
A. The station of PVC is 2+000	B. The elevation of PVC is 2498.0m
C. The Station of PVT is 2+200	D. The elevation of PVT is 2503.0m
Answer: B	

34. The overhaul volume of 7200m^3 is to be overhauled at an average overhaul distance of 2400m with a contract rate of 10 birr/(m^3-km). What is the overhauling cost of the earthwork?	
A. 172,800 birr	B. 17,280 birr
C. 172,800,000 birr	D. 72,000 birr
Answer: C	

35. Which is NOT the possible solution to improve safety at a given intersection?	
A. Separating the points of conflict	B. Increasing the area of conflict
C. Keeping it simple and visible	D. Reducing the points of conflict
Answer: B	

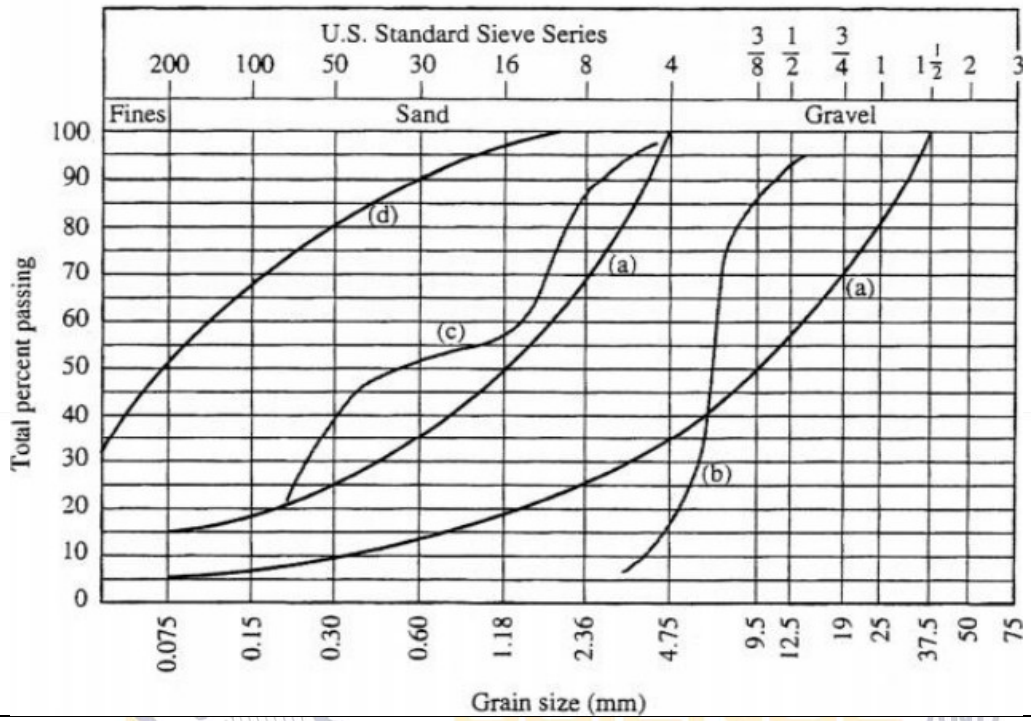
Course Name: Highway Engineering II

36. _____ is defined as the excessive accumulated vertical deformation of pavement along the wheel path due to repeated traffic loading.
A. Thermal cracking
B. Faulting failure
C. Fatigue cracking
D. Rutting
Answer: D

37. A plate-loading test using a plate of 305mm diameter was performed on the surface of the subgrade. A total load of 40kN was applied & a deflection of 2.54mmm was measured. Assuming that the subgrade has a Poison's ratio of 0.5, determine the elastic modulus of the subgrade. Use surface deflection, $\boldsymbol{\omega_o = \frac{\pi(1-v^2)}{2E} qa}$
A. 47.4 MPa
B. 32.4 MPa
C. 45.5 Mpa
D. 54.1 Mpa
Answer: C

38. Which percentage of Aggregate Impact Test (AIT) is more suitable for surface-course construction if you're a material engineer on a road project?
A. 10%
B. 35%
C. 22%
D. 40%
Answer: A

39. The following diagram shows the aggregate gradation of different aggregates. Label letters b, c, and d, respectively.



