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 අගෝස්තු 2018  
 முதலாம் வருட கலைத்தேர்வு பரீட்சை (வெளிவாரி-புதிய பாடத்திட்டம்)  
 ஒகஸ்ட் 2018  
 1<sup>st</sup> YEAR (100 LEVEL) EXAMINATION IN BACHELOR OF ARTS (EXTERNAL -  
 NEW SYLLABUS) AUGUST 2018

**FNDE 102 - Basic Mathematics**

**Instructions:**

1. There are eight (08) questions in this paper. Answer any five (05) questions.
2. Time: Three (03) hours.
3. Calculators are not allowed.
4. Total marks: 100

1. (a) Simplify the following.

(i).  $(2\sqrt{5})^3$

(iii)  $\frac{(3a^2)^2}{18a^3}$

(ii).  $(3a^3b)^4$

(iv)  $(2x+1)(3x+4)$

(2.5 marks each)

(b) Factorise the following polynomials.

(i).  $4x^2 - 81$

(iv)  $x^2 + 3x - 4x - 12$

(ii).  $y^3 - 8$

(v)  $3x^2 + 6x - 72$

(iii).  $x^2 - 14x + 49$

(02 marks each)

2. (a) Solve the following.

(i).  $5(x+1) - 22 = -7$

(ii).  $\frac{2x+3}{4} = \frac{x-2}{3}$

(04 marks each)

(b) Draw the following inequalities in a number line.

(i).  $x \geq 1$

(ii)  $-3 \leq x \leq 4$

(iii)  $x \leq -1$  හෝ  $x \geq 2$

(06 marks)

(c) Solve the following inequalities. Draw them in a graph.

(i).  $3x - 4 \leq 2$

(ii).  $-5 < 4 - 2x$

(03 marks each)

3. (a) Solve the following simultaneous equations. Verify your solution by drawing the equations in a graph.

$4x + 3y = 17$

$5x - 4y = -2$

(10 marks)



- (b) A person has Rs. 2, Rs. 5 and Rs. 10 coins. He has 85 coins altogether and their total value is Rs. 400. The number of Rs.2 coins he has is five times the number of Rs. 5 coins. How many coins of each type does the person have? (10 marks)

4. Find the stationary points of the function  $y = 3x^2 - 18x - 7$ . Verify whether the stationary points are minima or maxima. Draw a graph of the function to show your results. (20 marks)

5. Solve the following limits.

(i) 
$$\lim_{x \rightarrow 1} \frac{x^2 - 1}{x - 1}$$

(ii) 
$$\lim_{x \rightarrow \infty} \frac{x^2}{1 - x^2}$$

(iii) 
$$\lim_{x \rightarrow 0} \frac{(x+5)^2 - 25}{x}$$

(iv) 
$$\lim_{x \rightarrow 2} \frac{(x^2 - 7x + 10)}{(x - 2)}$$

(05 marks each)

6. Differentiate the following functions.

(i)  $y = (2x^2 + 4x + 7)^3$

(ii)  $y = x^3(4x - 1)^4$

(iii)  $y = \frac{4x + 1}{(2x^2 + 1)^2}$

(iv)  $y = \ln(2x^4 + 9)$

(v)  $y = e^{2x}$

(04 marks each)

7. Integrate the following functions.

(i)  $\int (2x^2 - 4x^6) dx$

(ii)  $\int (7e^x + \frac{2}{x}) dx$

(iii)  $\int (2 - 4x)^9 dx$

(iv)  $\int \frac{3x}{x^2 - 1} dx$

(v)  $\int (x - 2)(x^2 + 4x + 2)^5 dx$

(04 marks each)



8. In a country town there are 3 supermarkets: P, Q and R. 60% of the population shop at P, 36% shop at Q, 34% shop at R, 18% shop at P and Q, 15% shop at P and R, 4% shop at Q and R, and 2% shop at all 3 supermarkets. A person is selected at random.

Determine the probability that the person shops at:

- (i) none of the supermarkets
- (ii) at least one of the supermarkets.
- (iii) exactly one of the supermarkets.
- (iv) either P or Q.
- (v) R, given that the person shops at either P or Q or both.

(04 marks each)