MIZAN TEPI UNIVERSITY

COLLEGE OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

SAMPLE EXIT EXAM QUESTIONS

(Target Group: Regular and Extension 2011 AY Graduating Class Students)

1: While driving at a speed of 30KMPH (with available friction 0.4) down the grade, the driver requires a braking distance twice that required for stopping the vehicle when he travels up the same grade. The grade is

(a) 7% (b) 10.6%
(c) 13.3% (d) 33.3%
Answer: C

2: The data given below pertain to the design of flexible pavement

Initial Traffic=1500cvpd, Traffic growth rate=8% per annum, Design life=12years, Vehicle damage factor=2.5, Distribution factor=0.75.The design traffic in terms of million standard axles (msa) would be

(a) 18.12 msa
(b) 194.81 msa
(c) 19.48 msa
(d) 21 msa
Answer: C

3: An observer travelling at a constant speed of 70 KMPH with the traffic stream over a 5 km stretch is passed by 17 vehicles more than what he passes. When the observer travel against the stream at the same speed, the number of vehicles he meets is 303.The flow of the traffic stream is

(a) 2240 vph (b) 4480 vph
(c) 4160 vph (d) 2002 vph
Answer: A

4: In speed and delay study, if the average journey time on a stretch of road length of 3.5 km is 7.55 minutes and average stopped delay is 1.8 minutes, the average running speed will be, nearly

(a) 36.5 kmph (b) 37.5 kmph
(c) 38.5 kmph (d) 39.5 kmph
Answer: A

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5: Assuming a longitudinal coefficient of friction to be 0.4, the resulting retardation of a vehicle being brought to a stop is nearly

(a) 0.98 m/sec^2 (b) 1.95 m/sec^2
(c) 3.93 m/sec^2 (d) 2.90 m/sec^2
Answer: C

6: On a highway if the velocity of the moving vehicle on a lane is 60 kmph, stopping distance is 25 m and average length of vehicles is 5m, What is the basic capacity of the lane

(a) 1600 vph
(b) 2200 vph
(c) 2000 vph
(d) 2400 vph

Answer: C

7: A vehicle travelling on dry, level pavement at 80 kmph had the brakes applied. The vehicle travelled 80m before stopping. The coefficient of friction that will be developed

(a) 0.325 (b) 0.315
(c) 0.345 (d) 0.355

Answer: B

8: If the normal flows on two approach roads at an intersection are respectively 500 pcu per hr and 300 pcu per hr. The saturation flows are 1600 pcu per hr on each road and total lost time per signal cycle is 165,then the optimum cycle time by Webster's method is

(a) 72.5 sec (b) 58 sec
(c) 48 sec (d) 19.3 sec

Answer: B

9: Traffic flow equation for a section of road is u=80-0.7K,where "u" is the speed in kmph and K is the density in vpkm. The maximum expected flow is

(a) 4572 vph (b) 2286 vph
(c) 1143 vph (d) 572 vph

Answer: B

10: During measurement in spot speed study, a total of 1000 vehicles were observed,85th percentile and 15 percentile speeds were obtained as 40kmph and 10kmph respectively. The number of vehicles moving between speeds of 10kmph and 40kmph would be

(a) 350 (b) 500
(c) 600 (d) 700

Answer: D

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11: What will be the ruling radius of a horizontal curve on a highway for a design speed of 100kmph, assume allowable super-elevation to be 7% and lateral friction as 0.13

(a) 405m (b) 395m
(c) 385m (d) 375m
Answer: B

12: It was noted that on a section of road, the free speed was 80kmph and the jam density was 70 vpkm. The maximum flow in vph that could be expected on this road is

(a) 800 (b) 1400
(c) 2800 (d) 5600
Answer: B

13: Radius of horizontal curve= 325m, design speed=65kmph, length of wheel base of largest truck=6m, pavement width= 10.5m, Terrain of the area =Rolling

Extra widening of pavement will be

(a) 0.55m (b) 0.60m
(d) 0.45m (d) 0.40m
Answer: A

14: The advantages of super elevation are

1. It allows design speed to be maintained on a curve as on a straight portion.
2. Helps in keeping the vehicles to their correct side.
3. Lessens the danger of skidding at bends
4. Keeps the pressure on the wheels as equally distributed.