A. Uniformly graded, Gap graded, and Open-graded
B. Well-graded, Gap graded, and Open-graded
C. Uniformly graded, Gap graded, and well graded
D. Gap-graded, Open-graded, and uniformly graded

Answer: A

40. Which construction sequences can be argued to be the convenient procedure from the upward sub-base layer?

A. Prime coat, granular base, dense bituminous macadam, tack coat, and dense asphalt concrete
B. Granular base, prime coat, dense bituminous macadam, tack coat, and dense asphalt concrete
C. Tack coat, granular base, prime coat, dense bituminous macadam, and dense asphalt concrete
D. Granular base, tack coat, dense bituminous macadam, prime coat, and dense asphalt concrete

Answer: B

41. Traffic analysis indicated the estimated total cumulative repetition over the design period on the design lane and the corresponding mean equivalency factors or truck factor values for each vehicle class, as shown in the Table below.

Vehicle class, i	**Cumulative repetition over the design period on the design lane**	**Mean equivalency or truck factor per vehicle class**
Small Car	1,800,000	0.00

Bus	300,000	0.40
Medium Truck	1000,000	5.88
Heavy Truck	200,000	15.00
Truck-trailers	500,000	12.00

What should be the number of cumulative equivalent standard axles (ESAs) that need to be considered in the structural design of this highway?

A. 9 Million
B. 3.8 Million
C. 15 Million
D. 33.28 Million

Answer: C

Course Name: Transport Engineering

42. During the cost-benefit analysis of Transport projects, financial analysis involves …….

A. Analyzing projects from the perspective of social benefit as a whole.	B. Assessing disturbance to the wildlife and population displacement.
C. Measuring all the effects of the project on the cash flow	D. Analysis of ecological effects of projects on the topography

Answer: C

43. Six vehicles pass a 300-m highway segment in periods of 10, 12, 10, 15, 12, and 15 seconds, respectively. The time mean speed, u_t is_____.

A. 90 km/hr	B. 24.39 km/hr
C. 25 km/hr	D. 87.57 km/hr

Answer: A

44. If the model that describes the relationship between space mean speed, u_s (in km/hr), and density, k (in veh/km) on a highway segment is given as $u_s = 120 - 3*k$ (Which of the following is NOT true about the model?

A. Mean free speed is 120 km/hr	B. Jam density is 40 veh/km
C. Density at maximum flow is 20 veh/km	D. Maximum flow rate is 360 veh/hr

Answer: D

45. The following values of PTSF and ATS have been determined based on the analysis of Two roadway segments.

Segment	PTSF (%)	ATS (mi/h)
1	35	51
2	50	56

Determine the LOS if the roadway segments are Class I by using Table 1

Table 1 level of service criteria for two-lane highways in class I

LOS	*Percent Time-Spent-Following*	*Average Travel Speed (mi/h)*
A	≤ 35	> 55
B	> 35–50	> 50–55
C	> 50–65	> 45–50
D	> 65–80	> 40–45
E	> 80	≤ 40

Note: LOS F applies whenever the flow rate exceeds the segment capacity.

A. B and B	B. A and A
C. A and B	D. B and A
Answer: A	

46. Which of the following is not a category of Traffic markings?

A. Vertical Markings	B. Transverse markings
C. Longitudinal markings	D. Object markers
Answer: A (CLO5-Cognitive-Application)	

47. If the traffic volume on a highway in 2020 is 7981 vehicles per day, with a predicted annual growth rate of 5%. What will be the traffic volume (vehicles per day) in the year 2030?

