

MIZORAM PUBLIC SERVICE COMMISSION

DEPARTMENTAL EXAMINATIONS FOR JUNIOR ENGINEER (CIVIL) UNDER PUBLIC WORKS DEPARTMENT. OCTOBER, 2015.

CIVIL ENGINEERING

Time Allowed : 3 hours

F.M. : 100 P.M. : 40

*Marks for each question is indicated against it.
Attempt all questions.*

GROUP - A (BUILDING WORKS)

Attempt question No. 1 and any other 2 (two) questions.

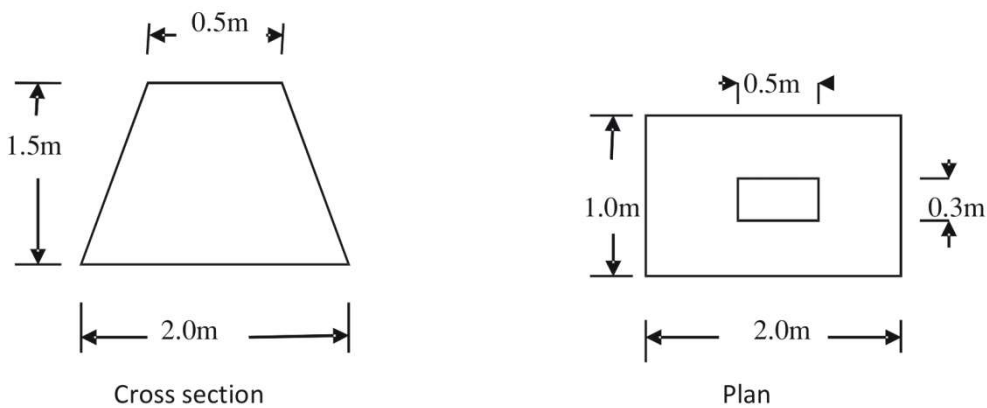
1. (a) Draw a longitudinal section of a Septic tank having length = 4.00m and height = 1.50m. Assume thickness of the wall. **(10)**
- (b) Prepare preliminary estimate of a two storied RCC Office building having plinth area of 250.00 sq.m. for ground floor and 150.00 sq.m for first floor. Rate may be assumed as Rs.2500.00/sq.m for both the floor. The following components are to be added: **(10)**
 - (i) Internal Electrification = % as per SOR 2013
 - (ii) Water supply and sanitary = % as per SOR 2013
 - (iii) Quality control = 1%
 - (iv) W/C establishment = 2%
 - (v) Contingencies = 3%
2. Fill in the blanks. **(15×1=15)**
 - (a) Curing of concrete is done with _____.
 - (b) Steel reinforcement is provided in RCC to take the _____ force.
 - (c) The minimum clear cover an RCC beam is _____.
 - (d) Slump test is used to determine _____ of concrete.
 - (e) The weight of 5m length of 16mm dia. reinforcing steel bar is _____ kgs.
 - (f) 7500mm is equal to _____ Km.
 - (g) Ordinary Portland Cement attains its design strength in _____ days after mixing.
 - (h) The diameter of reinforcement bars shall not exceed _____ of the total thickness of the slab.
 - (i) Queen-post truss is suitable for a span varying from _____ to _____ metres.
 - (j) The minimum number of longitudinal bars in a rectangular column is _____ nos.
 - (k) An opening above a window is called _____.
 - (l) Covered area just above staircase is called _____.
 - (m) The vertical members fixed between steps and hand rail are known as _____.
 - (n) The members which support covering material of a sloping roof are known as _____.
 - (o) Compressive strength of concrete is obtained from cube test at the end of _____ days.
 - (p) _____ are used for compacting freshly placed concrete.

3. (a) Choose the correct one : (5×1=5)
- (i) Clear cover for a column should not be less than
 - (a) 12mm
 - (b) 25mm
 - (c) 40mm
 - (ii) The maximum spacing of shear reinforcement along the axis of the member for vertical stirrups is
 - (a) 0.5d
 - (b) 0.75d
 - (c) 1.0d
 - (iii) The minimum cement content required in RCC to ensure durability for moderate exposure is
 - (a) 250kgs/m³
 - (b) 290kgs/m³
 - (c) 360kgs/m³
 - (iv) The minimum permissible dia of bar in column is
 - (a) 10mm
 - (b) 12mm
 - (c) 16mm
 - (v) Concrete attains its specified strength after
 - (a) 7days
 - (b) 21days
 - (c) 28days

- (b) State whether the following are True or False. (5×1=5)
- (i) Full brick masonry is also called load bearing wall.
 - (ii) In a simply supported beam, maximum bending moment occurs at mid span.
 - (iii) The minimum frequency of sampling for 40cum of concrete is 6.
 - (iv) The diameter of water supply pipes commonly used for internal works is 15mm.
 - (v) Minimum thickness for waist slab of stairs is 150mm.

- (c) Write full form of the following: (5×1=5)
- (i) M.S. handles
 - (ii) C.P. brass
 - (iii) P.C.C.
 - (iv) N.L.C.P.R.
 - (v) S.B.C.