The correct answer is

(a) 1,2 and 3 (b) 1,3 and 4
(c) 2,3 and 4 (d) 1,2,3 and 4
Answer: D

15: An irregular shape cross-section consists of joining the points whose co-ordinates are (3,4), (4,3),(8,5) and the distance between each point is 5m,then area covered by cross-section according to "Trapezoidal Formula" is

(a) 38 m^2 (b) 39.8 m^2
(c) 36 m^2 (d) 37.5 m^2
Answer: D

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16: The stopping sight distance depends upon

(b) Total reaction time of driver (b) Speed of vehicle
(c) Efficiency of brakes (d) all of the above

Answer: D

17: Coefficient of friction is less when the pavement surface is

(e) Rough
(f) Dry
(g) Smooth and dry
(h) Smooth and wet

Answer: D

18: The shoulder provided along the road edge should be

(b) Rougher than the traffic lanes (b) Smoother than the traffic lanes
(c) Of same colour as that of the pavement (d) Of very low load bearing capacity

Answer: A

19: If the stopping distance is 60m, then the minimum stopping sight distance for two lane, two way traffic is

(b) 30m (b) 60m
(c) 120m (d) 180m

Answer: B

20: What is the psychological widening of a pavement on horizontal curve of radius 230m for ruling speed 80 Kmph

(b) 0.455m (b) 0.555m
(c) 0.186m (d) 0.136m

Answer: B

21: For a constant value of coefficient of lateral friction, the value of required super-elevation increases with

(e) Increase in both speed and radius of curve.
(f) Decrease in both speed and radius of curve.
(g) Increase in speed and with decrease in radius of curve.
(h) Decrease in speed and with increase in radius of curve.

Answer: C

22: Reaction time of a driver

(b) increases with increase in speed (b) decreases with increase in speed
(c) is same for all speeds (d) none of the above

Answer: B

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23: If the angle of intersection and radius of simple circular curve are 120 degree and 700m respectively, then

i) length of long chord is 700m
ii) length of curve is 700/2m

(a) only (i) is correct (b) only (ii) is correct
(c) both (i) and (ii) are correct (d) None of these

Answer: A

24: The length of a long chord of a simple circular curve of radius R and angle of defection Δ is

(b) R cos (Δ/2) (b) 2R cos (Δ/2)
(c) 2 R sin (Δ/2) (d) R sin (Δ/2)

Answer: C

25: For a chord of 60m, the mid –ordinate for a circular curve of 50 m radius will be

(b) 10 m (b) 12.5 m
(c) 15 m (d) 18.75 m

Answer: A

26. If in a pin-jointed plane frame (m + r) > 2j, then the frame is

(A) Stable and statically determinate
(B) Stable and statically indeterminate
(C) Unstable
(D) None of the above

Answer:B

27. Principle of superposition is applicable when

A) Deflections are linear functions of applied forces
(B) Material obeys Hooke's law
(C) The action of applied forces will be affected by small deformations of the structure
(D) None of the above

Answer:A

28. The Castigliano's second theorem can be used to compute deflections

(A) In statically determinate structures only
(B) For any type of structure
(C) At the point under the load only
(D) For beams and frames only

Answer:B

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29. When a uniformly distributed load, longer than the span of the girder, moves from left to right, then the maximum bending moment at mid section of span occurs when the uniformly distributed load occupies

(A) Less than the left half span
(B) Whole of left half span
(C) More than the left half span
(D) Whole span
Answer:D

30. For stable structures, one of the important properties of flexibility and stiffness matrices is that
the elements on the main diagonal
(i) Of a stiffness matrix must be positive
(ii) Of a stiffness matrix must be negative
(iii) Of a flexibility matrix must be positive
(iv) Of a flexibility matrix must be negative
The correct answer is
(A) (i) and (iii)
(B) (ii) and (iii)
(C) (i) and (iv)
(D) (ii) and (iv)
Answer:A

31. When a load crosses a through type Pratt truss in the direction left to right, the nature of force in any diagonal member in the left half of the span would

(A) Change from compression to tension
(B) Change from tension to compression
(C) Always be compression
(D) Always be tension

Answer:A

32. Which of the following methods of structural analysis is a force method?

(A) Slope deflection method
(B) Column analogy method
(C) Moment distribution method
(D) None of the above
Answer:B

33. Which of the following is not the displacement method?

(A) Equilibrium method
(B) Column analogy method
(C) Moment distribution method
(D) Kani's method
Answer:B

