OCTOBER 2023
EBS 169&169J
TRIGONOMETRY
1 HOUR 20 MINUTES

Candidate's Index Number
Signature:

UNIVERSITY OF CAPE COAST
COLLEGE OF EDUCATION STUDIES
SCHOOL OF EDUCATIONAL DEVELOPMENT AND OUTREACH
INSTITUTE OF EDUCATION

COLLEGES OF EDUCATION
FOUR-YEAR BACHELOR OF EDUCATION (B.ED)
FIRST YEAR, END-OF-SECOND SEMESTER EXAMINATION, SEPT./OCT. 2023

4TH OCTOBER 2023 **TRIGONOMETRY** **3:40 PM – 5:00 PM**

SECTION B
[40 MARKS]

Answer only TWO questions from this Section.
Please, note that if you answer more than two questions, only the first two will be marked.

1.

a. In $\Delta ABC, |BC| = 12cm, \angle ABC = 59^{\circ}$ and $\angle ACB = 73^{\circ}$. Find the length of the remaining two sides. **(7 marks)**

b. A central angle θ subtended by an arc length of 7cm and a radius of 4cm. Find: **(6 marks)**
   i. the radian measure.
   ii. the degree measure.
   iii. the area of the sector determined by θ.

c. Two towns, $P(30^{\circ}N, 42^{\circ}W)$ and $Q(30^{\circ}N, 18^{\circ}E)$ are on the surface of the earth. Find, to one decimal place the distance between P and Q along latitude $30^{\circ}N$. (Take the radius to be 6400km and $\pi = 3.14$). **(7 marks)**

2.

a. Find, without using tables or calculators the exact value of $\tan 75^{\circ}$ and leave your answer in form $a + \sqrt{3}$. **(5 marks)**

b. Show that the equation is an identity by transforming the left – hand side into the right – hand side. $(\sec\theta + \tan\theta)(1 - \sin\theta) = \cos\theta$. **(5 marks)**

c. Show that $3\cos\theta + 4\sin\theta$ may be expressed in the form $R\cos(\theta - \alpha)$, where α is acute. Find the values of R and α. **(10 marks)**

3.

a. Find the values of x in the interval $0^\circ \leq x \leq 360^\circ$ for which $\sin(2x + 30^\circ) = 0.8$. **(5 marks)**

b. Find the amplitude, the period, and the phase shift and sketch the graph of $y = 2\cos(3x - \pi)$. **(6 marks)**

c. A helicopter sets out from its base P and flies on a bearing of 123° to point Q where it changes its course to 060° and flies 18km to point R. **(9 marks)**

i. Find the size of the angle PQR.

ii. Calculate the bearing on which the helicopter must fly to return directly to its base. When the helicopter is at point R it is 22km from its starting point.

4.

a. Find the values of $\sin\theta$ and $\tan\theta$, if $\cos\theta = \frac{12}{13}$ and θ lies in the fourth quadrant. **(5 marks)**

b. Express $\cos^4 x$ in terms of values of the cosine function with exponent 1. **(5 marks)**

c. When the angle of elevation of the sun is 64°, a telephone pole that is tilted at an angle of 9° directly away from the sun casts a shadow 21feet long on level ground. Calculate the approximate length of the pole. **(10 marks)**