A. 10,500	B. 13,000
C. 15,000	D. 12,000
Answer: B	

Thematic Area: Construction Materials, Building Construction, and Construction Management

Course Name: Construction Materials

48. Which of the following test is used to measure the workability of concrete?	
A. Compacting Factor	B. Compressive strength test
C. Specific gravity and water absorption test	D. Fineness test
Answer: A	

49. Which of the following is the material has the highest strength weight ratio?	
A. Steel	B. Masonry
C. Concrete	D. Wood
Answer: A	

50. From the standpoint of the economy in cement for a given water cement ratio, which aggregate shape is preferable to use in concrete?	
A. Angular	B. Elongated
C. Flaky	D. Rounded
Answer: D	

51. Which one of the following cement type is used for the construction of Sewage and Water treatment plant?	
A. Sulphate Resisting Cement	B. Quick Setting Cement
C. Low Heat Cement	D. Rapid hardening Cement
Answer: A	

52. Which of the following is a technique used to prevent segregation in concrete making process?
A. High water cement ratio
B. Expel entrapped air
C. Using gap graded aggregate
D. Throw concrete from a height
Answer: B

53. Given the following information

Aggregates Weights in different Conditions (gm)			
W_{agg}	**W_{OD}**	**W_{SSD}**	**$W_{SSD\ (in\ water)}$**
1000	980.4	1009.8	652

The bulk specific gravity (SSD) of the aggregate is:

A. 2.74	B. 2.63

C. 2.51	D. 2.82
Answer: D	

Course Name: Building Construction

54. A local swelling of a finished plastered wall.
A. Cracking
B. Blistering
C. Dubbing
D. Hacking
Answer: B

55. Which one of the following statement in NOT correct about building element.
A. Combined footings are frequently used to support loads which are close to property line.
B. The primary function of floor is to provide a level surface with sufficient strength to support the imposed loads of people and furniture.
C. The location of door should be located on the center of the length of a wall.
D. Roofs are strong visual elements in a building and thus affect the aesthetic beauty of a building.
Answer: C

56. Choose the best formwork type to be re used in large number for good finish.
A. Aluminum
B. Plywood
C. Fiber glass
D. Steel
Answer: C

57. After how many stairs is a landing provided in public residential places.
A. 18
B. 12
C. 20
D. 15
Answer: B

58. Which drawing type is used to show the design materials, dimensions, and final appearance of the exterior of a building?
A. Elevation plan
B. Floor plan
C. Site plan
D. Section plan
Answer: A

59. Chose the recommended foundation type, where a large spacing between two columns creates a situation where a continuous footing is uneconomical due to the usage of large quantity of concrete.
A. Combined footing
B. Strap footing
C. Mat foundation
D. Strip foundation
Answer: B

Course Name: Construction Management

60. Which one of the following is **NOT** one of the functions of management based on Henry Fayol's classification?	
A. Leading	B. Actuating
C. Planning	D. Staffing
Answer: B	

61. Project X is expected to finish within 60 working days having a predetermined supervision at 30^{th} day with a status of 50% completion. But the status of the project at 30^{th} day is 40%. What will be the total project duration if the remaining work continues with the same progress?	
A. 48 days	B. 75 days
C. 65 days	D. 70 days
Answer: B	

62. If D is the duration, ES and EF are the earliest start and finish, LS and LF are latest start and latest finish time, and TF and FF are total float and free float, then the following relation is NOT true.	
A. $TF_i = LS_i - ES_i$	B. $LF_i = Min\ (LS_{i+1})$
C. $FF_i = Max\ (ES_{i+1}) - EF_i$	D. $LS_i = LF_i - D_i$
Answer: C	

63. In quality management system the correct cycle to improve quality is?	
A. Plan-Check-Do-Act	B. Check-Plan-Do-Act
C. Plan-Do-Check-Act	D. Check-Plan-Act-Do
Answer: C	

64. Which step comes first in risk management process of construction projects	
A. Identify the risks	B. Analyze the risks
C. Treat the risks	D. Establish the context
Answer: D	

65. Which one of the following is true about safety risk?
A. Safety risks affects people by exposure to hazard
B. In safety risk the results of an accident are immediate
C. Safety risk is often a hidden danger
D. Safety risks is often difficult to assess
Answer: B

Course Name: Construction Materials

66. Chose the correct statement.
A. The main difference between specification and drawing is that specification should generally show dimensions, extents, size, shape, and location of component parts.
B. Manufacturer's specifications are intended to be used as reference standard in the construction of a project.
C. All dimensions should be measure to the nearest 0.01m.
D. Centre line method are suitable only when the cross sections of all walls are unequal
Answer: C

