

MIZORAM PUBLIC SERVICE COMMISSION

COMPETITIVE EXAMINATIONS FOR RECRUITMENT TO LECTURER (CIVIL ENGINEERING) (CONTRACT) UNDER HIGHER & TECHNICAL EDUCATION DEPARTMENT, MARCH, 2017

PAPER - I

Time Allowed : 2 hours

Full Marks : 200

Attempt all questions.

All questions carry equal marks of 2 each.

1. Good quality stone must
 - (a) be durable
 - (b) be free from clay
 - (c) resist action of acids
 - (d) all of these
2. The hardest rock is
 - (a) diamond
 - (b) talc
 - (c) graphite
 - (d) quartz
3. The approximate specific gravity of rock or stone is on the range of:
 - (a) 2 - 2.5
 - (b) 2.6 - 3.0
 - (c) 1.5-2
 - (d) none of these
4. Reaction indicates
 - (a) opposing force
 - (b) moment
 - (c) tension
 - (d) compression
5. Which one is not considered as load
 - (a) concentrated load
 - (b) moment
 - (c) uniformly distributed load
 - (d) uniformly varying load
6. Perfect frames is
 - (a) $n > 2j-3$
 - (b) $n = 2j-3$
 - (c) $n < 2k-3$
 - (d) $n = 3j-2$
7. The point where bending moment changes its sign from positive to negative is known as
 - (a) moment
 - (b) flexural rigidity
 - (c) point of contraflexure
 - (d) compression

8. Which one is not the force acting on the dam:
- (a) uplift force (b) self weight of the dam
(c) ice pressure (d) air pressure
9. The term EI is called as
- (a) moment of resistance (b) flexural rigidity
(c) compressive strength (d) tensile strength
10. A body with negligible dimension is known as
- (a) particle (b) matter
(c) space (d) all of these
11. A body will be in equilibrium condition when external effect on a body is:
- (a) Minimum (b) Maximum
(c) Zero (d) None of these
12. A quantity which has magnitude and direction is known as
- (a) scalar (b) vector
(c) moment (d) collinear
13. If shear force is zero along a section, the bending moment at that section will be
- (a) zero (b) minimum
(c) maximum or minimum (d) parallel
14. The height of retaining wall exceed 6m, the type of retaining wall used is
- (a) gravity (b) cantilever
(c) counterfort (d) embankment
15. Structures can be classify as statically determinate if
- (a) no. of equation > no. of unknowns (b) no. of equation = no. of unknowns
(c) no. of equation < no. of unknowns (d) none of these
16. The relationship between moment and radius of curvature:
- (a) $\frac{M}{I} = \frac{E}{R} = \frac{f}{y}$ (b) $\frac{M}{I} = \frac{R}{E} = \frac{f}{y}$
(c) $\frac{M}{I} = \frac{E}{R} = \frac{y}{f}$ (d) all of these
17. Stresses are occurred due to
- (a) Bending moment and shear force (b) Bending moment and wind force
(c) shear force and tensile force (d) shear force and compressive force

18. Maximum bending moment on udl is
- (a) $wl^2/12$ (b) $wl/4$
(c) $wl^2/8$ (d) none of these
19. According to IS 456-2000, Modulus of Elasticity (E) of concrete is equal to
- (a) $5000\sqrt{fck}$ (b) $2700\sqrt{fck}$
(c) $1500\sqrt{fck}$ (d) none of these
20. The minimum compressive strength of 1st class brick should be
- (a) 75 kg/cm^2 (b) 90 kg/cm^2
(c) 100 kg/cm^2 (d) 120 kg/cm^2
21. The most reliable estimate is
- (a) detailed estimate (b) preliminary estimate
(c) plinth area estimate (d) all of these
22. Pick up the item of work not included in the plinth area estimate
- (a) wall thickness (b) verandah area
(c) courtyard area (d) water closet area
23. According to Indian Standard Institute, the actual size of of modular brick is
- (a) $23\text{cm} \times 11.5\text{cm} \times 7.5\text{cm}$ (b) $19\text{cm} \times 19\text{cm} \times 9\text{cm}$
(c) $20\text{cm} \times 10\text{cm} \times 10\text{cm}$ (d) none of these
24. The detention period in a septic tank is assumed
- (a) 25 minutes (b) 30 minutes
(c) 40 minutes (d) 15 minutes
25. The frog of a brick is normally made on its
- (a) top face (b) bottom face
(c) longer face (d) all of these
26. Clay and silt content in a good brick earth must be at least
- (a) 30% (b) 25%
(c) 45% (d) 50%
27. A pug mill is used for
- (a) softening brick earth (b) moulding earth brick
(c) tempering brick earth (d) all of these

