Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER I
SESSION 2019/2020

COURSE NAME	:	CALCULUS
COURSE CODE	:	BWD 11002
PROGRAMME CODE	:	BWD
EXAMINATION DATE	:	DECEMBER 2019 / JANUARY 2020
DURATION	:	2 HOURS 30 MINUTES
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

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THIS QUESTION PAPER CONSISTS OF **FOUR (4)** PAGES

Q1 (a) Evaluate

(i) $\lim_{x\to\infty} f(x) = \frac{1}{x}$ (ii) $\lim_{t\to 0} = \frac{\sqrt{4+t}-2}{t}$

(6 marks)

(b) Find x so that $f(x)$ discontinuous .

$$f(x) = \frac{x^2+4}{x-2}$$

(4 marks)

(c) Find a so that $f(x)$ continuous for any x.

$$f(x) = \begin{cases} x^2 - 1, & x < 3 \\ 2ax, & x \leq 3 \end{cases}$$

(5 marks)

(d) Differentiate the following functions with respect to x.

(i) $y = xe^{2x}$

(4 marks)

(ii) $(\sin(2x))y^2 = x$

(6 marks)

Q2 (a) Given $f(x) = 9x^{\frac{2}{3}}$.

(i) Write the expression of $f'(x)$.

(ii) Find the value of x when $f(x) = 36$.

(iii) Find the value of $f'(x) + f''x$.

(12 marks)

(b) Find minimum or maximum points of $y = xe^x$.

(5 marks)

(c) Let $f(x) = \sin x$.

(i) Find all critical points of $f(x)$.

(ii) Determine whether the critical points is minimum, maximum or inflection point.

(iii) Sketch the graph of $f(x)$. Label the minimum, maximum or inflection points.

(8 marks)

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Q3 (a) Evaluate these integrals.

(i) $\int \frac{e^{5x}}{e^{3x}} dx$.

(7 marks)

(ii) $\int_0^{\pi} \frac{\sin 2x}{2\cos x} dx$.

(8 marks)

(b) Given $y = x\sqrt{x+1}$.

(i) Show that $\frac{dy}{dx} = \frac{3x+2}{2\sqrt{x+1}}$.

(ii) Hence, evaluate $\int_3^8 \frac{3x+2}{\sqrt{x+1}} dx$.

(10 marks)

Q4 (a) Find the volume of solid as shown in **Figure Q4(a)** that results when the shaded region is revolved about the x-axis.

(10 marks)

(b) Find the radius and height of the right circular cylinder of largest volume that can be inscribed in a right circular cone with radius 6 inches and height 10 inches as in **Figure Q4(b)**.

(15 marks)

- END OF QUESTIONS –

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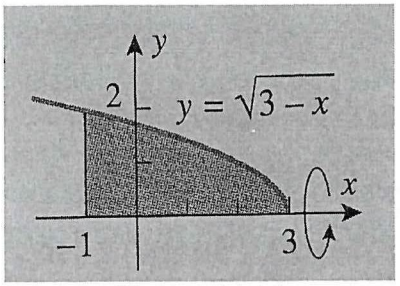

Figure Q4 (a)

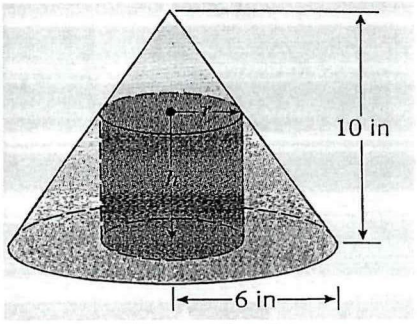

Figure Q4 (b)

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