

8

QUESTION PAPER SERIES CODE
<b>B</b>

Centre Name : \_\_\_\_\_

Roll No. : \_\_\_\_\_

Name of Candidate : \_\_\_\_\_

**S A U**

**Entrance Test for M.Phil./Ph.D. (Economics), 2015**

**[ PROGRAMME CODE : PEC ]**

Time : 3 hours

Maximum Marks : 100

**INSTRUCTIONS FOR CANDIDATES**

*Candidates must carefully read the following instructions before attempting the Question Paper :*

- (i) Write your Name, Roll Number and Centre Name in the space provided for the purpose on the top of this Question Paper and in the OMR/Answer Sheet.
- (ii) This Question Paper has Two Parts : Part—A and Part—B.
- (iii) Part—A (Objective-type) has 25 questions of **two** marks each. All questions are compulsory.
- (iv) **One-fourth of marks assigned to any question in Part—A will be deducted for wrong answers in multiple-choice questions.**
- (v) Part—B (Subjective/Essay-type/Long Answer) has 10 questions out of which 5 questions are to be answered. Each question carries **ten** marks.
- (vi) **Please darken the appropriate Circle of 'Question Paper Series Code' and 'Programme Code' on the OMR Sheet in the space provided.**
- (vii) Part—A (Multiple Choice) questions should be answered on OMR Sheet and answers for Part—B should be written in the Answer Book.
- (viii) Answers written by the candidates inside the Question Paper will NOT be evaluated.
- (ix) Calculators and Log Tables may be used. Mobile Phones are **NOT** allowed.
- (x) A page at the end has been provided for Rough Work.
- (xi) **Return the Question Paper and the OMR/Answer Sheet to the Invigilator at the end of the Entrance Test.**
- (xii) **DO NOT FOLD THE OMR/ANSWER SHEET.**

/8-B

**INSTRUCTIONS FOR MARKING ANSWERS IN THE 'OMR SHEET'**

**Use BLUE/BLACK Ballpoint Pen Only**

1. Please ensure that you have darkened the appropriate Circle of 'Question Paper Series Code' and 'Programme Code' on the OMR Sheet in the space provided.

**Example :**

**Question Paper Series Code**

Write Question Paper Series Code A or B and darken appropriate circle.

	A or B
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(A)

**Programme Code**

Write Programme Code out of 14 codes given and darken appropriate circle.

Write Programme Code

MEC	<input type="radio"/>	MAM	<input type="radio"/>	PCS	<input type="radio"/>
MSO	<input type="radio"/>	MLS	<input type="radio"/>	PBT	<input type="radio"/>
MIR	<input type="radio"/>	PEC	<input checked="" type="radio"/>	PAM	<input type="radio"/>
MCS	<input type="radio"/>	PSO	<input type="radio"/>	PLS	<input type="radio"/>
MBT	<input type="radio"/>	PIR	<input type="radio"/>		

2. Use only Blue/Black Ballpoint Pen to darken the Circle. Do not use Pencil to darken the Circle for Final Answer.
3. Please darken the whole Circle. ●
4. Darken ONLY ONE CIRCLE for each question as shown below in the example :

**Example :**

Wrong	Wrong	Wrong	Wrong	Correct
● (b) (c) ●	⊗ (b) (c) d	⊗ (b) (c) ⊗	● (b) (c) ●	a (b) (c) ●

5. Once marked, no change in the answer is allowed.
6. Please do not make any stray marks on the OMR Sheet.
7. Please do not do any rough work on the OMR Sheet.
8. Mark your answer only in the appropriate circle against the number corresponding to the question.
9. **One-fourth of marks assigned to any question in Part—A will be deducted for wrong answers in multiple-choice questions.**
10. Write your six digits Roll Number in small boxes provided for the purpose; and also darken appropriate circle corresponding to respective digits of your Roll Number as shown in the example below.