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34. For a two-hinged arch, if one of the supports settles down vertically, then the horizontal thrust

(A) Is increased
(B) Is decreased
(C) Remains unchanged
(D) Becomes zero
Answer:C

35. The deflection at any point of a perfect frame can be obtained by applying a unit load at the joint in

(A) Vertical direction
(B) Horizontal direction
(C) Inclined direction
(D) The direction in which the deflection is required

Answer:D

36. The principle of virtual work can be applied to elastic system by considering the virtual work of

(A) Internal forces only
(B) External forces only
(C) Internal as well as external forces
(D) None of the above
Answer:C

37. If in a rigid-jointed space frame, $(6m + r) < 6j$, then the frame is

(A) Unstable
(B) Stable and statically determinate
(C) Stable and statically indeterminate
(D) None of the above
Answer:A

38. The three moments equation is applicable only when

(A) The beam is prismatic
(B) There is no settlement of supports
(C) There is no discontinuity such as hinges within the span
(D) The spans are equal
Answer:C

39. Which of the following methods of structural analysis is a displacement method?

(A) Moment distribution method
(B) Column analogy method
(C) Three moment equation
(D) None of the above
Answer:A

40. The fixed support in a real beam becomes in the conjugate beam a

(A) Roller support
(B) Hinged support
(C) Fixed support
(D) Free end **Answer:D**

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41. For a symmetrical two hinged parabolic arch, if one of the supports settles horizontally, then the horizontal thrust

(A) Is increased
(B) Is decreased
(C) Remains unchanged
(D) Becomes zero
Answer:B

42. To generate the jth column of the flexibility matrix

(A) A unit force is applied at coordinate j and the displacements are calculated at all coordinates
(B) A unit displacement is applied at coordinate j and the forces are calculated at all coordinates
(C) A unit force is applied at coordinate j and the forces are calculated at all coordinates
(D) A unit displacement is applied at coordinate j and the displacements are calculated at all coordinates

Answer:A

43. The load W is moving from left to right on a simply supported beam of span T. the maximum bending moment at 0.41 from the left support is

(A) 0.16 WL
(B) 0.20 WL
(C) 0.24 WL
(D) 0.25 WL
Answer:C

44. In the displacement method of structural analysis, the basic unknowns are

(A) Displacements
(B) Force
(C) Displacements and forces
(D) None of the above
Answer:A

45. A rigid-jointed plane frame is stable and statically determinate if

(A) (m + r) = 2j
(B) (m + r) = 3j
(C) (3m + r) = 3j
(D) (m + 3r) = 3j
Where m is number of members, r is reaction components and j is number of joints
Answer:C

46. In moment distribution method, the sum of distribution factors of all the members meeting at any joint is always

(A) Zero
(B) Less than 1
(C) 1
(D) Greater than 1
Answer:C

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47. When a uniformly distributed load, shorter than the span of the girder, moves from left to right, then the conditions for maximum bending moment at a section is that

(A) The head of the load reaches the section
(B) The tail of the load reaches the section
(C) The load position should be such that the section divides it equally on both sides
(D) The load position should be such that the section divides the load in the same ratio as it divides the span
Answer:D

48. The width of the analogous column in the method of column analogy is

(A) 2/EI
(B) 1/EI
(C) 1/2 EI
(D) 1/4 EI
Answer:B

49. Muller Breslau's principle for obtaining influence lines is applicable to
(i) Trusses
(ii) Statically determinate beams and frames
(iii) Statically indeterminate structures, the material of which is elastic and follows Hooke's law
(iv) Any statically indeterminate structure
The correct answer is
(A) (i), (ii) and (iii)
(B) (i), (ii) and (iv)
(C) (i) and (ii)
(D) Only (i)
Answer:A

50. In column analogy method, the area of an analogous column for a fixed beam of span L and flexural rigidity EI is taken as

(A) L/EI
(B) L/2EI
(C) L/3EI
(D) L/4EI
Answer:A

51. The degree of static indeterminacy of a rigid-jointed space frame is

(A) m + r - 2j
(B) m + r - 3j
(C) 3m + r - 3j
(D) 6m + r - 6j
Where m, r and j have their usual meanings
Answer:D

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52. Degree of kinematic indeterminacy of a pin-jointed plane frame is given by

