

4. The shadow of a tower standing on a level ground is found to be 40 km longer when the Sun's altitude is  $30^\circ$  than when it is  $60^\circ$ . Find the height of the tower?
5. Two tangents TP and TQ are drawn to a circle with center O from an external point T. Prove that  $\angle PTQ = 2\angle OPQ$ .
6. One card is drawn from a well-shuffled deck of 52 cards. Calculate the probability that the card will  
(i) be an ace (ii) not be an ace
7. The marks obtained by 30 students of class X of a certain school in a mathematics paper consisting of 100 marks are presented in table below. Find mean of the marks obtain by students:

Marks obtained ( $x_i$ )	10	20	36	40	50	56	60	70	72	80	92	95
Number of students ( $f_i$ )	1	1	3	4	3	2	4	4	1	1	3	1

8. (A) In a certain code, TRIPPLE is written as SQHOOKD. How is DISPOSE written in that code?  
(B) If train is called bus, bus is called tractor, tractor is called car, car is called scooter, scooter is called bicycle, bicycle is called moped, which is used to plough a field?

==END OF PAPER==

**BACHELOR OF VOCATION**  
Public Services  
**Subject: Mathematics and Reasoning-III**  
Subject Code: MAR-701  
Semester: Fifth  
December 2021  
Theory (External): 70 Marks  
Time: 03 Hours

**Instructions to the Students**

1. This Question paper consists of two Sections. All sections are compulsory.
2. Section A comprises 10 questions of objective type in nature. All questions are compulsory. Each question carries 2 marks.
3. Section B comprises 8 essay type questions out of which students need to do any 5. Each question carries 10 marks.
4. Read the questions carefully and write the answers in the answer sheets provided.
5. Do not write anything on the question paper.
6. Wherever necessary, the diagram drawn should be neat and properly labelled

**Roll Number**

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**SECTION -A (SHORT/OBJECTIVE TYPE QUESTIONS)**  
(10x2=20 Marks)

- A. If  $\cos A = \frac{4}{5}$ , then the value of  $\tan A$  is  
 (a)  $\frac{3}{5}$  (c)  $\frac{4}{3}$   
 (b)  $\frac{3}{4}$  (d)  $\frac{5}{3}$
- B.  $\sin(90^\circ - A) =$   
 a)  $\sin A$  (c)  $\cos A$   
 b)  $\tan A$  (d)  $\operatorname{cosec} A$
- C. Which of the following cannot be probability of an event?  
 a)  $\frac{1}{3}$  (c) 0.03  
 b) 0.1 (d) 1.3
- D. The class-mark of the class 150-160 is  
 a) 130 (c) 140  
 b) 155 (d) 143
- E. On 8<sup>th</sup> February, 2020 it was Saturday. What was the day of the week on the 1<sup>st</sup> February, 2016?  
 a) Sunday (c) Tuesday  
 b) Monday (d) Wednesday
- F. Your friend has not invited you to his marriage party. You will  
 a) Hold it against him  
 b) Ignore the whole affair  
 c) Attend the ceremony  
 d) Send him you best wishes

- G. Which of the following is not a criterion for congruence of triangles?  
 a) SAS (c) SSA  
 b) ASA (d) SSS
- H. In  $\triangle ABC$ ,  $AB = AC$  and  $\angle B = 50^\circ$ . Then,  $\angle C$  is equal to  
 a)  $40^\circ$  (c)  $80^\circ$   
 b)  $50^\circ$  (d)  $130^\circ$
- I. If three angles of a quadrilateral are each equal to  $75^\circ$ . The fourth angle is  
 a)  $150^\circ$  (c)  $45^\circ$   
 b)  $135^\circ$  (d)  $75^\circ$
- J. A series is given with one term missing. Select the correct alternative from the given are that will complete the series GRZ, KWV, OBR, SGN?  
 a) XMJ (c) WMJ  
 b) XLJ (d) WLJ

**SECTION -B (ESSAY TYPE QUESTIONS)**  
(5x10=50 Marks)

- Draw the graph of the pair of linear equations  $x - y + 2 = 0$  and  $4x - y - 4 = 0$ . Calculate the area of the triangle formed by the lines so drawn and the  $x$ -axis.
- An observer 1.5 tall is 20.5 m away from a tower 22m high. Determine the angle of elevation of the top of the tower from the eye of the observer.
- If  $\tan x = \frac{-3}{4}$  and  $\frac{3\pi}{2} < x < 2\pi$ , find the values of  
 (i)  $\sin 2x$  (ii)  $\cos 2x$  (iii)  $\tan 2x$