28. With storage, strength of cement
- (a) increases (b) decreases
(c) remains the same (d) all of these
29. Strength of cement concrete primarily depends upon
- (a) quality of water (b) quantity of concrete
(c) quantity of cement (d) water cement ratio
30. Which one is a not harmful ingredient in brick earth?
- (a) lime (b) alkalies
(c) iron pyrites (d) silica
31. Soundness of cement is tested using
- (a) vicat's apparatus (b) compressive strength test
(c) slump cone test (d) le-chatelier apparatus
32. For the manufacture of Porland cement, the proportions of raw materials used are
- (a) lime 63%, silica22%, other ingredients 15%
(b) lime 50%, silica35%, other ingredients 15%
(c) lime 40%, silica40%, other ingredients 20%
(d) all of these
33. Good quality cement contains higher percentage of
- (a) di-calcium silicate (b) tri-calcium silicate
(c) tri-calcium aluminate (d) gypsum
34. Which one is not the factor of quality of timber
- (a) time of fell (b) method of seasoning
(c) maturity of tree (d) transportation of tree
35. Seasoning of timber is done
- (a) to remove water (b) to clean the timber
(c) to paint its surface (d) all of these
36. The most valuable timber is obtained from
- (a) sal (b) shisham
(c) fir (d) teak
37. Which is not defects due to insects
- (a) marine borers (b) termites
(c) white rot (d) beetles

38. A well seasoned timber may contain moisture upto
- (a) 4-6% (b) 8-10%
(c) 10-12% (d) 15-20%
39. Most commonly used solvent in oil paints is
- (a) spirit (b) coal tar
(c) turpentine (d) petroleum
40. The base material for distemper is
- (a) lime (b) lime putty
(c) chalk (d) cement wash
41. The most accurate method for the determination of water content in the laboratory is
- (a) sand bath method (b) pycnometer method
(c) oven drying method (d) calcium carbide method
42. The condition when concrete and steel reinforcement reach its maximum permissible limit at the same time is
- (a) balanced section (b) under reinforced
(c) over reinforced (d) deformed section
43. The most commonly adopted scale for residential building floor plan drawing
- (a) 1:20 (b) 1:100
(c) 1:300 (d) 1:500
44. Effective span of the beam is
- (a) clear span+centre to centre of support (b) clear span
(c) effective depth of slab (d) all of these
45. Cover for foundation, column, beam and slab are
- (a) 50,40,35,15(mm) (b) 55,50,35,20(mm)
(c) 45,30,35,10(mm) (d) 50,40,25,15(mm)
46. Anchorage value of 45° bend is equal to
- (a) $8d$ (dia of bar) (b) 12 (dia of bar)
(c) $5d$ (dia of bar) (d) $1.5d$ (dia of bar)
47. Minimum thickness or depth of the continuous beam
- (a) $L/20$ (b) $L/25$
(c) $L/15$ (d) $L/8$

48. Strength gaining of Ordinary Portland Cement after 7 days curing
- (a) 65% of design strength (b) 70% of design strength
(c) 75% of design strength (d) 50% of design strength
49. Unequal settlements at the support of a statically indeterminate structure develop
- (a) No reactions (b) Reactions from supports
(c) Strains in member only (d) Member force
50. The method of moment distribution in structural analysis is
- (a) Approximate method (b) An exact method
(c) An Iterative method (d) None of these
51. Which of the following method is not a displacement method
- (a) Kani's Method (b) Equilibrium Method
(c) Column Analogy Method (d) Moment distribution Method
52. Euler critical load of column restrained or fixed at both ends is
- (a) $\frac{4\pi^2 EI}{L^2}$ (b) $\frac{2\pi^2 EI}{L^2}$
(c) $\frac{\pi^2 EI}{L^2}$ (d) $\frac{\pi^2 EI}{4L^2}$
53. When the strain in a material increases with time under sustained constant stress, the phenomenon is known as
- (a) Strain hardening (b) Creep
(c) Hysteresis (d) Visco-elasticity
54. Hooke's law is obeyed by a material with its
- (a) Plastic Limit (b) Yield Limit
(c) Limit of Proportionality (d) Elastic limit
55. Modulus of Rigidity is defined as
- (a) Stress to strain (b) Stress to volumetric strain
(c) Longitudinal stress to strain (d) Shear stress to shear strain
56. The limiting value of Poisson's ratio
- (a) 1 and -0.5 (b) 0 and 5
(c) -1 and 0.5 (d) -1 and -0.5

