MIZORAM PUBLIC SERVICE COMMISSION

DEPARTMENTAL EXAMINATIONS FOR
DRAFTSMAN - I / JUNIOR ENGINEER
UNDER IRRIGATION & WATER RESOURCES DEPARTMENT, DECEMBER, 2017

ENGINEERING PAPER

Time Allowed : 3 hours   FM : 100   PM : 40

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

1. What is the difference between Plane Surveying and Geodetic Surveying? **(2)**

2. Name the different parts of a Surveying Compass. Give the names of the diferrent types of Surveying Compasses. **(3)**

3. What do you mean by Representative Fraction (R.F)? When 1 centimetre on a map represents 10 metre on the ground, calculate the Representative Fraction. **(3)**

4. Find the correct words to replace X :

   The ratio of the smallest division on the main scale to the number of divisions on the vernier is called X. **(2)**

5. Pick up the most accurate method of estimation from the following :- **(2)**
   - (a) Building cost index estimate
   - (b) Plinth area estimate
   - (c) Detailed estimate
   - (d) Cube rate estimate

6. Pick up the item of work *not* included in the plinth area estimate from the following :- **(2)**
   - (a) Wall thickness
   - (b) Room area
   - (c) Verandah area
   - (d) Courtyard area

7. One brick thickness of wall is roughly equal to X. Pick up the most accurate replacement for X from the following :- **(2)**
   - (a) 10 cm
   - (b) 15 cm
   - (c) 20 cm
   - (d) 30 cm

8. The plan of a building is in the form of a rectangle with centerline dimensions of the outer walls as 10.30 m x 15.30 m. The thickness of walls in superstructure is 0.30 m. Calculate the carpet area of the building. **(4)**

9. Which of the following documents contains detailed description of all items of work excluding their quantities, along with the current rates? **(2)**
   - (a) Analysis of rates
   - (b) Tender document
   - (c) Abstract estimate
   - (d) Schedule of rates

10. A cement concrete has to be mixed in the proportion 1: 1.5 :3. If the quantity of cement taken is 50 kg, find the weights of sand and stone aggregates. If the total quantity has to be increased by 52% in order to compensate for its dryness, calculate the total quantity required. **(4)**

11. The internal dimensions of a room are fixed in such a way that the length is twice its breadth. If the internal perimeter of the room is 24 m, find the cost of carpeting the floor of the room @ Rs 200 per sqm. **(4)**

12. What are the various characteristics of a first class brick? **(3)**

13. List out the 4 main constituents of an Ordinary Portland Cement. **(2)**

14. Write short notes on curing of concrete. **(3)**

15. Choose the correct one from the following : - **(2)**

Strength of concrete increases with

   (a) increase in water cement ratio   (b) decrease in water cement ratio

   (c) decrease in size of aggregate   (d) decrease in curing time

16. In a singly reinforced beam, the effective depth is measured from its compression edge to X. Pick up the most accurate replacement for X from the following :- **(2)**

   (a) tensile edge   (b) centre of tensile reinforcement

   (c) neutral axis of the beam   (d) longitudinal central axis

17. The main reinforcement in RCC Cantilever beams is placed at X. Pick up the most accurate replacement for X from the following :- **(2)**

   (a) top fibre   (b) bottom fibre

   (c) side fibres   (d) both (a) and (b)

18. The diameter of longitudinal bars of a column should never be less than X. Pick up the most accurate replacement for X from the following :- **(2)**

   (a) 6 mm   (b) 8 mm

   (c) 10 mm   (d) 12 mm

19. Which of the following terms is not used to designate a raingauge? **(2)**

   (a) pluviometer   (b) ombrometer

   (c) odometer   (d) hyetometer

20. What is a hyetograph? **(2)**

21. Explain the terms (a) Flow through pipes and (b) Flow through open channels. Under what circumstances the flow through pipes can become flow through open channels? **(4)**

22. What are notches and weirs? **(4)**

23. Give an expression for Discharge over a rectangular notch or weir clearly indicating the meaning of all the terms involved in the expression. **(3)**

24. Define (a) Steady flow and Unsteady flow, (b) Uniform flow and Non–uniform flow. **(4)**

25. Describe, in brief, the various types of Weirs. **(4)**

26. Give an expression for (a) Chezy's formula and (b) Manning's formula for Discharge through an open channel clearly indicating the meaning of all the terms involved in the formulae. **(4)**

27. What are the characteristics of the Most Economical Section of a Channel? List out the characteristics of the most economical trapezoidal channel. **(4)**

28. If V_1 and V_2 are the velocities in the pre-enlargement and enlarged sections of a pipe respectively, the expression for minor head loss due to sudden enlargement in pipes is given by X. Find the accurate replacement for X. **(3)**

29. Define the terms (a) Hygroscopic water (b) Capillary Water and (c) Gravitational water. **(3)**

30. Define the terms (a) Saturation Capacity and (b) Field Capacity. **(4)**

31. What are the factors on which the water requirement of crops depends? **(4)**

32. Name the various methods of Surface Irrigation. Which one of them is most frequently used to irrigate orchards? **(4)**

33. Name the two forms of multiple cropping used in India. **(2)**

34. Define 'duty of water'. What is its unit of measurement? **(3)**

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