67. In preparing cement concrete by volume the most commonly used size of the wooden box used to measure aggregate in Ethiopia is.	
A. 35cm x 25cm x 40cm	B. 18cm x 40cm x 50cm
C. 40cm x 25cm x 30cm	D. 35cm x 30cm x 40cm
Answer: B	

68. How much volume of coarse aggregate in meter cube is needed if volume batching is used and the concrete mix ratio is 1:2:5 for one bag of cement?	
A. 0.07	B. 0.105
C. 0.175	D. 0.35
Answer: C	

69. A Forman is supervising the concrete works in addition to masonry works, excavation and backfill by distributing his equivalent time to those tasks in a daily basis. How much is his utilization factor in concrete work?	
A. 50%	B. 20%
C. 25%	D. 75%
Answer: C	

70. A concrete work consumes a daily labor cost of birr 18,000 and daily equipment cost of birr 15,000 including all overhead costs, profits and VAT. If the productivity for labor and equipment are 10 and 15 in cubic meters per day respectively, what will be the cost to fill 40 cubic meters of concrete?	
A. Birr 2,500	B. Birr 3,400
C. Birr 2,100	D. Birr 2,800
Answer: D	

71. Which one of the following element of contract describes the willingness of parties to enter in to a legally binding agreement?	
A. Consent	B. Capacity
C. Form	D. Object of contract.
Answer: A	

Thematic Area: GeoTechnical Engineering

Course Name: Soil Mechanics I

72. Laboratory test is conducted according to UCSC and it is found that more than 35% of materials is smaller than sieve #200 with liquid limit greater than 50. Which of the following describes the soil type correctly.	
A. MH	B. CL
C. ML	D. CH
Answer: A	

73. A clay layer 3.66m thick rests beneath a deposit of submerged sand is 7.92m thick the top of the sand is located 3.05m below the surface of a lake. The saturated unit weight of the sand is 19.62KN/m3. The total vertical pressure and the effective vertical pressure at mid height of the clay layer respectively;	
A. 218.9 kN/m^2 and 93.3 kN/m^2	B. 2189 kN/m2 and 933 kN/m^2
C. 21.89 kN/m^2 and 9.33 N/m^2	D. 2.189 kN/m2 and 0.933 kN/m^2
Answer: A	

74. Predict the degree of saturation of 75 mm diameter and 150 mm high clay specimen with a mass of 1392.5g. When it is dried, the mass becomes 1196.5g. Assume the specific gravity of the soil grains is 2.70.	
A. 18.06%	B. 89.5%
C. 80.6%	D. 76.05%
Answer: B	

75. Assume that the soil mass is 10cm, thick 5cm high, and 14cm long that the head loss is 12cm and that $k=10^{-3}$ cm/s. what is the total seepage	
A. 0.43cm^3/s	B. 0.58cm^3/s
C. 0.86cm^3/s	D. 0.24cm^3/s
Answer: A	

76. Of the following which one is not correct?
A. The process by which an increase in stress causes water to flow out of the soil accompanied by volume reduction is referred to as consolidation.
B. Soils of very low permeability (clays of high plasticity), there may be significant consolidation during construction and application of load to the foundation.
C. Compaction does not involve any removal of water from the soil.
D. Consolidation is a process that occurs in clays and silts.
Answer: B

77. A laboratory consolidation test on a normally consolidated clay showed the following results:

Stress, Δσ' (kN/m^2)	Void ratio at the end of consolidation, e
140	0.92
212	0.86

The specimen tested was 25.4 mm in thickness and drained on both sides. The expected maximum primary consolidation settlement in the field is:

Use $Sc = \frac{CcHc}{1+eo} log \frac{\sigma'o+\Delta\sigma}{\sigma'}$

A. 78.5 mm	B. 87.5 mm
C. 75.8 mm	D. 57.8 mm

Answer: B

Course Name: Soil Mechanics II

78. Which of the following is not true about stress in a soil from surface load.

A. Stress decrease in depth	B. Stress increase in radius for constant depth
C. Stress decrease in radius for constant depth	D. Stress in a soil depends on poisons ratio of soil

