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UNIVERSITY OF VOCATIONAL TECHNOLOGY

Faculty of Training Technology

Bachelor of Technology in Information & Communication Technology

(Multimedia & Web, Software, Network) 2015 / 2016 (B1)

Year I – Semester- I Examination - September -2015

Mathematics EE10404

Instructions: Answer o5 Questions

Duration : 03 Hours

1.

a. Find Sin A, Cos A and Tan A values for the angles 30^0, 45^0, and 90^0, write your answers in the following format.

A	30^0	45^0	90^0
Sin A			
Cos A			
Tan A			

b. Write an expression for Sin (A + B) and Cos (A + B) and hence find the values of Sin 120^0, Cos 120^0, and Tan 120^0.

c. Write an expression for Tan (A + B), by considering $165^0 = 120^0 + 45^0$, show that Tan 165^0 = $\overline{\quad}$ – 2

2.

a. Coordinates of four points are given as A (6,-1), B (4, 3), C (-5, 2) and D (-7, 6). Find the gradient of the lines AB and CD.
State whether AB is parallel or perpendicular to CD. Evaluate lengths AB and CD.
Show that AB = CD.

b. P (-1, 3) and Q (11, k), if PQ = 13 units, find the possible two values of k.

3.

a. An architect designs a rectangular window such that the width of the window is 18 inch. It is less than the height. If the perimeter of the window is 180 inch, what are the dimensions of the window. Find the area of the window.

b. The manager of the theater estimates that the profit P in hundreds of dollars per show, can be represented by $P = -(t-12)^2 + 100$, where t ($t > 0$) is the price of a ticket in dollars.
Find,
   i. For what price of the ticket, the profit is zero.
   ii. For what price of the ticket, the profit is maximum.
   iii. Draw the graph of the profit function.

4.

a. Convert the following numbers to decimal form.
11001.01_2, 70.42_8, $3B.2E_{16}$.
b. Convert 252_{10} to equivalent Binary, Octal and Hexadecimal number.
c. Convert 54.875_{10} to equivalent Binary, Octal and Hexadecimal number.

5.

a. Expand $(1+2x)^5$ and $(2+3x)^4$ using Binomial Theorem.

b. Expand $(3 - –)^4$ using Binomial Theorem. Check your result by substituting x = 1.

6.

a. $Z_1 = 1 + j$, $Z_2 = 1 – j$, express each $(Z_1 + Z_2)$, $(Z_1 – Z_2)$, $Z_1 Z_2$ and Z_1 / Z_2 in (a + jb) form.

b. Convert each $(Z_1 + Z_2)$, $(Z_1 – Z_2)$, $Z_1 Z_2$ and Z_1 / Z_2 to Polar form.

c. If z = —— , find $z + –$ in (a + jb) form.

7.

a. P =
   i. Find the determinant of P (|P|).
   ii. Find the Transpose of P (P^T).
   iii. Hence find $P^T.P$ and $P.P^T$.
   iv. Find the Inverse of P (P^{-1}).

b. P =
   i. Find $(P^T)^{-1}$
   ii. Show that $(P^T)^{-1} = (P^{-1})^T$
   iii. Find the 2x2 diagonal matrix B such that PBP^T =