University Examinations 2011/2012

FIRST YEAR, FIRST SEMESTER EXAMINATIONS FOR THE DEGREE OF
BACHELOR OF SCIENCE IN MATHEMATICS AND COMPUTER SCIENCE,
BACHELOR OF SCIENCE ,BACHELOR OF SCIENCE IN COMPUTER SCIENCE AND
BACHELOR OF SCIENCE IN PUBLIC HEALTH

SMA 2104: MATHEMATICS FOR SCIENCE

**DATE: APRIL 2012**   **TIME: 2 HOURS**

INSTRUCTIONS: *Answer question **one** and any other **two** questions*

QUESTION ONE (30 MARKS)

a) Evaluate $^{10}C_4$. (3 Marks)

b) Rationalize the denominator and simplify the expression $\frac{2\sqrt{5}-3}{3\sqrt{5}-2}$. (2 Marks)

c) Determine the median and the interquartile range of the following data;
   147,151,152,151,146,148,156,154,155,157,148,148. (4 Marks)

d) Solve the following equation $2\log_5 x + \log_x 5 = 3$. (3 Marks)

e) Determine the zeros of the polynomial $2x^3 + 3x^2 - 8x - 12 = 0$. (5 Marks)

f) The sum of the first n terms of a series is given by $s_n = 2n(n + 6)$. Show that the
   terms are in arithmetic progression (A.P) and find the fifth term. (5 marks)

g) If $(x + 1)^2$ is a factor of $2x^4 + 7x^3 + 6x^2 + Ax + B$, find the values of A and B.
   (4 Marks)

h) Solve the equation $^3/_2 \log_{10} a^3 - \log_{10} \sqrt{a} - 2\log_{10} a = 4$. (4 Marks)

QUESTION TWO (20 MARKS)

a) Express;
   i. 135^0 in radians in terms of π. (2 Marks)
   ii. $\frac{11}{3}\pi$ radians in degrees. (2 Marks)

b) Solve the equation $6\cos^2 x + \cos x - 1 = 0$ for $0 \le x \le 360°$. (5 Marks)

c) Show that $\cos\theta - \cos 5\theta + \cos 9\theta - \cos 13\theta = 4\sin 2\theta \sin 7\theta \cos 4\theta$. (5 Marks)

d) In the figure θ is the centre of the circle and angle A0B=10^0, arc APB=5π cm.
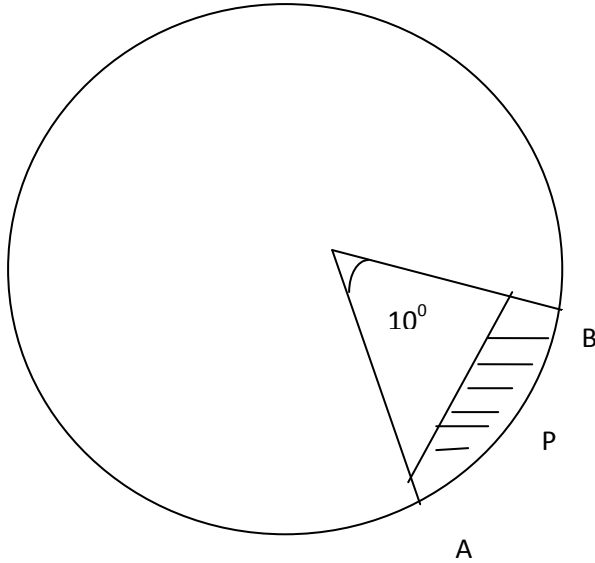
Calculate

   i.   The radius of the circle.   (3 Marks)

   ii.   The shaded area correct to 2 d.p.   (3 Marks)

QUESTION THREE (20 MARKS)

a) Determine the median and semi – inter quartile range for the data 7.5, 10, 5, 3, 2, 9, 8, 7, 4, 5, 8.5, 9.5.   (6 Marks)

b) Use the frequency distribution below to answer the questions that follow;

Length (cm)	Frequency
25-29	5
30-34	12
35-39	25
40-44	11
45-49	7

   i.   State the class boundaries of the class 40-44.   (3 Marks)

   ii.   State the modal class of the distribution.   (1 Mark

   iii. Calculate the mean and standard deviation of the distribution.   (10 Marks)

QUESTION FOUR (20 MARKS)

a) A box holds eight red and four blue beads. Three beads are taken at random from the box and not replaced. Determine the probability that;

i.　　All three are red.　　　　　　　　　　　　　　　　(2 Marks)
　　　ii.　　There are at least two blue beads.　　　　　　　　　(3 Marks)
　　　iii.　　There are at most two red beads.　　　　　　　　　(3 Marks)
b)　i)　Write the expansion of $(10+x)^5$.　　　　　　　　　　(4 Marks)
　　ii) Use the expansion above to approximate $(10.04)^5$ correct to the nearest whole
　　number.　　　　　　　　　　　　　　　　　　　　　(4 Marks)
c)　Find the sixth term in the expansion of $(2 + 3x)^8$.　　　　　(4 Marks)