Answer: B

79. The most appropriate tri-axial test to assess the long-term stability of an excavated clay soil is

A. Unconfined compression test	B. Consolidated drained test
C. Unconsolidated undrained test	D. Consolidated undrained test

Answer: B

80. Terzaghi's general bearing capacity formula for a strip footing (C Nc + q Nq + 0.5 BγNγ) gives

A. Safe bearing capacity	B. Net safe bearing capacity
C. Net ultimate bearing capacity	D. Ultimate bearing capacity

Answer: D

81. What is the total active thrust on a vertical wall 5m high retaining a sand of unit weight 17 kN/m3 for which the effective angle of internal friction is 35°; the surface of the sand is horizontal and the water table is below the bottom of the wall.

A. 5.75kN/m	B. 75.5kN/m
C. 0.27kN/m	D. 57.5kN/m

Answer: D

82. During stability evaluation, the term mobilized shear strength means:	
A. Shear strength	B. Applied shear strength
C. Maximum shear strength	D. Minimum shear strength
Answer: B	

Course Name: Foundation Engineering I

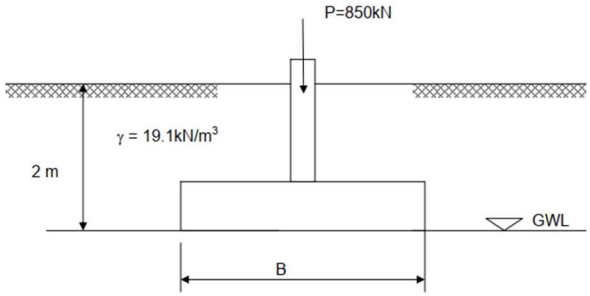
83. The extent of exploration does not depends on:	
A. Importance of the project	B. Arrangement of the foundations
C. Complexity of soil stratification	D. Wind Speed
Answer: D	

84. Which of the following is true about sounding test?
A. Substantially used method to estimate the in situ undrained shear strength
B. The methods are based on the principle that a soil exhibiting more resistance to the penetration of a standard device is more sound
C. The test is conducted in a pre-bored hole
D. Standard penetration test is very suitable for clay soil
Answer: B

85. Mat foundation is selected in the following except when:	
A. Allowable bearing pressure is low	B. When individual column footing tend to overlap
C. Differential setting arising out of footings.	D. Allowable bearing capacity of soil is high
Answer: D	

86. Assume that undrained compressive strength of a soil in a site is 300kPa. It is proposed to construct a single story villa. What type of foundation has to be used?	
A. Isolated footing	B. Wall footing
C. Cantilever footing	D. Mat foundation
Answer: A	

87. Determine the dimensions of a square footing necessary to sustain an axial column load of 850kN as shown in Fig. below, if an allowable presumptive bearing pressure of 150kN/m^2 is used.



A. 3.40m x 3.40m	B. 2m x 2m
C. 2.40m x 2.40m	D. 3m x 3m

Answer: C

88. There are two phases in the design of a conventional retaining wall. From the following which one will fall under the second phase?

A. Check for stability overturning failure	B. Determination of steel reinforcement
C. Check for bearing capacity failure	D. Check for the whole stability of structure

Answer: B

Course Name: Foundation Engineering II

89. One of the following is incorrect about the advantage of pier foundation.

A. Bearing capacity can be increased by driving during installation.
B. Since no volume of soil is displaced, the problem of shifting and lifting of piles is eliminated.
C. Changes can be made in the design criteria during the progress of a job.
D. Construction equipment is normally mobile and construction can proceed rapidly

Answer: A

90. The allowable working load on a pre-stressed concrete pile 21 m long that has been driven into sand is 502 kN. The pile is octagonal in shape with D = 356 mm. Skin resistance carries 350 kN of the allowable load, and point bearing carries the rest.
Use $E_p = 21 \times 10^6$ kN/m^2, $E_s = 25 \times 10^3$ kN/m^2, $\mu_s = 0.35$, and $\xi = 0.62$.
Evaluate elastic shortening of the pile.

