

International Islamic University Chittagong

Department of Economics & Banking

Midterm Examination, Spring-2022

Program: BSS (Hons) in Economics & Banking

Course Code: MATH-3503

Course Title: Mathematics for Economists

Time: 1.5 hours Full Marks: 30

[Answer any Three of the following questions. All parts of a question must be answered sequentially. Figures in the right margin indicate full marks.]

- | | Marks |
|---|-------|
| 1(a). Distinguish between definite and indefinite integration. | 2.0 |
| 1(b). Evaluate the following: | 8.0 |
| (i) $\int (x^4 - 2x + \sqrt{x}) dx$ | |
| (ii) $\int \frac{2x+4}{x^2+4x+8} dx$ (iii) $\int x \ln x dx$ | |
| 2(a). Given the marginal propensity to import $M'(Y) = 0.15$ and the information given that when $M = 20$ then $Y = 0$, find the import function $M(Y)$. | 3.0 |
| 2(b). Evaluate the following: | 7.0 |
| i) $\int_4^2 x^2 \left(\frac{1}{3}x^3 + 1\right) dx$ | |
| ii) $\int_0^1 x e^{-(x^2+3)} dx$ | |
| iii) $\int_0^1 (2\alpha y + \beta)(\alpha y^2 + \beta y)^3 dx$ | |
| 3(a). Given the marginal propensity to savings $s'(Y) = 0.2 - 0.1Y^{-1/2}$ and the information given that when $C = Y$ then $Y = 100$, find the consumption function $C(Y)$ and saving function $S(Y)$. | 4.0 |
| 3(b). The demand and supply function for a product are given by, $P = 300 - 6q - q^2$ and $P = q^2 + 4q$ respectively. Compute the consumer's and producer's surpluses at market equilibrium. | 6.0 |
| 4(a). Why differential equation is important in the study of economics? Discuss. | 2.0 |
| 4(b). Estimate complementary function (y_c), particular integral (y_p), general solution and definite solution of the following differential equations: | 8.0 |
| i) $4 \frac{dy}{dt} + 5y = 6$ | |
| ii) $\frac{dy}{dt} - 2y = 3; y(0) = 4$ | |
- Check the validity of your answer.