



# UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Sixth Semester – 2019

Paper: Mathematical Economics II

Course Code: ECON-308 Part – I (Compulsory)

Time: 15 Min. Marks: 10

Roll No. in Fig. ....

Roll No. in Words. ....

Signature of Supdt.: .....

**ATTEMPT THIS PAPER ON THIS QUESTION SHEET ONLY.**

**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 correct choice.**

**(1x10=10)**

- (i) The reverse process of derivative is called:  
(a) Definite integral (b) improper integral  
(c) indefinite integral (d) None of these
- (ii) When two limits of integration are identical the value of the definite integral is:  
(a) one (b) zero  
(c) infinite (d) all of these
- (iii) If the equation is  $\frac{dy}{dx} = 2$  then particular integral is:  
(a) 2 (b)  $2t$   
(c) Zero (d)  $2t^2$
- (iv) The differential equation of the form:  $\frac{dy}{dt} + ty = 3ty^2$  is called:  
(a) First order difference equation (b) Second order difference equation  
(c) Simultaneous differential equation (d) Bernoulli equation
- (v) The value of  $\cos\left(\frac{3\pi}{4}\right)$  is:  
(a)  $\frac{1}{\sqrt{2}}$  (b)  $-\frac{1}{\sqrt{2}}$   
(c)  $\frac{1}{2}$  (d)  $\frac{\sqrt{3}}{2}$
- (vi) The integration of one (1) with respect to x is:  
(a) x (b) y  
(c) zero (d) constant
- (vii) If the slope of supply and demand curve are same then the time path will be:  
(a) Explosive (b) Damped  
(c) uniform (d) all of these
- (viii) In Solow Growth model output is function of:  
(a) Capital (b) Labor  
(c) Land (d) Capital and Labor
- (ix) The relationship between the rate of growth of money wage and the rate of unemployment is:  
(a) Positive (b) Negative  
(c) Positive & Negative (d) None of these
- (x) Particular integral ( $y_p$ ) of the equation  $y''(t) = -10$  is  
(a)  $-10t^2$  (b)  $-10t$   
(c)  $-5t$  (d)  $-5t^2$



**ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED**

- Q.2 Write short answers. (5x4=20)
- (i) Solve:  $\int \ln x \, dx$
  - (ii) Given the demand function  $P_d = 25 - Q^2$  and supply function  $P_s = 2Q + 1$ . Assuming pure competition find the consumer's surplus.
  - (iii) Define integrating factor.
  - (iv) For second order differential equation  $y''(t) + a_1y'(t) + a_2y = 0$ . Show that sum of roots is  $-a_1$  and product of roots is  $a_2$ .
  - (v) Define Convergence and the Roth theorem.
- Q.3 For a general exact differential equation  $Mdy + Ndt = 0$ , derive the formula for the general solution of an exact differential equation:
- $$\int Mdy + \int Ndt - \int \left( \frac{\partial}{\partial t} \int Mdy \right) dt = 0 \quad 10$$
- Q.4 Find the polar and exponential forms of the following complex numbers:
- (a)  $\frac{3}{2} + \frac{3\sqrt{3}}{2}i$
  - (ii)  $4(\sqrt{3} + i)$  5+5=10
- Q.5 Find the general solution of:
- $$y_{t+2} + \frac{1}{4}y_t = 5 \quad 10$$