**Example :**

**ROLL NUMBER**

1	3	5	7	2	0
●	1	1	1	1	1
2	2	2	2	●	2
3	●	3	3	3	3
4	4	4	4	4	4
5	5	●	5	5	5
6	6	6	6	6	6
7	7	7	●	7	7
8	8	8	8	8	8
9	9	9	9	9	9
0	0	0	0	0	●

**PART—A**

Answer **all** questions

1. Given the following information :

<i>Indicators</i>	<i>Years</i>	
	<i>2012-2013</i>	<i>2013-2014</i>
Nominal GDP	58998	63000
Real GDP	54821	57000

The rate of inflation will be

- (a) 2.78 percent  
(b) 1.70 percent  
(c) 2.10 percent  
(d) 0.50 percent
2. Historically, the premium in the rate of return in stock markets over the less risky bond markets have been much higher than can be explained by standard economic theory with reasonable rate of risk aversion. Which of the following factors might explain a part of this unusually high risk premium?  
(a) Non-availability of adequate number of assets to diversify risk  
(b) Presence of non-diversifiable risks  
(c) Behavioural biases  
(d) All of the above
3. A theory of investment has used a function  $W$  defined for all  $T > 0$  by  $W(T) = \frac{K}{T} \int_0^T e^{-\delta t} dt$  ( $K$  and  $\delta$  are strictly positive). By evaluating the integral, we can conclude that  $W(T)$  lies in the interval  
(a)  $[0, T]$   
(b)  $[T, K]$   
(c)  $[0, K]$   
(d)  $[K, T]$
4. Which of the following sets is not convex?  
(a)  $\{(x, y) \in \mathbb{R}^2 \mid x \leq 1, y \leq 1\}$   
(b)  $\{(x, y) \in \mathbb{R}^2 \mid x, y \in [0, 1]\}$   
(c)  $\{(x, y) \in \mathbb{R}^2 \mid xy \leq 1, x, y \geq 0\}$   
(d) Both (a) and (b)

5. Given the following optimization problem :

$$\text{Min } f(x, y)$$

subject to

$$3x - 6y = 9 \quad (P)$$

If  $(x, y, \lambda) = (1, -1, 3)$  is a stationary point of the associated Lagrange function, it can be assured that  $(1, -1)$  is a global minimum of the problem  $(P)$  when the function  $(x, y)$  is

- (a) convex
  - (b) concave
  - (c) neither convex nor concave
  - (d) both convex and concave
6. The maximum production of a firm is 500 units of a certain good and the shadow price of the available resource is 3. What would be the effect on the maximum production level, if the resources were increased by one unit?
- (a) The maximum production level would increase by 1500 units
  - (b) The maximum production level would reduce by 3 units
  - (c) The maximum production level would increase by 3 units
  - (d) The maximum production level would decrease by 1500 units
7. Let

$$A = \begin{pmatrix} 1 & 2 & 3 \\ 1 & 0 & -1 \\ 3 & 4 & 5 \end{pmatrix}$$

Which of the following statements is correct?

- (a)  $A$  is invertible since  $\det A = 0$
  - (b)  $A$  is not invertible since  $\det A = 0$
  - (c)  $A$  is invertible since  $\det A \neq 0$
  - (d)  $A$  is not invertible since  $\det A \neq 0$
8. With i.i.d. sampling, each of the following is true, except
- (a)  $E(\bar{Y}) = \mu_Y$
  - (b)  $\text{var}(\bar{Y}) = \sigma^2 / n$
  - (c)  $E(\bar{Y}) < E(Y)$
  - (d)  $\bar{Y}$  is a random variable

9. Let  $\bar{Y}$  denotes the sample average of a random sample with mean  $\mu$  and variance  $\sigma^2$ . Two alternative estimates of  $\mu$  are given by  $w_1 = \frac{n-1}{n}\bar{Y}$  and  $w_2 = \frac{\bar{Y}}{2}$ . Which of the following is correct?
- (a) Both  $w_1$  and  $w_2$  are unbiased estimators of  $\mu$
- (b) Both  $w_1$  and  $w_2$  are biased estimators of  $\mu$
- (c)  $w_1$  is a biased estimator of  $\mu$  and  $w_2$  is an unbiased estimator of  $\mu$
- (d)  $w_1$  is an unbiased estimator of  $\mu$  and  $w_2$  is a biased estimator of  $\mu$
10. If  $x_1$  and  $x_2$  are two independent variables which follow a chi-square distribution, with degrees of freedom parameters  $n_1$  and  $n_2$  respectively, then  $\frac{x_1/n_1}{x_2/n_2}$  has
- (a) a  $t$ -distribution with  $(n_1 + n_2 - 1)$  degrees of freedom
- (b) a standard normal distribution
- (c) an  $F$ -distribution with  $n_1$  and  $n_2$  degrees of freedom
- (d) None of the above.
11. The value of the Durbin-Watson statistic  $d$  ranges from
- (a) 0 to 2
- (b) 0 to 4
- (c) 0 to 1
- (d) 1 to 4
12. Suppose that a random variable  $X$  has a continuous distribution with the following probability function :

