

## **Rules and pattern of Entrance Examination for M.Phil. (Economics), 2017**

The total marks in the entrance test will be 100. The entrance test questions will consist of two Groups.

**Group A:** Domain Knowledge in Economics (50 Marks)

**Group B:** Research Methodology (50 Marks)

1. The questions from **Group A** will be of MCQ type. Each question will carry 2 marks and there will be 25 questions. The correct question will be awarded 2 marks and an incorrect question will be awarded (-0.5) marks. Correct answer option shall have to be marked by black/blue ball point pen.
2. The questions from **Group B** will be of short answer type and there will be no negative marking.
3. The duration of the examination is two and half hours.
4. The 25 questions of **Group A** will be distributed over three topics: (A) Micro economics (10 questions); (B) Macroeconomics (10 questions); (C) Indian Economy (10 questions).
5. The Questions of **Group B** will be distributed over four topics (A) Mathematics (10 marks); (B) Statistics ( on Probability and statistical Inference) ( 10 marks) (C) Econometrics (15 marks) (D) Data Analysis (15 marks)
6. A composite score for each examinee will be computed on the basis of the following formula:  
Composite Score = Marks obtained in the written examination +15.  
Merit list shall be prepared on the basis of the composite score.
7. In case of ties in the composite score, ranking will be done on the basis of number of incorrect answers from Group A of written examination.
8. Yet unresolved ties shall be broken on the basis of aggregate percentage of marks obtained at the postgraduate level.

**M.Phil. Admission Test, 2017**

**Economics**

**Model Question**

**Group A**

**Domain Knowledge in Economics**

**Correct answer is as marked in black.**

**Micro Economics**

1. Consider a utility function  $U = x^3 y^6$ . What is the indirect utility function if prices of x and y and income are denoted by  $p_x, p_y$  and M respectively?

(i)  $\frac{M}{p_x p_y}$  o

(ii)  $\frac{2M}{9p_x p_y}$  •

(iii)  $M p_x p_y$  o

(d) It cannot be ascertained on the basis of the given information. o

**Macro Economics**

2. Endogenous growth model differs from standard neo-classical one sector growth models because:

(i) Production function is non linear in inputs o

(ii) Production function is non-linear in efficiency of labour factor o

(iii) Production factor is linear in capital stock •

(iv) Production function is linear in labour 0

3. Consider an economy where there are a large number of identical individuals, who sell labour at the money wage rate  $W$  and spend their entire wage income on consumption. The average price of consumption goods is  $P$ . Individuals' profit income is nil. The utility function of the representative individual is  $U = 0.5C^{0.5} - L$ , where  $C$  denotes consumption in real terms and  $L$  denotes supply of labour. The number of individuals in the economy is normalized to unity. All markets are perfectly competitive. The aggregate labour supply function of the given economy is given by

(i)  $1/16$  0

(ii)  $\frac{1}{16} \left( \frac{W}{P} \right)^{-1}$  •

(iii)  $\frac{1}{16} \frac{W}{P}$  0

(iv)  $1/8$  0

### Indian Economy

4. Which of the following activities is not included in the Index of Industrial Production of India?

(i) Manufacturing. 0

(ii) Construction. •

(iii) Mining. 0

(iv) Electricity 0

5. Which of the following pairs is NOT correctly matched:

(i) Rangarajan Committee : Balance of Payments 0

(ii) Kelkar Committee : Tax Reforms 0

(iii) Tarapore Committee : Capital Account Convertibility 0

(iv) Chakravarty Committee : Power Sector •

**Group B**

**Research Methodology**

1. For each of the relations below explain determine which of the three conditions of equivalence hold:
  - a. For  $(x_1, y_1), (x_2, y_2) \in R_2$ , define  $(x_1, y_1) \sim (x_2, y_2)$  if  $2(y_1 - x_1) = 3(y_2 - x_2)$ .
  - b. Let P be the set of all people living in North America. For  $p, q \in P$ , define  $p \sim q$  if p is the sister of q.

2.5+2.5
2. Let f be given by  $f(x) = \sqrt{4-x}$  for  $x \leq 4$  and let g be given by  $g(x) = x^2$  for all  $x \in \mathbb{R}$ . Give the domains of  $f + g$ ,  $fg$ ,  $f \circ g$  and  $g \circ f$ .  
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3. The mean of a normal distribution is 50 and 5% of the values are greater than 60. Find the standard deviation of the distribution (Given that the area under standard normal curve between  $z=0$  and  $z=1.64$  is 0.45).  
5
4. A sample of 100 possess mean of 3.5 inches with a standard deviation of 1.9 inches. Test whether the sample is from a population with mean 3.25 inches at 5% level of confidence.  
5
5. Consider the following two equations model:

$$y_1 + \alpha_{12}y_2 + \beta_{11}x_1 = u_1$$

$$\alpha_{21}y_1 + y_2 + \beta_{21}x_1 = u_2$$

Where  $y_1$  and  $y_2$  are endogenous,  $x_1$  exogenous non-stochastic variables, and  $u_1$  and  $u_2$  are disturbance terms, independent in time, with

$$u = \begin{pmatrix} u_1 \\ u_2 \end{pmatrix} \quad E(u) = V(u) = \sum \otimes I_T \quad \Sigma = \begin{pmatrix} \sigma_1^2 & \sigma_{12} \\ \sigma_{21} & \sigma_2^2 \end{pmatrix}$$

- a. Establish whether the following restrictions are sufficient to identify the model
- $$\alpha_{12} + \alpha_{21} = 2$$
- $$\beta_{21} = 2\beta_{11}$$

- b. Describe the procedure for estimating the model while incorporating the restrictions.

4+4

6. Prove that: if  $\sqrt{N}(\hat{\theta}_N - \theta) = O_p(1)$ , then  $\hat{\theta}_N = o_p(N^{-c})$  for any  $0 \leq c < \frac{1}{2}$ , where  $\{\hat{\theta}_N : N = 1, 2, \dots\}$  is a sequence of estimators of parameter  $\theta$ .

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7. In a socio-economic survey, the monthly incomes (measured in Rs/000) earned by the households of three communities (viz. SC/ST, OBC and General) are given in the following table.

SC/ST	OBC	General
10	10	20
11	12	25
15	18	25
20	17	40
10	16	10
8	16	15
7	17	15
6	11	10
9	14	10
14	9	20
Mean=11	Mean=14	Mean=19

Given the above table, answer the following:

- (a) In which social group, the income distribution is found to be more skewed?
- (b) Find the variance of income of different social groups. Does higher variance always lead to higher income inequality? Give reasons.
- (b) What is the test statistic to be used if you are interested to compare the mean income between SC/ST and OBC communities? What test statistic do you suggest if there are more than two groups?

5+5+5