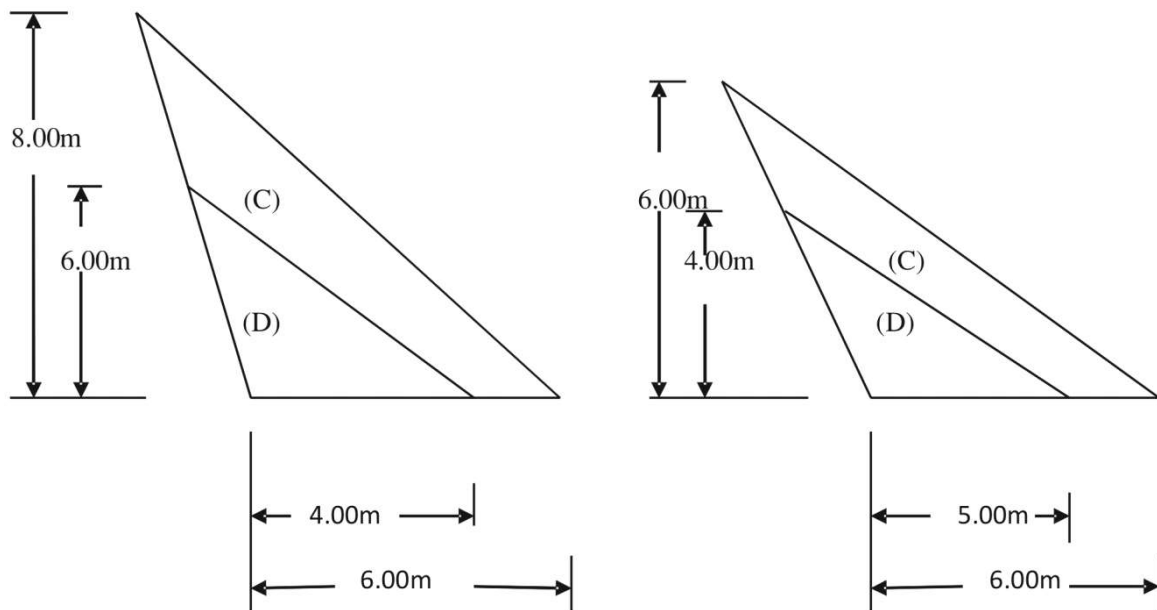
4. (a) Prepare analysis of rates for any item of work in Building works. (10)
- (b) Figure below shows the trapezoidal portion of a foundation, compute the volume. (5)



GROUP B (ROAD WORKS)

Attempt question No. 5 and any other 2 (two) questions.

5. (a) Figures below show cross sections at chainage 0.00 and at chainage 10.00m of a newly formation cutting of a road. Enter the measurement and compute the quantity of soil class (C) and (D). (15)



- (b) Calculate the total weight and weight per metre length of a solid circular steel bar having 5.00m diameter and 10.00m in length. Density of steel may be assumed as 2500kg/cum. (5)

6. Fill in the blanks. (15×1=15)

- (a) The magnetic bearing of a line is measured by _____.
- (b) The most commonly used instrument for setting out gradient in Mizoram is _____.
- (c) The highest point on a carriage way is known as _____.
- (d) The length of a road visible ahead to the driver at any instant is called _____.
- (e) The transverse inclination of the pavement surface to counteract the effect of centrifugal force is called _____.
- (f) Concrete pavement is also called _____ pavement.
- (g) The moisture content which marks the boundary of the liquid and plastic states of the soil is called _____.
- (h) The size of IRC grade-I for WBM is _____ mm to _____ mm.
- (i) _____ are provided along the edges of the pavement on both sides to provide lateral support.
- (j) Unit of measurement for WBM is _____.
- (k) A survey instrument commonly used for determining the level difference of ground surface is called _____.
- (l) 10.00 sq.ft is equal to _____ sq.m.

- (m) The CBR value can determined at the site by _____ test.
- (n) The hardness or softness of bitumen is tested by using an equipment called _____.
- (o) The slope provided in the transverse direction of the road to drain off the rain water from the road surface is called _____.

7. (a) Choose the correct one : (5×1=5)

- (i) The full width of land acquired before finalisation of highway alignment is known as
 - (a) Formation width
 - (b) Carriage way
 - (c) Right of way
- (ii) Bottom-most component of a flexible pavement is
 - (a) Sub-base
 - (b) Subgrade
 - (c) Base
- (iii) The size range for aggregate of IRC grading-II is
 - (a) 90mm – 40mm
 - (b) 63mm – 45mm
 - (c) 53mm – 22mm
- (iv) Steel beam acting as a cross-beam in a Bailey Bridge is
 - (a) Reinforcement Chord
 - (b) Transom
 - (c) Racker
- (v) The aggregate impact value for WBM should not exceed
 - (a) 30%
 - (b) 40%
 - (c) 50%

(b) Write True or False : (5×1=5)

- (i) Unit of measurement for 20mm premix carpet is sq.meter.
- (ii) Design thickness of a pavement depends on the strength of aggregate.
- (iii) Bailey Bridge is a permanent bridge.
- (iv) NP3 Hume Pipe is stronger than NP2.
- (v) Higher value of camber should be provided for the area having high intensity of rainfall.

(c) Write full form of the following : (5×1=5)

- (i) CRRRI
- (ii) MORTH
- (iii) LAV
- (iv) WBM
- (v) SDBC

8. (a) Define the following : (5×2=10)

- (i) Superelevation.
- (ii) High flood level.
- (iii) Optimum Moisture Content.
- (iv) Weep hole.
- (v) Bench Mark.

(b) Draw a sectional details of masonry retaining wall. Give appropriate dimensions. Drawing can be drawn without scale. (5)