$$f(x) = \begin{cases} ce^{-2x}, & \text{for } x > 0 \\ 0, & \text{otherwise} \end{cases}$$

The probability of  $1 < X < 2$  is

- (a)  $e^{-2}$
- (b)  $e^{-2} - e^{-4}$
- (c)  $e^{-4} - e^{-2}$
- (d) None of the above

13. In classical development theory, if capitalists spend a high share of profit on personal consumption, it would be
- productive expenditure as it maximizes the utility of capitalists
  - productive expenditure as it acts as an incentive for further expansion
  - unproductive expenditure as it diverts funds away from capital accumulation
  - unproductive expenditure as it diverts funds from social security provisioning

Answer Question Nos. 14 and 15 based on the following paragraph :

“Suppose, in a common fishing ground of a given size, each fisherman uses a single private input, a fishing boat, in catching fish. The fish production function is  $C = F(K)$ , which is increasing and strictly concave, where  $C$  is the total catch and  $K$  is the size of the total fishing fleet. The competitive price of a boat is  $p$ . The Pareto-optimal solution for  $K$  is given by  $K^*$  when  $F'(K^*) = p$ . Suppose that the fish are evenly distributed in the fishing grounds so that each boat catches the same amount. At the Nash equilibrium, each fisherman will take the total size of the fleet of all the other fishermen,  $\bar{K}$ , as given and will maximize the profits from his share of the catch,  $\{[k / (k + \bar{K})] F(k + \bar{K}) - pk\}$ , with respect to  $k$ , the fisherman’s choice variable of the number of fishing boats. At a symmetric equilibrium with  $n$  fishermen  $k / K = 1 / n$ , and the first-order condition for profit maximization yields  $p = (1 / n) F'(K) + [(n - 1) / n] F(K) / K$ .”

[Pranab Bardhan and Christopher Udry (1999), *Development Microeconomics*, Oxford University Press, pp. (170–171)]

14. Suppose the access to the fishing ground is free and the number of fishermen is very large. This will lead to a classic case of ‘tragedy of the commons’ as
- the price of boats will converge to average product
  - the total size of the fishing fleet will be larger than Pareto-optimal
  - the profits will not be maximized and the agents will share the total income
  - All of the above
15. The situation in the previous question is similar in nature to the economic problem of
- disguised unemployment in traditional agriculture
  - excess capacity in industries
  - over-specialization in natural resources
  - declining terms of trade for agriculture

Answer Question Nos. 16 and 17 based on the following paragraphs :

In a closed economy, the size of the industrial sector is a function of agricultural productivity. Agriculture has to be capable of producing the surplus food and raw materials consumed in the industrial sector, and it is the affluent state of the farmers that enables them to be a market for industrial products. If the domestic market is too small, it is still possible to support an

industrial sector by exporting manufactures and importing food and raw materials. But it is difficult to begin industrialization by exporting manufactures. Usually one begins by selling in familiar and protected home market and passes on to exporting only after one has learnt to make one's costs competitive.

The distinguishing feature of the Industrial Revolution at the end of the eighteenth century is that it began in the country with the highest agricultural productivity—Great Britain—which therefore already had a large industrial sector. The Industrial Revolution did not create an industrial sector where none had been before. It transformed an industrial sector which already existed by introducing new ways of making the same old things. The revolution spread rapidly in other countries which were also revolutionizing their agriculture, specially in Western Europe and North America. But countries of low-agricultural productivity, like Central and Southern Europe, or Latin America or China had rather small industrial sectors, and there it made rather slow progress.

