USME

QUESTION PAPERS
SUPPLEMENTARY EXAMINATION
FEBRUARY-2020

MBA (Business Analytics), BBA and
BA (H) ECONOMICS

1st ,3rd & 5th SEMESTER

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(USME)

QUESTION PAPERS FOR SUPPLEMENTARY EXAMINATION, FEBRUARY 2020
MBA (Business Communication) SEM- I & III
BBA & BA (H) ECONOMICS SEMESTER : I , III & V

INDEX

MBA

END SEMESTER EXAMINATION (Supplementary)

PAPER CODE-MB106 February 2020

Business Communication

Time: 3:00 Hours *Max. Marks : 50*

Note : Answer all question by Selecting any two parts from Ques. 1,2,3 &5.
Ques. 4 is compulsory
questions.
All questions carry equal marks.
Assume suitable missing data, if any.

Marks: 10

Q.1 (a) Explain the 7C'S of communication highlighting the role of feedback in making the process of communication effective?

(b) Explain the various types of reports and essentials of a good report writing.

(c) Highlight the importance of Non Verbal Communication?

Marks: 10

Q.2 (a) Discuss the challenges faced for Career Management in the globalised 21st century?

(b) Explain the facilitators in communication highlighting the role of effective communication in modern business?

(c) Explain the essentials of a good resume?

Marks: 10

Q.3 (a) Communication skills are mutual respects skill comment.

(b) Elaborate in details the various variants of soft skills keeping the dynamic role of globalised manager in mind?

(c) