NAME: ..... COMB: .....

ST. STEPHEN'S COLLEGE BBAJJA

S.6 APPLIED MATHEMATICS

TEST 1

DURATION: 1:30Min

1. The daily number of patients visiting a certain hospital is uniformly distributed between 150 and 210.

   a) Write down the probability density function of the number of patients.

   b) Find the probability that between 170 and 194 patients visit the hospital on a particular day.

2. a) Given that X ~ N (2, 2.89), find P (X < O)

   c) The marks in an examination were normally distributed with mean μ and standard deviation σ. 20% of the candidates scored less than 40 marks and 10% scored more than 75 marks. Find the
      i) Value of μ and σ
      ii) Percentage of candidates who scored more than 50 marks.
   d) On average 15% of all boiled eggs sold in a restaurant have cracks. Find the probability that a sample of 300 boiled eggs will have more than 50 cracked eggs.

3. a) i) Obtain graphically the root of the equation $x^3 = 4$.
      ii) Derive the simplest iterative formula based on Newton Raphson method that can be used to find a better approximation to the root of the above equation.

   b) Using the value from the graph as initial approximation, find the root of the equation correct to four significant figures.

4. a) Show that that the equation $xe^x - x - 1 = 0$ has a root between 0 and 1. Hence using linear interpolation, find the root of the equation.

   b) i) Use trapezium rule with six strips to estimate

   $\int_1^2 \mathrm{x}^{-2} \log x \, dx$. Correct to two significant figures.