If the smallness of the market was one constraint, due to low-agricultural productivity, the absence of the investment climate was another. Western Europe had been creating a capitalist environment for at least a century; a whole set of new people, of ideas and of institutions which did not exist in Asia or Africa, or even for the most part in Latin America, despite their closer cultural heritage. Power in these countries—as also in Central and Southern Europe—was still closely concentrated in the hands of the landed class, who benefited from cheap imports, and saw no reason to support the emergence of a new industrial class. There was no industrial entrepreneurship. Of course the agricultural countries were just as capable of sprouting an industrial complex of skills, institutions and ideas, but this would take time. In the meantime it was relatively easy to respond to the other opportunity that the industrial revolution opened up, namely to export agricultural products, especially as transport costs came down. There was no lack of traders to travel through the countryside collecting small parcels of produce from thousands of small farmers; or of landowners, domestic and foreign, ready to man plantations with imported Indian or Chinese labour.

And so the world divided : into the countries which industrialized and exported manufactures, and the other countries which exported agricultural products. The speed of this adjustment, especially in the second half of the nineteenth century, created an illusion. It came to be an article of faith, in Western Europe that the tropical countries had comparative advantage in agriculture, when in fact, as Indian production soon began to show, there were much bigger differences in food production per head than in modern industrial production per head as between tropical and temperate countries.

[From *The Evolution of the International Economic Order* by W. Arthur Lewis]

16. According to the section above, agricultural productivity constraints industrial growth in a closed economy because
- (a) agriculture provides food and raw materials for the industrial sector
  - (b) agriculture provides food, raw material and generates demand for the industrial sector
  - (c) agriculture provides food, raw material and sometimes generates demand for industrial sector
  - (d) None of the above

17. Industrial Revolution did not take place in the tropical countries during the second half of the nineteenth century due to
- (a) low-agricultural productivity resulting from a weak landlord class
  - (b) a strong landlord class that did not have the incentive to raise agricultural productivity
  - (c) comparative advantage of these countries in agricultural commodities
  - (d) Both (b) and (c)
18. Given well-behaved preferences, if demand for a good does not change following its own price decrease, it must be that
- (a) it is an inferior good
  - (b) it is a Giffen good
  - (c) it is a necessity
  - (d) the substitution effect is very large
19. The dominant strategy (as well as pure strategy Nash) equilibrium for the normal form game below yields which of the following equilibrium payoffs?

	<i>Tennis</i>	<i>Swimming</i>
<i>Yes</i>	3, 1	3, 0
<i>No</i>	2, 0	1, 0

- (a) (3, 1)
  - (b) (3, 0)
  - (c) (2, 0)
  - (d) (1, 0)
20. When a monopolist is able to price discriminate for the same good to different buyers, the price in the elastic market will be
- (a) the same as in the less elastic market
  - (b) lower than in the less elastic market
  - (c) higher than in the less elastic market
  - (d) zero
21. In an insurance market (say for health coverage), 'moral hazard' can be curtailed by
- (a) raising the premium
  - (b) abolishing the premium
  - (c) insisting on a suitable 'co-payment'
  - (d) None of the above



22. For a linear market demand curve and a constant MC function, the Cournot output is
- smaller than the monopoly output
  - same as the competitive output
  - larger than the monopoly output
  - None of the above

Next **three** questions are based on the following information :

Consider an economy where the aggregate output is produced by using two factors,  $K$  and  $L$ , using a production function  $Y = K^\alpha L^{1-\alpha}$ . At every point of time, both factors are fully employed. A constant proportion  $s$  of total output is saved and automatically invested at each point in time, leading to augmentation of capital stock. However, capital is also subject to depreciation at a rate  $\delta$ . Labour force grows at a constant rate  $n$ .

23. The steady state level of per capita output is given by

- $s\left(\frac{K}{L}\right)^\alpha - (n + \delta)\frac{K}{L}$
- $\left(\frac{s}{n + \delta}\right)^{\frac{1}{1-\alpha}}$
- $\left(\frac{s}{n + \delta}\right)^{\frac{\alpha}{1-\alpha}}$
- Cannot be determined from the given information

24. The optimal savings rate which will maximize the per capita consumption level at the steady state is given by

- $\alpha$
- $n + \delta$
- $\alpha(n + \delta)$
- $\left(\frac{s}{n + \delta}\right)^{\frac{1}{1-\alpha}}$

25. With  $\alpha = 1/3$ , rate of population growth = 1 percent and depreciation rate of capital = 5 percent, how long this economy will take to get halfway of its balanced growth path values within a Solow framework?

