UNIVERSITY OF THE PUNJAB

Seventh Semester – 2019

Examination: B.S. 4 Years Program

Roll No. in Fig. .....

Roll No. in Words. .....

.....

.....

Signature of Supdt.:

PAPER: Mathematics (Advance)

Course Code: BBA-403 Part–I (Compulsory)

MAX. TIME: 30 Min.

MAX. MARKS: 10

Attempt this Paper on this Question Sheet only.

Please encircle the correct option. Division of marks is given in front of each question.

This Paper will be collected back after expiry of time limit mentioned above.

Q.1. Encircle the right answer, cutting and overwriting is not allowed. (1x10=10)

(i) If $f(x) = sinx + cosx$, then $f'(0) = ...$
(a) -1 (b) 1 (c) 0 (d) None of these

(ii) If $y = x^4 + 2x^2 + 2$, then $dy/dx = ...$
(a) $x\sqrt{(y-1)}$ (b) $2x\sqrt{(y-1)}$ (c) $4x\sqrt{(y-1)}$ (d) None of these

(iii) For a function $f(x)$, if $f'(c) = 0$ & $''(c) > 0$ then $f(x)$ has ... at $x = c$
(a) relative maxima (b) relative minima (c) point of inflection (d) None of these

(iv) If $y = e^{10x}$ then $y''' = ...$
(a) $10e^{10x}$ (b) $100e^{10x}$ (c) $1000e^{10x}$ (d) None of these

(v) If $f(x) = 3 + x$, then
(a) $f'(0) \neq f'(1)$ (b) $f'(0) = f'(1)$ (c) $f'(0) > f'(1)$ (d) None of these

(vi) If $\int \frac{sec^2 x}{tanx} dx = ...$
(a) $ln(tanx) + c$ (b) $ln(secx) + c$ (c) $sec\frac{1}{x} + c$ (d) None of these

(vii) $\int \frac{e^x}{e^x - 1} dx = ...$
(a) $ln|1 - e^x| + c$ (b) $ln|1 + e^x| + c$ (c) $ln|e^x - 1| + c$ (d) None of these

(viii) $\int_a^b f(x)f'(x)dx = ...$
(a) $f(b) - (a)$ (b) 0 (c) $1/2(f(b)^2 - f(a)^2)$ (d) None of these

(ix) If $\int \frac{f'(x)}{f(x)} dx$ is equal to
(a) $ln(f(x)) + c$ (b) $ln(f'(x)) + c$ (c) $\frac{(f(x))^2}{2} + c$ (d) None of these

(x) $\int_0^1 \frac{dx}{1+x^2} = ...$
(a) $\frac{\pi}{6}$ (b) $\frac{\pi}{4}$ (c) $\frac{\pi}{3}$ (d) None of these

UNIVERSITY OF THE PUNJAB

Seventh Semester – 2019

Examination: B.S. 4 Years Program

Roll No. .....

PAPER: Mathematics (Advance)

Course Code: BBA-403 Part – II

MAX. TIME: 2 Hrs. 30 Min.

MAX. MARKS: 50

ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED

Q.2. Give short answers to the following questions. (10x2=20)

(i) Find $\frac{dy}{dx}$ if $x^2 + y^2 = 1$.

(ii) Diferentiate $sin\sqrt{x} + \sqrt{sinx}$ w.r.t. x.

(iii) Find $\frac{dy}{dx}$ if $y = ln(x + \sqrt{x^2 + 1})$.

(iv) Find the first order partial derivative of $f(x, y) = xysinx$.

(v) Diferentiate $sinx$ w.r.t. $cotx$.

(vi) Solve the differential equation $\frac{dy}{dx} = 3x^2$; $y(1) = -1$.

(vii) Find the change in $y = x^2 + 2x$ when x changes from 2 to 2.18.

(viii) If $y = e^{-x}sin3x$ find y''.

(ix) Evaluate the integral $\int_0^1 (\sqrt{x} + 1)^2 dx$.

(x) Evaluate the integral $\int (x - 1)(x - 3)dx$.

Q.3 State 2^{nd} derivative test and find the extreme values of the function $f(x) = 3x^2 - 4x + 5$. **(6)**

Q.4 Find the extreme values of $f(x, y, z) = x + y + z$ subject to $g(x, y, z) = x^2 + y^2 + z^2 - 4 = 0$ by using Lagrange Multipliers. **(6)**

Q.5 If $x = acos^3\theta, y = bsin^3\theta$ then show that $a\frac{dy}{dx} + btan\theta = 0$. **(6)**

Q.6 Use numerical integration to find the approximate value of $\int_0^1 \frac{1}{\sqrt{x^2+1}} dx$ with $n = 4$. **(6)**

Q.7 A random variable X has probability density function **(6)**

$$f(x) = \begin{cases} c\sqrt{x}, & \text{if } 0 \leq x \leq 1, \\ 0, & \text{if otherwise.} \end{cases}$$

Find (i) Find c (ii) $P(\frac{1}{2} \leq x \leq 1)$.