(A) 2j - r
(B) j - 2r
(C) 3j - r
(D) 2j + r
Answer:A

53. The number of independent equations to be satisfied for static equilibrium of a plane structure is

(A) 1
(B) 2
(C) 3
(D) 6
Answer:C

54. The degree of static indeterminacy of a pin-jointed space frame is given by

(A) m + r - 2j
(B) m + r - 3j
(C) 3m + r - 3j
(D) m + r + 3j

Answer:B

55. While using three moments equation, a fixed end of a continuous beam is replaced by an additional span of

(A) Zero length
(B) Infinite length
(C) Zero moment of inertia
(D) None of the above
Answer:A

56. Select the correct statement

(A) Flexibility matrix is a square symmetrical matrix
(B) Stiffness matrix is a square symmetrical matrix
(C) Both (A) and (B)
(D) None of the above
Answer:C

57. For a single pint load W moving on a symmetrical three hinged parabolic arch of span L, the maximum sagging moment occurs at a distance x from ends, the value of x is

(A) 0.211 L
(B) 0.25 L
(C) 0.234 L
(D) 0.5 L
Answer:A

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58. Study the following statements.
(i) The displacement method is more useful when degree of kinematic indeterminacy is greater than the degree of static indeterminacy.
(ii) The displacement method is more useful when degree of kinematic indeterminacy is less than the degree of static indeterminacy.
(iii) The force method is more useful when degree of static indeterminacy is greater than the degree of kinematic indeterminacy.
(iv) The force method is more useful when degree of static indeterminacy is less than the degree of kinematic indeterminacy.
The correct answer is
(A) (i) and (iii)
(B) (ii) and (iii)
(C) (i) and (iv)
(D) (ii) and (iv)
Answer:D

59. Bending moment at any section in a conjugate beam gives in the actual beam

(A) Slope
(B) Curvature
(C) Deflection
(D) Bending moment
Answer:C

60. The number of independent displacement components at each joint of a rigid-jointed space frame is

(A) 1
(B) 2
(C) 3
(D) 6
Answer:D

61. Independent displacement components at each joint of a rigid-jointed plane frame are

(A) Three linear movements
(B) Two linear movements and one rotation
(C) One linear movement and two rotations
(D) Three rotations
Answer:B

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62. If there are m unknown member forces, r unknown reaction components and j number of joints, then the degree of static indeterminacy of a pin-jointed plane frame is given by

(A) m + r + 2j
(B) m - r + 2j
(C) m + r - 2j
(D) m + r - 3j
Answer:C

63. The carryover factor in a prismatic member whose far end is fixed is

(A) 0
(B) 1/2
(C) 3/4
(D) 1
Answer:B

64. Effects of shear force and axial force on plastic moment capacity of a structure are respectively to

(A) Increase and decrease
(B) Increase and increase
(C) Decrease and increase
(D) Decrease and decrease

Answer:D

65. The degree of kinematic indeterminacy of a pin-jointed space frame is

(A) 2j - r
(B) 3j - r
(C) j - 2r
(D) j - 3r
Answer:B

66. The maximum bending moment due to a train of wheel loads on a simply supported girder

(A) Always occurs at centre of span
(B) Always occurs under a wheel load
(C) Never occurs under a wheel load
(D) None of the above

Answer:B

67. Consider the following statements:
Sinking of an intermediate support of a continuous beam
1. Reduces the negative moment at support.
2. Increases the negative moment at support.
3. Reduces the positive moment at support.
4. Increases the positive moment at the center of span.
Of these statements

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(A) 1 and 4 are correct
(B) 1 and 3 are correct
(C) 2 and 3 are correct
(D) 2 and 4 are correct
Answer:A

68. When a series of wheel loads crosses a simply supported girder, the maximum bending moment under any given wheel load occurs when

(A) The center of gravity of the load system is midway between the center of span and wheel load under consideration
(B) The center of span is midway between the center of gravity of the load system and the wheel load under consideration
(C) The wheel load under consideration is midway between the center of span and the center of gravity of the load system
(D) None of the above
Answer:B

69. Castigliano's first theorem is applicable

(A) For statically determinate structures only
(B) When the system behaves elastically
(C) Only when principle of superposition is valid
(D) None of the above
Answer:C

70. Number of unknown internal forces in each member of a rigid jointed plane frame is

(A) 1
(B) 2
(C) 3
(D) 6
Answer:C

71. The number of independent equations to be satisfied for static equilibrium in a space structure is

(A) 2
(B) 3
(C) 4
(D) 6
Answer:D

72. A simply supported beam deflects by 5 mm when it is subjected to a concentrated load of 10 kN at its center. What will be deflection in a 1/10 model of the beam if the model is subjected to a 1 kN load at its center?