57. For ductile materials, the most appropriate failure theory is
- (a) Shear strain energy theory
 - (b) Maximum shear stress theory
 - (c) Maximum principal stress theory
 - (d) Maximum principal strain theory
58. The maximum strain energy stored in a body without exceeding the limit of proportionality is
- (a) Proof Resilience
 - (b) Modulus of rigidity
 - (c) Resilience
 - (d) Bulk Modulus
59. The neutral axis is a section
- (a) at the centroid axis
 - (b) at the middle axis
 - (c) where strain change its sign
 - (d) where the principal stress is zero
60. A visco-elastic material
- (a) has a viscous surface
 - (b) is elastic all the time
 - (c) has a small plastic zone
 - (d) has a time dependant stress strain relation
61. A fighter plane flying horizontal at altitude of 4121 m with velocity of 468 km/hr has aimed an energy camp. In order to hit the camp, the exact distance of the plane from the camp should be
- (a) 3770 m
 - (b) 8770 m
 - (c) 4770 m
 - (d) 5770 m
62. The weakest section in a fillet is
- (a) side perpendicular to force
 - (b) throat of the fillet
 - (c) smaller side
 - (d) none of these
63. A dead load is
- (a) one that does not exist
 - (b) one that is dead
 - (c) one that can be neglected
 - (d) one that remains constant
64. The stress at neutral axis is
- (a) zero
 - (b) maximum tensile
 - (c) minimum compressive
 - (d) maximum compressive

65. Match List I and List II and select the correct answer using the codes given below the lists:

List I		List II	
A	dy/dx	1	Shear Force
B	d^2y/d^2x	2	Slope
C	d^3y/d^3x	3	Load
D	d^4y/d^4x	4	Bending moment

Codes

- (a) A B C D
2 3 4 1
- (b) A B C D
2 4 1 3
- (c) A B C D
1 3 4 2
- (d) A B C D
4 2 1 3

66. Sand particles are made up of

- (a) clay (b) rock minerals
(c) chemical (d) fly ash

67. The relation between modulus of rupture f_{cr} and characteristic strength of concrete f_{ck} is given by

- (a) $f_{cr} = 0.4\sqrt{f_{ck}}$ (b) $f_{cr} = 0.5\sqrt{f_{ck}}$
(c) $f_{cr} = 0.7\sqrt{f_{ck}}$ (d) $f_{cr} = 1.2\sqrt{f_{ck}}$

68. According to IS :456-2000, minimum slenderness ratio for short column is

- (a) less than 12 (b) less than 20
(c) between 20 to 24 (d) more than 24

69. In structural steel of grade Fe 415, the number 415 is used to represent strength of steel

- (a) ultimate strength (b) yield strength
(c) proof strength (d) design strength

70. In cold weather countries cement preferred is
- (a) Ordinary Portland cement (b) Puzzolana cement
(c) Calcium chloride cement (d) Low heat cement.
71. Timber as a material is not suitable for the construction of
- (a) Fender piles (b) Friction piles
(c) Tension pile (d) None of these
72. Minimum percentage area of HYSD reinforcement in a 150 mm thick water tank wall is
- (a) 0.16 (b) 0.23
(c) 0.20 (d) 0.24
73. In limit state approach, spacing of main reinforcement controls primarily
- (a) Collapse (b) Durability
(c) Cracking (d) Deflection
74. In RCC beam, side face reinforcement is provided, if its depth exceeds
- (a) 300 mm (b) 500 mm
(c) 800 mm (d) 750 mm
75. Shear span is defined as the zone where
- (a) Bending moment is zero (b) Shear force is zero
(c) Shear force is constant (d) Bending moment is constant
76. The formwork for RCC structures can be removed after
- (a) 1 days (b) 3 days
(c) 7 days (d) 14 days
77. Slump value for mass concrete should range between
- (a) 0-25 mm (b) 25-50 mm
(c) 50-100 mm (d) 100-175 mm
78. In a spherical dome subjected to concentrated load at crown or uniformly distributed load, the meridional force is always
- (a) zero (b) tensile
(c) compressive (d) shear
79. The minimum number of piles needed in a group of piles to support a column is
- (a) three (b) two
(c) one (d) four
80. There should be no tension anywhere in the body of the retaining wall, if the wall is
- (a) of cantilever type (b) a masonry wall
(c) of buttress type (d) of counterfort type

