



CHUMEY HIGHER SECONDARY SCHOOL
BUMTHANG
ANNUAL EXAMINATION 2022



Subject: Plumbing

Class: X

Index Code

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Writing Time: 1 hour

Total Marks: 50

READ THE FOLLOWING INSTRUCTIONS CAREFULLY:

1. **Do not** write for the first **fifteen minutes**. This time is to be spent on reading the questions.
After having read the questions, you will be given **ONE** hour to answer all the questions.
2. In this paper, there are two **SECTIONS: A and B**. Both Sections **A and B** are **COMPULSORY**.
3. **Do not** remove or tear off any page from the booklet.
4. **Do not** leave the examination hall before you have made sure that you have answered all the questions.

For Teacher's use only

Question	Q1. a	Q1. b	Q1. c	Q1. d	Total	Signature
Marks	10	10	5	5	30	
Marks Scored						

Question	Q2 (a)	Q2 (b)	Q2 (c)	Q2 (d)	Q2 (e)	Q3 (a)	Q3 (b)	Q3 (c)	Q3 (d)	Q3 (e)	Q4 (a)	Q4 (b)	Q4 (c)	Q4 (d)	Total	Signature
Marks	1	1	1	1	1	2	2	1	1	1	2	2	2	2	20	
Scored																

SECTION A [30 MARKS]
ANSWER ALL QUESTION

Question 1

a) **Direction: For multiple choice questions, there are four alternatives: A, B, C, and D. Choose the correct alternative and circle it. Do not circle more than ONE alternative. If there is more than one choice circled, no score will be awarded.** [10]

i. The threaded part of the die and stock is known as a
 A bit.
 B head.
 C guard.
 D handle.

ii. The standard length of GI pipe is
 A 3 m.
 B 4 m.
 C 5 m.
 D 6 m.

iii. GI pipes are coated with zinc to prevent from
 A cracks.
 B leakage.
 C scratches.
 D corrosion.

iv If the value of Z_1 for the union of $\frac{1}{2}$ inch is 13 mm, Z_2 will be
 A. 8 mm.
 B. 10 mm.
 C. 12 mm.
 D. 14 mm.

v. The PP-R pipe of 20mm having SDR 11 and PN 10 will have the minimum wall thickness as
 A 1.3 mm.
 B 1.9 mm.
 C 1.12 mm.
 D 1.16 mm.

vi. Copper pipes are commonly used for
 A. drainage pipeline
 B. sewerage pipeline.
 C. wastewater pipeline.
 D. hot and cold-water pipeline.

vii. The fitting used for joining PEX pipe is known as
 A clipper.
 B crimper.
 C suppression.
 D compression.

viii. The plumber wants to supply water in three different locations located at 8500 mm, 580 m and 1220 cm from the point of supply. Calculate the total length of HDPE pipe required.
 A 787 m
 B 795 m
 C 887 m
 D 893 m

ix. You are given three pieces of HDPE pipe, having the same dimension. The cutting angle required to obtain a joint shown in the diagram below is
 A 103°
 B 108°
 C 113°
 D 123°

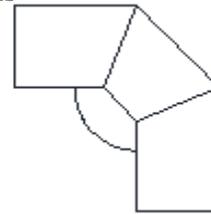


Fig 1: Elbow joint

x. You are given two pieces of HDPE pipe with the same dimension. The cutting angle required to obtain a joint shown in the diagram below is
 A. 22°
 B. 35°
 C. 45°
 D. 65°

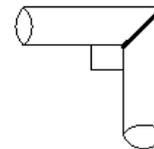


Fig 2: Elbow joint

b) Directions: Fill in the blanks with an appropriate word(s).	[10]
i. The friction can be reduced by applying _____ while threading pipe.	
ii. The universal threading machine can thread GI pipe size ranging from 15 mm to _____ mm.	
iii. If center to center measurement (M) = 500 mm, the cutting length of 15 mm GI pipe with elbow joints will be _____ cm.	
iv. If the size of CPVC pipe in metric is 32 mm, its imperial size in inch will be _____.	
v. The standard length of PP-R pipe is _____ cm.	
vi. The temperature of the PP-R welding machine should be maintained at _____ degree celsius.	
vii. The jointing compound which prevents oxidation in copper pipes is _____.	
viii. We use _____ to heat copper pipes while joining.	
ix. The PEX fitting shown in the diagram below is known as a _____ threaded elbow.  <i>Fig: PEX fitting</i>	
x. To perform thread joint of 20 mm HDPE pipe, we need the GI fitting of _____ mm.	