(A) 5 mm
(B) 0.5 mm
(C) 0.05 mm
(D) 0.005 mm
Answer:A

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73. A pin-jointed plane frame is unstable if

(A) (m + r) < 2j
(B) (m + r) = 2j
(C) (m + r) > 2j
(D) None of the above
Where m is number of members, r is reaction components and j is number of joints
Answer:A

74. Degree of static indeterminacy of a rigid-jointed plane frame having 15 members, 3 reaction components and 14 joints is

(A) 2
(B) 3
(C) 6
(D) 8
Answer:C

75. The degree of static indeterminacy up to which column analogy method can be used is

(A) 2
(B) 3
(C) 4
(D) Unrestricted
Answer:B

76. In the slope deflection equations, the deformations are considered to be caused by
(i) Bending moment
(ii) Shear force
(iii) Axial force
The correct answer is
(A) Only (i)
(B) (i) and (ii)
(C) (ii) and (iii)
(D) (i), (ii) and (iii)
Answer:A

77. A single rolling load of 8 kN rolls along a girder of 15 m span. The absolute maximum bending moment will be

(A) 8 kN.m
(B) 15 kN.m
(C) 30 kN.m
(D) 60 kN.m
Answer:C

78. The deformation of a spring produced by a unit load is called

(A) Stiffness
(B) Flexibility
(C) Influence coefficient
(D) Unit strain

Answer:B

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79. The acceptable limit for safety and serviceability requirements before failure occurs is called would be described better by the term
    a) Breaking Point b) Failure point c) Limit State d) Ductility
    Answer: C
80. In limit state design of concrete structures, the recommended partial safety factor for steel according to EUROCODE is
    a) 1.5 b) 1.15 c) 1.0 d) 0.87
    Answer: B
81. A simply supported beam carries a working live load of 2.5kN/m. the design load for limit state of collapse is, in kN/m
    a) 9 b) 6 c) 7.2 d) 12
    Answer: B
82. The stress strain curve of the concrete as per EUROCODE is
    a) A perfect line up to failure
    b) Straight line up to 0.002 strain value and then parabolic up to failure
    c) Parabolic up to 0.002 strain value and then uniform up to failure
    d) Linear up to 0.002 strain and uniform up to failure
    Answer: B
83. An RCC beam is subjected to the following moments;
    Dead load moment=20kN-m;
    Live load moment=30kN-m;
    Seismic load moment=10kN-m;
    Wind load=5kN-m; the design moment as per limit state of collapse is
    a) 60 kN-m b) 75 kN-m c) 72 kN-m d) 80 kN-m
    Answer:D
84. The ultimate moment of resistance if the reinforcement is 3 bars of 20mm diameter is
    a) 72 b) 22 c) 50 d) 66
    Answer:A
85. A doubly reinforced beam is recommended when one of the following is mandatory
    a) The depth beam is restricted
    b) The breadth of the beam is restricted
    c) Both depth and breadth is restricted
    d) Shear is very high
    Answer: A
86. A T-beam roof section has following details
    Thickness of slab =100mm
    Width of rib=230mm
    Overall depth of the beam=350mm
    Centre to centre distance of the beams=4m
    Effective simply supported span of beams=6m
    Effective flange width is
    a) 4m b) 2.36m c) 3.28m d) 1.83m