- 15.5 years
- 17.5 years
- 21.5 years
- 25.5 years

**PART—B**

Answer any five questions

26. Some economists have claimed that the increasing trend in inequality in the advanced economies in the last three decades has precipitated the recent financial crisis. Argue for or against this claim.
27. Much effort is currently being made to formulate a post-2015 version of the Millennium Development Goals (MDGs). It may be contended that these efforts will not be majorly successful in achieving meaningful development across the world unless core structural causes of underdevelopment are addressed. Discuss.
28. Let the utility function be  $u(x_1, x_2) = x_1x_2$ , where  $x_1$  and  $x_2$  are the quantities of two commodities. Let the prices of these commodities be denoted by  $p_1$  and  $p_2$ , and the money income be denoted by  $m$ .
- (a) Now, suppose that initially  $p_1 = 5$ ,  $p_2 = 15$  and  $m = 150$ . How much of each good would be demanded? Explain.
- (b) Price of good-1 now jumps to 10 (with the price of good-2 and money income remaining constant). How much additional income would the person have to be given to remain as well-off as before the price change? Show all steps in the calculation. Graph your result.
29. Consider that market demand for a good  $x$ , which is sold under conditions of perfect competition, is given by  $x = 60 - 3p$ , where  $p$  denotes the price of the good. Let the marginal cost of production of this good be given by  $MC = x/2$ .
- (a) Find the competitive price and output, and illustrate in a suitable graph.
- (b) Now, consider a per unit tax on this good imposed by the new government of 2 (may think of all prices and costs in terms of a currency called, rupee). Calculate the new equilibrium quantities.
- (c) Calculate and explain the 'deadweight-loss' (using Marshallian surplus ideas) induced by the tax and compare it with the revenue raised by the government.
30. Consider a competitive market economy consisting of a representative firm and a single dynasty of identical, representative and infinitely lived households. The households maximize intertemporal utility, while the producers have a technology represented by a linearly homogeneous production function with no technological progress. The growth rate of workforce as well as the rate of depreciation of the capital stock is constant. Show that the solution to a benevolent social planner's problem coincides with that of a decentralized market economy.
31. Why do the Keynesian theories not make strong predictions about the impact of aggregate demand fluctuations on the variables like unemployment, real wage and markup?

32. Consider the following system :

$$\begin{aligned}2x + 2y + 3z &= 0 \\4x + 8y + 12z &= -4 \\6x + 2y + tz &= 4\end{aligned}$$

- (a) Determine all values of  $t$  for which the system is consistent.
- (b) Determine all values of  $t$  for which there is a unique solution and compute the solution for these cases.
- (c) Determine all values of  $t$  for which there are infinitely many different solutions and give the general solution for these cases.

33. Consider the following Kuhn-Tucker problem :

$$\text{Max } f(x; y; z; w) = xw - yz$$

subject to

$$\begin{aligned}x^2 + y^2 &\leq 1 \\4z^2 + 9w^2 &\leq 36\end{aligned}$$

- (a) Write down the Kuhn-Tucker conditions.
- (b) Show that there is a solution of these conditions with  $(x; y; z; w) = (0; 1; 3; 0)$  and find the corresponding multipliers.

34. The grade point averages of a large population of university students are approximately normally distributed with mean 2.4 and standard deviation 0.8.

- (a) If you need to finish in the top 25 percent of your class to earn a certain scholarship, what must your grade point average be?
- (b) Suppose that four students are randomly selected from the student body. What is the probability that at least one will earn the scholarship?
- (c) Suppose that four students are randomly selected from the student body. What is the probability that their average grade point average is above 3?

35. Write a concise note on the relationship between  $R^2$ ,  $\bar{R}^2$  and  $F$  statistic (including their role in modeling) in a linear regression model.

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SPACE FOR ROUGH WORK