c) Directions: Write TRUE or FALSE for the following statements in the boxes provided.	[5]																
i. The universal threading machine is equipped with a changeable chuck wheel.																	
ii. Lesser the diameter of the GI pipe, the lesser will be the number of threads																	
iii. The size of the female adapter of size 20 mm × 25 mm is required for joining the two pipes of ¾ inch CPVC pipe and 1 ¼ inches HDPE pipe.																	
iv. The size of the female adapter should be 20 mm x 20 mm to join ¾ inch CPVC pipe with 1 inch HDPE pipe																	
v. HDPE pipes are used in solar water heating systems.																	
d) Directions: Match each item under column A with the most appropriate item in column B. Rewrite the correct pairs by writing the alphabet against the number in the space provided.	[5]																
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%; text-align: center;">Column A</th> <th style="width: 50%; text-align: center;">Column B</th> </tr> </thead> <tbody> <tr> <td>i. Joining of copper pipes</td> <td>a. Heating system</td> </tr> <tr> <td>ii. The maximum pipe size threaded by ratchet die set</td> <td>b. 2:1</td> </tr> <tr> <td>iii. The purpose of using jointing compound</td> <td>c. Teflon tape</td> </tr> <tr> <td>iv. The purpose of the white layer in the PP-R pipe</td> <td>d. Reamer</td> </tr> <tr> <td>v. Use of PEX pipes</td> <td>e. reduces the growth of bacteria</td> </tr> <tr> <td></td> <td>f. flux and solder</td> </tr> <tr> <td></td> <td>g. 2 inches</td> </tr> </tbody> </table>		Column A	Column B	i. Joining of copper pipes	a. Heating system	ii. The maximum pipe size threaded by ratchet die set	b. 2:1	iii. The purpose of using jointing compound	c. Teflon tape	iv. The purpose of the white layer in the PP-R pipe	d. Reamer	v. Use of PEX pipes	e. reduces the growth of bacteria		f. flux and solder		g. 2 inches
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SECTION B [20 MARKS] ATTEMPT ALL QUESTIONS		
Question 2. Short Response Question (SRQ)		
a)	Why the GI pipes are threaded in a clockwise direction? Explain ONE consequence of it.	[1]
b)	Explain TWO purposes of gauge length in a universal threading machine.	[1]
c)	Describe any FOUR disadvantages of using PP-R pipes.	[1]
d)	Find the centre distance between tee and elbow joints if the cutting length is 75 cm. Take Z_1 and Z_2 as 15 mm.	[1]
e)	Interpret the abbreviation given below for HDPE pipe of 20 mm. <div style="text-align: center;"> $\begin{array}{c} b \\ \downarrow \\ a \longrightarrow \text{PN10} \longleftarrow c \end{array}$ </div>	[1]

Question 3

a) Why can PEX pipe withstand high temperatures? Explain with **ONE** reason.

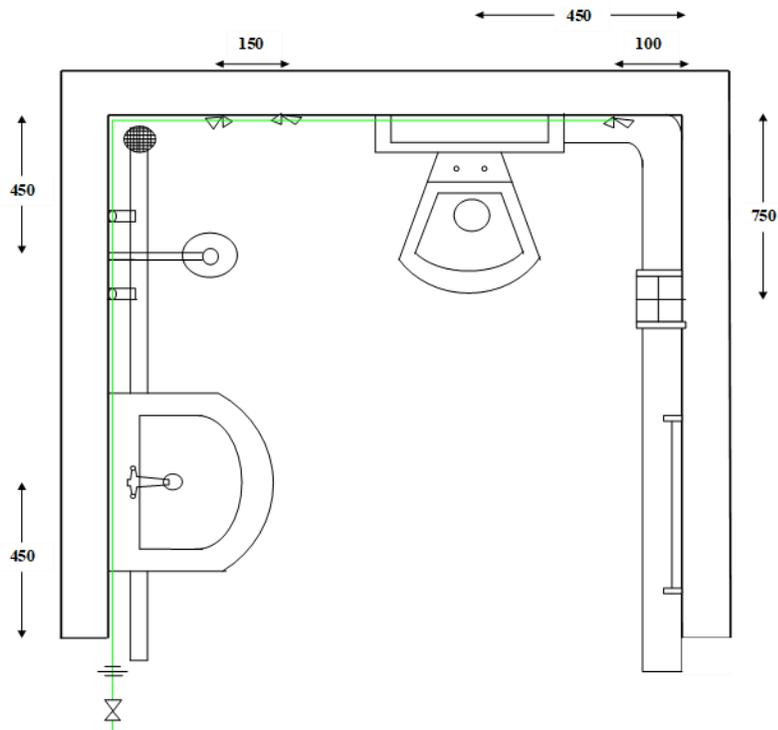
[1]

b) You are asked to install HDPE pipes in a village where there is no electricity. How would you join the pipes? Mention **FOUR** steps.

[2]

c) Design the isometric view based on the plumbing plan given in the diagram below. Use appropriate signs and symbols.

[2]



Note: Write answer on page number 10

d) Which of the following elbow joint would reduce the water pressure at bends?
Justify your answer with **ONE** point.

[1]



Elbow joint A



Elbow joint B

e) Explain **TWO** purposes of the carriage hand wheel in a universal threading machine.

[1]

Extended Response Question

Question 4

a) Fill in the metric and imperial marked **a, b, c,** and **d** in the table given below.

[2]

	Metric	Imperial
1	1 ½ inches	(a)
2	(b)	50 mm
3	1 ¼ inches	(c)
4	(d)	80 mm

b) Find Z_1 for ¾ inch GI pipe if the value of L, M, and Z_2 are 30.2 cm, 0.266 m and 18 mm respectively.

[2]

c) Explain the steps involved in producing leak-free and aligned joints between CPVC pipe and fittings.

[2]

d) How many rolls of HDPE of 20 mm diameter would be required to supply water from the source to a village which is 80,000 mm apart from each other.	[2]
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