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Answer: A

87. The permissible shear stress in concrete for beams without shear reinforcement depends upon
    a) Percentage of tension reinforcement
    b) Grade of concrete
    c) Both of the above
    d) None
    Answer: B
88. Diagonal tension crack occurs
    a) If shear force is dominant compared to bending moment at supports
    b) If bending moment is dominant compared to shear force
    c) Both (a) & (b)
    d) Neither (a) nor (b)
    Answer: A
89. The spacing (8mm) of 2 legged stirrups to be provided is
    a) 40 b) 115 c) 250 d) 400
    Answer: C
90. For a bar of diameter 'd' the anchorage value of hook is
    a) 2d b) 4d c) 8d d) 16d
    Answer: B
91. A bar is bent into an angle of 90^o the anchorage value is
    a) Zero b) 4 times its dia c) 16 times its dia d) 8 times its dia
    Answer: B
92. The amount of torsion reinforcement required for a two way simply supported slab is Where Ast_{xx} is the main reinforcement in the shorter direction
    a) ¾ Ast_{xx} b) ¼ Ast_{xx} c) $0.75Ast_{xx}$ d) None
    Answer: D
93. In a slab 12mm diameter bars are to be provided at 200mm center to center as main reinforcement, due to non availability the diameter of bars to be changed to 16mm the new spacing would be
    a) 266.66mm b) 84.37mm c) 300mm d) 450mm
    Answer:C
94. A continuous beam of constant M_p has three equal spans and carries total uniform distributed load 'w' on each span. The value of collapse load for the beam will be
    a) 12Mp/L b) 8.65Mp/L c) 11.656Mp/L d) 4Mp/L
    Answer: D
95. At the location of plastic hinge
    a) Radius of curvature is infinite
    b) Curvature is infinite
    c) Moment is infinite
    d) Flexural stress is infinite
    Answer:C

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96. The shape factor of an isosceles triangle for bending about the axis parallel to the base is:

a) 1.5 b) 1.7 c) 2 d) 2.34

Answer: A

97. The number of plastic hinges necessary to convert a propped cantilever into a mechanism is

a) 2 b) 3 c) 1 d) 4

Answer: A

98. The collapse load of the beam is

a) 8Mp b) 4Mp c) 6Mp d) 16Mp

Answer: D

99. A continuous beam is considered as deep beam if L/D ratio is less than

a) 2 c) 1.5

b) 2.5 d) 1

Answer:B

100. The minimum area of steel in Shear Walls should not be less than

a) 0.4% Area c) 0.2% Area

b) 0.15% Area d) 0.12% Area

Answer:C

101. The compressive strength of concrete for a Pre-Tensioned structure should not be less than

a) 30 N/mm² c) 20 N/mm²

b) 40 N/mm² d) 50 N/mm²

Answer:A

102. The minimum thickness of Concrete Walls should not be less than

a) 200 mm c) 100 mm

b) 400 mm d) 50mm

Answer:C

103. The tensile strength of steel for a Pre-stressed Concrete will be …

a) 215-415 N/mm² c) 500-550 N/mm²

b) 1600-2000 N/mm² d) None

Answer:D

104. The Corbels are designed for ----------structures

a) RC c) Precast

b) Pre-tensioned d) Post-tensioned

Answer:C

105. 'Water bar' is ….

a) steel c) concrete

b) Water d) Polymer rubber

Answer:A

106. A simply supported beam is considered as deep beam if L/D ratio is less than

c) 2 c) 1.5

d) 2.5 d) 1

Answer:D

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107. The minimum area of vertical steel for Deep beams is

c) 0.12% Area
c) 0.2% Area
d) 0.15% Area
d) 0.002% Area

Answer:D

108. The compressive strength of concrete for a Post-Tensioned structure should not be less than

c) 30 N/mm²
c) 20 N/mm²
d) 40 N/mm²
d) 50 N/mm²

Answer:A

109. The compressive strength of concrete for a Pre-Tensioned structure should not be less than

c) 30 N/mm²
c) 20 N/mm²
d) 40 N/mm²
d) 50 N/mm²

Answer:A

110. The twisting moment will be exit in….. beams

c) continuous
c) simply supported
d) Ring
d) None

Answer:D

111. The ring beams are designed for ----------structures

c) Water tanks
c) Precast
d) Pre-tensioned
d) Post-tensioned

Answer:A

112. 'Bunkers' are …. structures

c) Shallow
c) Deep
d) Water
d) rubber

Answer:D

113. Which one of the following professional does not involve in bridge engineering discipline?

a) Structural engineer
b) Hydraulic engineer
c) Geotechnical engineer
d) None
e) All except d

Answer:D

114. Which one of the following concept tells us mankind was involved in the ancient in bridge construction and utilization of the facility?

a) Tree fallen accidentally across a stream was the earliest example of a beam type bridge.
b) The natural rock arch formed by erosion of the loose soil below was the earliest forebear of arch bridges.