81. The heat of hydration of cement can be reduced by
- (a) reducing the proportions of C_3A and C_3S
 - (b) increasing the proportions of C_3A and C_3S
 - (c) increasing the fineness of cement
 - (d) none of these
82. The maximum area of compression reinforcement in a beam is
- (a) $0.04 bd$
 - (b) $0.04bD$
 - (c) $0.12 bd$
 - (d) $0.12 bD$
83. The minimum area of tension reinforcement in a beam expressed as percentage of cross sectional area is
- (a) $0.85/f_y$
 - (b) $0.75/f_y$
 - (c) $85/f_y$
 - (d) 4%
84. For the same cross-sectional area which beam will be deflected least
- (a) T - beam
 - (b) Rectangular
 - (c) Circular beam
 - (d) I-beam
85. The design shear strength of concrete depends on
- (a) area of longitudinal steel provided
 - (b) area of shear stirrups provided
 - (c) spacing of shear reinforcement
 - (d) none of these
86. Which of the following is generally not designed for shear
- (a) A cantilever beam
 - (b) A slab
 - (c) A footing
 - (d) None of these
87. The reinforcement for positive moments in a continuous one way slab can be curtailed from the continuous edge at a distance of
- (a) $0.25l$
 - (b) $0.35l$
 - (c) $0.15l$
 - (d) $0.5l$
88. In RCC column, if ties are not provided, the column is likely to
- (a) Fail by buckling
 - (b) Fail by crushing
 - (c) Behave like a beam
 - (d) None of these
89. If spacing of ties is kept more than that specified by the IS code then
- (a) Ties will fail on application of load
 - (b) concrete cover is likely to spall
 - (c) Slenderness ratio of column will change
 - (d) none of these
90. To design a column, one should normally start by assuming the area of steel as
- (a) 0.15%
 - (b) zero
 - (c) 0.18%
 - (d) 1%

91. A surface water tank will be economical if its shape is
(a) square (b) circular
(c) rectangle (d) all of these
92. Counterfort retaining walls are provided for heights more than
(a) 7m (b) 5m
(c) 5.5m (d) 6m
93. The factor of safety adopted against overturning of retaining walls in
(a) 1.5 (b) 2
(c) 3 (d) 1.7
94. Wobble effect is related with
(a) creep of concrete (b) frictional loss
(c) creep of steel (d) shrinkage of concrete
95. The diameter d (mm) of rivet, connecting the plate of thickness, t (mm) given by Urvin's formula is
(a) $d = 4.05\sqrt{t}$ (b) $d = 6.01t$
(c) $d = 1.9\sqrt{t}$ (d) $d = 6.01\sqrt{t}$
96. Select the correct statement:
(a) Riveting is less noisy than bolting
(b) Material cost of the rivet is higher than that of bolt
(c) Bolts are used as temporary fastenings whereas rivets are used as permanent fastenings
(d) None of these
97. Web crippling occurs due to
(a) Excessive bending moment (b) Column action of web
(c) Failure of web under concentrated load (d) Secondary bending moment
98. The co-efficient of expansion for steel may be taken as
(a) $1.2 \times 10^{-5} \text{ }^\circ\text{C}$ (b) $2.2 \times 10^{-5} \text{ }^\circ\text{C}$
(c) $1.5 \times 10^{-5} \text{ }^\circ\text{C}$ (d) $2 \times 10^{-5} \text{ }^\circ\text{C}$
99. When two plates placed end to end are joined by two cover plates, the joint is known as
(a) lap joint (b) butt joint
(c) chain riveted lap joint (d) double cover butt joint
100. Estimate of a residential building estimated using plinth area rate come under
(a) preliminary estimate (b) engineer's estimate
(c) bid estimate (d) all of these