

MAHARASHTRA STATE BOARD OF VOCATIONAL EDUCATION EXAMINATIONS, MUMBAI

Examination—April, 2016 (Two Year Diploma Courses)

GROUP—ALL GROUPS

[TIME ALLOWED — 3 HOURS]

(MARKS — 70)

ELECTIVE-I—APPLIED MATHEMATICS (THEORY)

Marks

1. (a) Fill in the blanks (any eight) :—

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- (i) $\operatorname{Cosec} \theta \times \dots = 1$.
- (ii) Each object in a set is called an or a of set.
- (iii) Three or more distinct lines are said to be if they pass through a common points.
- (iv) $\lim_{x \rightarrow 0} \log(1 + x) = \dots$
- (v) Let $y = f(x)$ be a function. Then the derivative $f'(x)$ is defined by
- (vi) $\int x^n dx = \dots$ n is not equal to -1.
- (vii) A complex number whose both real and imaginary parts are zero is the complex number.
- (viii) The rank of a non singular matrix of order of $N \times N$ is
- (ix) The function $f(x) = x^3 - 6x^2 + 5$ is maximum at $x = \dots$
- (x) $\log_a (m \cdot n) = \dots + \dots$

(b) State true or false (any eight) :—

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- (i) The set of complex numbers is denoted by D.
- (ii) The branch of numerical method of mathematic is a part of applied mechanic.
- (iii) The probability can be denoted by $A \cdot b$.
- (iv) If $\frac{d}{dx} (f(x) \cdot g(x)) = g(x)$; then we write $f'(x) \cdot g(x) + f(x) \cdot g'(x) = f(x) + c$.
- (v) The moment tell us whether a distribution is symmetric or not.
- (vi) A straight line representing the real number s is called the index line.
- (vii) The concept of limits is very important concept in calculation.
- (viii) Face value of a Bills the amount specified in it is mines due.
- (ix) A number I defined as $i^2 = -1$ so that $I = \sqrt{-1}$ is called imaginary unit.
- (x) The relation, if any, between the two values of the variable is called the correlation.

2. Attempt any two of the following :—

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- (a) Solve by log table $0.8234 \div 17.65$.
- (b) $4 \cdot \cot 45^\circ - \sec 260^\circ + \sin 230^\circ$.
- (c) Differentiate the following with respect to x.

$$x^4 - 3x^2 - 7x + 4 \sqrt{x} - 5$$

- (d) Integrate the following w.r.t x

$$5x^4 - 3x^2 + 4 \sin x - (5/x^2) + (6/x^3).$$

[Turn over]

3. Attempt any *two* of the following :—

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(a) Prove the following :—

$$\lim_{n \rightarrow 2} \frac{x^2 - x^{-2}}{x^3 - 7} = 0$$

(b) Construct the forward difference table for the function given by

X	1	3	5	7	9
Y	0	8	24	48	80

(c) Verify that $y = Ae^x + Be^{-2x}$ is the gernal solution of $\frac{d^2y}{dx^2} + \frac{dy}{dx} - 2y = 0$

(d) (i) find $\sqrt{64.1}$ approximately.

(ii) find $\tan^{-1}(0.99)$ approximately.

4. Give brief answer and give example (any *two*) :—

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(a) Three coins are tossed . Find the number of all possible outcomes.

(b) Find the equation to the hyperbola which has the lines $x+4y-5=0$ and $2x-3y+1=0$ for its asymptotes and which passes through the (1, 2).

(c) What are the different kinds of agents ?

(d) Explain Binomial Theorem.

5. Write short notes on any *four* of the following :—

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(a) Need for complex numbers

(b) Types of sets

(c) Application of Boolean Algebra to Switching Circuit.

(d) Write short notes on Event and its types.

(e) Rule of Integration.