$$s_{e(1)} = \frac{(Q_{wp} + \xi Q_{ws})L}{A_p E_p}, \quad s_{e(2)} = \frac{q_{wp} D}{E_s}(1 - \mu_s^2) I_{wp} \quad \text{or} \quad s_{e(3)} = \left(\frac{Q_{ws}}{pL}\right)\left(\frac{D}{E_s}\right)(1 - \mu_s^2) I_{ws}$$

A. 3.35mm	B. 15.5mm
C. 0.84mm	D. 19.69mm

Answer: A

91. One of the following is NOT categorized as best cell fill property for the construction of cellular coffer dam
A. Is free-draining (large coefficient of permeability, k
B. Has a high angle of internal friction, ϕ
C. Contains small amounts of No. 200 sieve material—preferably less than 5 percent
D. Contains large of amounts of No. 200 sieve material—preferably greater than 5 percent
Answer: D

92. _____ controls design of foundation on expansive soils.	
A. Settlement	B. Heave
C. Pre-consolidation pressure	D. Hydraulic conductivity
Answer: B	

93. One of the following is not remediation method for contaminated sites due to problems in geotechnical engineering.	
A. Providing vertical cut off	B. Stabilizing soil materials
C. Replacement of contaminated soil and waste	D. Decontamination of contam
Answer: B	

94. Civil engineering infrastructure development projects impacted greatly on the environment except:	
A. Flooding	B. Noise pollution
C. Increase in size of available land	D. Water pollution
Answer: C	

Thematic Area: Hydraulic Engineering

Course Name: Hydraulic structure I

95. Which of the following type of dam is built in areas where the foundation is not strong enough to bear the weight of concrete?
A. Rock-fill dam
B. Gravity dam
C. Earth dam
D. Arch dam
Answer: C

96. A homogeneous earth fill dam has the distance from the focus to the directrix of seepage line **(y_o)**=14.5m and Coefficient permeability of 1.5 x 10^{-5} m/sec. Determine the seepage passing through per unit length of the dam?
A. 18.8m^3/day per meter
B. 18.8 m/day
C. 2.18x10^{-4} m^3/sec
D. 20.8 m^3/day per meter
Answer: A

97. What is the discharge passing over a high ogee spillway with effective length of 30m and design head of 2.5m?	
A. 301.94 m^3/s	B. 305.63 m^3/s
C. 302.89 m^3/s	D. 304.37 m^3/s
Answer: D	

98. Which of the following criteria has to be satisfied for no tension at any point on a gravity dam?
A. The resultant of all the forces must always pass through the mid-point of the base of the dam
B. The resultant force for all conditions of loading must pass through the middle third of the base
C. The resultant of all the forces must pass through the upstream extremity of the middle third of the base
D. The resultant of all the forces must pass through the downstream extremity of the middle third of the base
Answer: B

99. Which one is the correct sequence from the reservoir in the direction of the flow of water for the installation of a hydropower plant?
A. Reservoir, Head Race Tunnel , surge tank, turbine, penstock
B. Reservoir, Head Race Tunnel, , surge tank, penstock , turbine
C. Reservoir, Head Race Tunnel , penstock, surge tank , turbine
D. Reservoir, Head Race Tunnel , surge tank, turbine , penstock
Answer: B

100. Which of the following application Software is used to analyze and solve the factor of safety of embankment dams for slope stability and locate phreatic line through the body of the dam?
A. Crop WAT
B. HEC-RAS
C. GeoSLOPE
D. ArcGiS
Answer: C

101. A reservoir of glycerin has a mass of 1200Kg and a volume of 0.952m^3. The glycerin weight **(W);** mass density **(ρ);** Specific weight **(γ)**; and Specific gravity (Sg) respectively are_____	
A. 11,870N , 1161kg/m^3, 11.36KN/m^3, 1.36	B. 12,770N , 1361kg/m^3, 12.56KN/m^3, 1.16
C. 11,670N , 1061kg/m^3, 11.66KN/m^3, 1.36	D. 11,770N , 1261kg/m^3, 12.36KN/m^3, 1.26
Answer: D	