MIZORAM PUBLIC SERVICE COMMISSION

DEPARTMENTAL EXAMINATIONS FOR JUNIOR GRADE OF M.E.S. (AE/SDO)
UNDER MINOR IRRIGATION DEPARTMENT, MARCH, 2017.

ENGINEERING PAPER – I

Time Allowed : 3 hours   FM : 100   PM : 40

The figures in the margin indicate full marks for the questions.
Attempt all questions.

1. List (3 points each) the advantages and disadvantages of Well Irrigation in comparison with Canal Irrigation. **(6)**

2. Define (a) cone of depression and (b) specific capacity of the well. **(4)**

3. List the steps involved in design of an Irrigation Well. **(3)**

4. Find the correct word(s) to replace X :

   The most common type of Positive displacement pumps is the X. **(2)**

5. Name the various components of a centrifugal pump. **(4)**

6. What is a Weir? What is its function? **(4)**

7. A Parshall flume essentially consists of 3 different types of sections. Of what types are those sections? How do the floors behave in each of the sections? **(6)**

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

9. Name the various methods of Surface Irrigation. Which one of them is most frequently used to irrigate orchards? **(6)**

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

11. What is a canal outlet? What is the main objective of providing a canal outlet? Name the various types of canal outlets used in Irrigation Projects. **(7)**

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

13. What are the different causes of waterlogging? **(5)**

14. What the advantages and disadvantages of a sub-surface drainage system? **(4)**

15. Name any 5 (four) different types of cement commonly used in civil construction works in India. **(5)**

16. Describe the characteristics of a first class brick. **(4)**

17. Fill up the blank from the various alternatives provided in the following statement :

    The various requirements regarding material, joints and reinforcement detailing for control of cracking in RCC liquid retaining structures are listed in _____. **(2)**

    Alternatives :
    (a) IS 3307 (Part I) : 2009   (b) IS 3370 (Part I) : 2009
    (c) IS 3703 (Part I) : 2009   (d) IS 3770 (Part I) : 2009

18. Describe the various requirements regarding material, joints and reinforcement detailing for control of cracking in RCC liquid retaining structures as per relevant IS Code(s). **(6)**

19. A doubly reinforced concrete beam of area 250 mm × 500 mm is subjected to a bending moment of 65000 Nmm. Using M20 concrete and Fe 415 steel, Calculate the area of tensile and compressive steel required for the beam. Given:- (a) clear cover to reinforcement = 50 mm
(b) effective depth = 450 mm. (c) σcbc = 7 N/mm² (d) σst = 230 N/mm² **(8)**

20. What do you mean by the term ' Estimate'? Name the different types of Estimates commonly adopted. **(5)**

21. A portion of an irrigation canal has the following data:- (a) Bed width = 3m. (b) Free board = 44cm.
(c) Slope of digging = 1:1. (d) Side slope of banking = 1.5 :1 (e) Full supply depth = 1m.
(f) Top width of both the banks = 1.5m

Distance	Ground level	Proposed bed level
0 m	225.24 m	224.00 m
30 m	224.80 m	223.94 m
60 m	224.43 m	223.88 m
90 m	224.12 m	223.82 m
120 m	224.50 m	223.76 m
150 m	224.98 m	223.70 m

Using Average End – Area formula, Calculate the total quantity of earthwork required both in digging and embankment. **(10)**

* * * * * * *