PRESIDENT'S OFFICE
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

FORM FOUR MIDTERM EXAMINATION

041 **BASIC MATHEMATICS**

Time: 3:00 Hours

Instructions

1. This paper consists of section A and B with total of **fourteen (14)** questions.
2. Answer **all** questions
3. Each question in section A carries six (06) marks while each question in section B carries **ten (10)** marks.
4. All necessary working and answers for each question must be shown clearly.
5. Mathematical tables and non-programmable calculators may be used
6. All communication devices and any unauthorized materials are **not** allowed in the examination room
7. Write your **Examination Number** on every page of your answer sheet.

SECTION A (60 Marks)

1. (a) Three balls ring together at a certain starting point of time. Then, they ring at the intervals of 20, 25, and 50 minutes, respectively. After what time interval of time will they ring together again?
   (b) (i) A study conducted among 300 college students showed that 21 students cannot drive. What percentage of the students can drive?
   (ii) Write percentage in part (b) (i) above in decimal.
2. (a) Two quantities P and Q are such that P = $\sqrt{2}$ - 3 and Q = $\sqrt{2}$ + 1. Use these quantities to show that $\frac{P}{Q} = 5 - 4\sqrt{2}$.
   (b) Solve for x, given that $\log_3 x + 3\log_x 3 = 4$.
3. (a) In a certain school, 50 students eat meat, 60 students eat fish and 25 eat both meat and fish. Assuming that every student eats meat or fish, find the total number of students in the school. (without drawing Venn Diagram).
   (b) How many grams are there in 0.00912 tones (t).
4. (a) Find the equation of the straight line through the point P (-2,5) and perpendicular to the line whose equation is 6x-7y = 4.
   (b) The vertices of triangle are A (1,2) B (6,2) and (5,5). Show whether its isosceles or equilateral triangle.
5. (a) A woman own a square plot of land 112.5 m long. She wants to plant trees in the entire plot. Each tree requires 6.25 m^2 of land. How many trees can she plant?

(b) Find the area of a regular pentagon inscribed in a circle of radius 8dm.

6. (a) Given that P = w$\left(\frac{1+a}{1-a}\right)$, Express the equation in terms of a .
   (b) If a*b = $a^2 - b$, find y given that 4*(2*y) = 4.
7. (a) If $y\alpha \frac{1}{x}$, fill the gaps in the gaps in the following table ;

X		1.2	8	
Y	6		1.5	0.8

(b) Kichan started a business on 1st june 2018 with a capital of 100,000/= and made the following transactions

June 2: Bought office furniture …….. 40,000/=
7: Bought goods……. 70,000/=
11: Sold goods…….. 65,000
16: Paid sundry expenses……. 30,000/=
19: Cash sales…….. 80,000/=
24: Paid wages…… 50,000/=

Required : Prepare cash account at the end of the month

8. (a) A geometric progression has $G_1 = 2$ and $G_2 = 4$. Find the sum of the first 10 terms.
   (b) The fourth term of an arithmetic progression is 11 and the sixth term is 17. Find the tenth term.
9. (a) Evaluate the following expression without using mathematical tables; $\frac{\sqrt{3}}{2}\cos 30^\circ - 2\tan 45^\circ$
   (b) From the top of a tower, the angle of depression of a point on the ground 10cm away from the base of the tower is 60°. How high is the tower?
10. (a) Solve the quadratic equation $x^2 - 8x + 7 = 0$.
    (b) A father is 32 years older than his son. After 4 years, the father's age will be twice the age of his son. Find their present ages.

SECTION B (40 Marks)

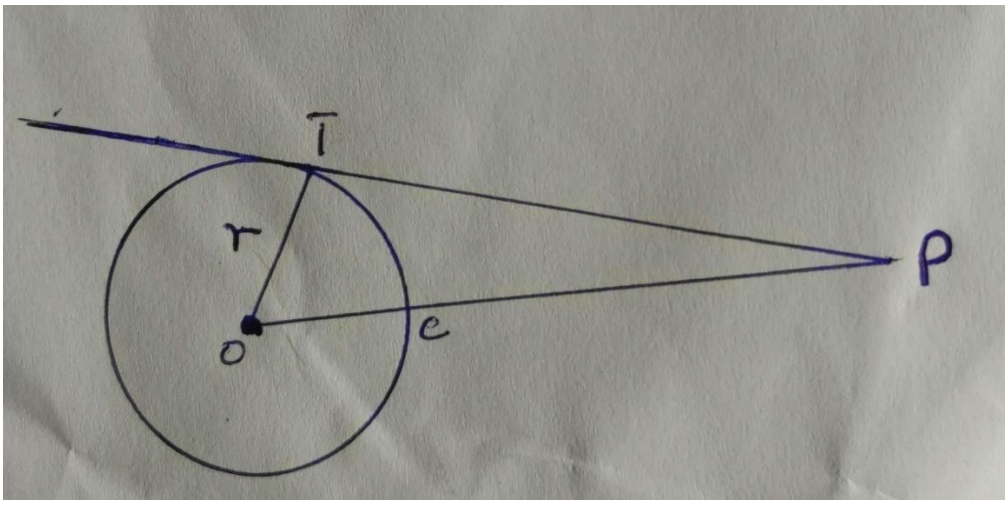
Answer **all** questions in this section

11. (a) (i)The table below shows the frequency distribution for Physics marks scored by 100 students. Use it to calculate the mean marks by using assumed mean method (use assumed mean A = 78).

Class interval	Frequency
91 – 95	0
86 – 90	1
81 – 85	6
76 – 80	10
71 – 75	15
66 – 70	34
61 – 65	22
56 – 60	10
51 – 55	2

(ii) Find the median mark.

(b) In the following figure is a tangent to a circle whose Centre at point O and the radius 5 cm . if PC is 8cm, find the length of PT



12. (a). A ship is steaming at 15 knots from point Q in western direction to point P. If the position of point P is $(40°\ S, 178°E)$ and that of point Q is $(40°S, 172°E)$, how long will the journey take?
    (b) Find the surface area of a right circular cone whose slant height is 10cm and whose base radius is 8cm (use $\pi = 3.14$).
    (c) Calculate the radius of a right circular cylinder of volume 1570 m^3 and height 20m. (use $\pi = 3.14$)

13. (a) Find the domain and range of the relation $y = \frac{1}{x+3}$.
    (b) A translation takes the origin to (-2,5) . Find where it will take (-6,6).
    (c) Reflect the point (5,3) on the line y=x.

14. (a) Given a function *f* defined as

$$f(x) = \begin{cases} -3\ if\ x \leq 1 \\ 1\ if\ 1 < x \leq 2 \\ 4\ if\ 2 < x \end{cases}$$

Draw the graph of *f* and hence state its domain and range.

(b) Find the maximum value or minimum value of the function $f(x) = 4-3x-2x^2$.