

# V71/V72/BCP101/BAM101/EE/20160518

Time : 3 Hours

Marks : 80

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## Instruction :

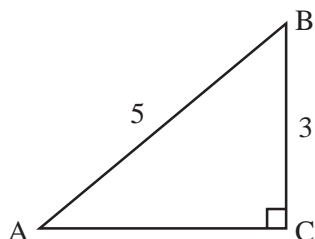
1. All Questions are Compulsory.
  2. Each Sub-question carry 5 marks.
  3. Each Sub-question should be answered between 75 to 100 words. Write every questions answer on separate page.
  4. Question paper of 80 Marks, it will be converted in to your programme structure marks.
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1. Solve any **four** sub-questions.

a) If the matrices  $A = \begin{pmatrix} 2 & 3 \\ 1 & 0 \end{pmatrix}$  and  $B = \begin{pmatrix} 2 & 3 \\ 0 & 1 \end{pmatrix}$  then show that  $A \times B \neq B \times A$ . 5

b) The 6<sup>th</sup> term of an A.P. is 17 and the 13<sup>th</sup> term is 38. Determine the 19<sup>th</sup> term. 5

c) In triangle ABC shown in the figure, find  $\sin A$ ,  $\cos A$ ,  $\tan A$ ,  $\sin B$ ,  $\cos B$ . 5



d) The frequency distribution for the value of resistance in ohms of 48 resistors is as shown. Determine the mean value of resistance. 5

20.5 - 20.9	3
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21.0 - 21.4	10
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21.5 - 21.9	11
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22.0 - 22.4	13
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22.5 - 22.9	9
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23.0 - 23.4	2
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e) Solve the cubic equation  $x^3 - 2x^2 - 5x + 6 = 0$  by using the factor theorem. 5

2. Solve any **four** sub-questions.
- a) Solve the following simultaneous equations using Cramer's rule. 5  
 $x+y+z = 4, 2x-3y+4z = 33, 3x-2y-2z = 2.$
- b) Find the differential coefficient of 5  
 i)  $y = 3x^2 \sin 2x$   
 ii)  $f(t) = 2 \cos 3t$  with respect to the variable.
- c) A  $\Delta ABC$  has sides  $a = 9.0$  cm,  $b = 7.5$  cm and  $c = 6.5$  cm. Determine the three angles and its area. 5
- d) The probability of a component failing in one year due to excessive temperature is  $\frac{1}{20}$ , due to excessive vibration is  $\frac{1}{25}$  and due to excessive humidity is  $\frac{1}{50}$ . Determine the probabilities that during a one year period of component. 5  
 i) Fails due to excessive temperature and excessive vibration.  
 ii) Fails due to excessive vibration or excessive humidity.
- e) Find the equation of tangent and normal to the curve  $y = 3x^2 - 2x$  at the point (2, 8). 5
3. Solve any **four** sub-questions.
- a) Convert  $\frac{2x^2 - 9x - 35}{(x+1)(x-2)(x+3)}$  into the sum of three partial fractions. 5
- b) Determine the tenth term of the series. 5  
 i) 3, 6, 12, 24, .....  
 ii) 5, 10, 20, 40, .....
- c) Evaluate the following expression, correct to 4 significant figures by using calculator. 5  

$$\frac{4 \sec 32^\circ 10' - 2 \cot 15^\circ 19'}{3 \operatorname{cosec} 63^\circ 8' \cdot \tan 14^\circ 57'}$$
- d) Determine the mean, median and mode for the set 5  
 2, 3, 7, 5, 5, 13, 1, 7, 4, 8, 3, 4, 3.
- e) In a  $\Delta xyz$ ,  $\angle y = 51^\circ$ ,  $\angle z = 67^\circ$  and  $yz = 15.2$  cm. Solve the triangle and find its area. 5

4. Solve any **four** sub-questions.
- a) Solve the following simultaneous equations using determinants.  
 $3x - 4y = 12$ ,  $7x + 5y = 6.5$ . 5
- b) Using Pascal's triangle method, Determine the expansion of : 5
- i)  $(2p - 3q)^5$
- ii)  $(2+x)^7$
- c) Prove that  $\sqrt{\frac{1 - \sin x}{1 + \sin x}} = \sec x - \tan x$ . 5
- d) Determine the standard deviation from the mean of the set of numbers 5, 6, 8, 4, 10, 3. Correct to 4 significant figures. 5
- e) Solve  $6 \cos^2\theta + 5 \cos\theta - 6 = 0$ , for the values of  $\theta$  from  $0^\circ$  to  $360^\circ$ . 5