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c) Creeper hanging from tree to tree allowing monkeys to cross from one bank to the other was the forerunners of suspension bridges.
d) All except B
e) No answer

Answer:E

115. Which one of the following bridge site selection criteria should need to be must fulfilled while selecting particular bridge site?
a) The site should allow for constructing approach road. The site should allow for constructing approach road.
b) The site should be selected where skewness can be avoided.
c) The site should have suitable strata at reasonable and workable depth for founding piers and abutments.
d) The channel in the reach should be well defined.
e) All except B

Answer:E

116. Which one of the following bridge type is the most common in Ethiopia?
a) Girder bridge
b) Slab bridge
c) Steel bridge
d) All except B
e) All of the above

Answer:B

117. Which one of the following factor used to determine particular bridge type which suites a specific site.
a) Geometric condition of the site
b) Subsurface condition of the site
c) Functional requirement
d) All
e) None of the above

Answer:D

118. In bridge design why dynamic load allowance factor IM will be taken into account?
a) Hammering effect of the wheel assembly to riding surface
b) Dynamic response of the bridge as a whole to passing vehicles
c) Both A and B
d) None

Answer:C

119. Which structural element of a building is under torsion and bending and shear when loads are acting simultaneously?
a) Column b) Beam c) Slabs d) None

Answer:C

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120. Tensile strength of concrete is less than the compressive strength by a ratio of

a) 1/25 b) 1/15 c) 1/10 d) 1/50

Answer:C

121. Maximum chloride content in prestressed concrete is limited to

a) 0.10 – 0.20 b) 0.20 – 0.30 c) 0.15 – 0.35 d) 0.05 – 0.10

Answer:D

122. What percentage of water by weight of cement is absorbed by cement for full hydration in normal conditions of exposure

a) 0.12 b) 0.20 c) 0.23 d) 0.25

Answer:B

123. Cylindrical strength fck_{cyl} is approximately equal to cube strength fck_{cube} by

a) $fck_{cyl} = 0.95\ fck_{cube}$ b) $fck_{cyl} = 0.90\ fck_{cube}$

c) $fck_{cyl} = 0.80\ fck_{cube}$ d) $fck_{cyl} = 0.75\ fck_{cube}$

Answer:A

124. Based on the figure shown below

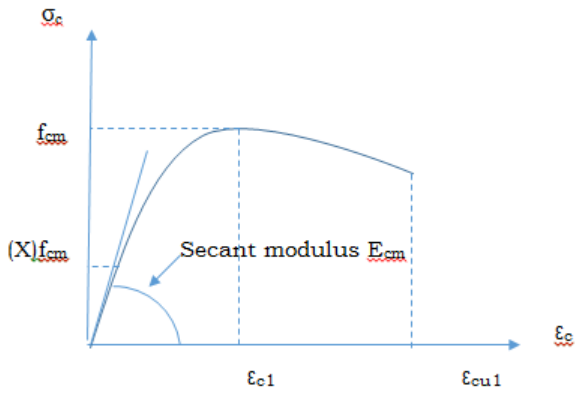


Figure above shows stress−strain curve for concrete in compression X – value is

a) 0.2 b) 0.25 c) 0.30 d) 0.4

Answer:D

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125. Concrete properties in limit state design philosophy is considered or calculated as per which stress-strain relationship curve

a) Parabolic b) Rectangular c) Bilinear d) None

Answer:B

126. The characteristic compressive strength fck of concrete is C25 what will be its Modulus of elasticity in GPa

a) 30.125 b) 28.960 c) 27.75 d) None

Answer:B

127. Which one of the factors given will not influence the long term concrete creep co-efficient Φ

a) Effective section Thickness b) age of loading

c) relative ambient humidity d) None

Answer:A

128. In stress–strain curve for cold worked steel reinforcing bars the yield stress is taken as an equivalent value of _____ % strain

a) 0.1 % b) 1.5% c) 20% d) 0.2%

Answer:D

129. A building is older than 40 years and the slabs are cracked cosmetically in order to find out the effect the characteristic loads are multiplied with which ψ values

a) Combination value b) frequent value

c) Quasi-permanent value d) All are answers

Answer:B

130. For which of the following given situations does the gamma factors (ϒ) for permanent and variable loads does not account for

a) The possibility of unfavorable deviation of the loads from the characteristic values

b) Accuracies in the design

c) Unforeseen redistribution of stress

d) Variations in the geometry of the structure and its elements

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Answer:A

131. When splitting tensile test is used to determine the tensile strength, the approximate value of Axial Tensile strength can be taken as _____% of Splitting Tensile strength value

a) 78% b) 90% c) 85% d) 81%

Answer:C

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