MIZORAM PUBLIC SERVICE COMMISSION

DEPARTMENTAL EXAMINATIONS FOR
JUNIOR ENGINEER / DRAFTSMAN
UNDER PUBLIC HEALTH ENGINEERING DEPARTMENT, JANUARY 2016

MECHANICAL ENGINEERING PAPER – II

Time Allowed : 3 hours FM : 100 PM : 40

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

1. What do you mean by I.C. and C.I. engines? **(2+2=4)**
2. State any one difference between diesel engine and petrol engine. **(2+2=4)**
3. Give a classification of I.C. engines according to the fuel used. **(3)**
4. What are the three methods of cooling of I.C. engines? **(3×1=3)**
5. When does an engine require overhaul? Mention three indications. **(3×1=3)**
6. Describe four maintenance procedures for diesel engine. **(4×1=4))**
7. Mention four different types of pump based on the function of pumps. **(4×1=4)**
8. What do you mean by pump and pumping? **(2+ 2=4)**
9. Mention any two machines which are used to develop power for the running (working) of pumps. **(2×1=2)**
10. What are the various methods which are adopted to estimate population of each sucessive future decade? Mention five. **(5×1=5)**
11. Calculate size of pumping main for the following data and select commercial diameter. **(10)**

    Quantity of water 1.0 MLD (Million litre per day)

    Pumping hour = 16 hours per day

    Velocity of flow V = 1.1 m/sec, take π =3.14

    Use the formula d = $\sqrt{\frac{4Q}{\pi V}}$

12. Calculate SHP (Shaft Horse Power) required of clear water and capacity of the pump driving motor for the following data. **(10)**

Rate of water supply	=	70 lpcd
Population	=	20,000 souls
Static head	=	420 m
Head losses due to friction, bend, valves etc	=	30 m
Combined efficiency	=	70%

Assuming 16 hour of pumping per day.

Use the formula ; Shaft Horse Power $= \frac{Q \times H \times \text{Specific gravity}}{75 \times \eta}$

Where

Q	=	discharge in litre/sec
H	=	Total head in metres
η	=	Pump efficiency

Take specific gravity = 1

Add 10% for pump requiring more than 75 kw and add 2% for elevation effect.

13. What is gas welding? How is it done? **(2+2=4)**

14. What is oxygen cutting? **(2)**

15. Mention any five major components of water supply plant. **(5×1=5)**

16. What do you mean by Machine and Mechanism? **(2+2=4)**

17. Describe five different types of pipe used for water supply. **(5×1=5)**

18. Describe four commercial sizes in mm of G.I pipe commonly used in PHE Department, Mizoram. **(5×1=5)**

19. Mention five different jointing materials (G.I specials) for jointing of G.I pipe. **(5×1=5)**

20. What do you mean by Hand Pump (HPTW)? What are two types of HPTW commonly used in Mizoram by PHED? **(2+2=4)**

21. What are two broad headings of types of welding? Explain briefly. **(2+4=6)**

22. Explain briefly the usefulness of log Books for Water Treatment Plant and Pump Houses. **(4)**

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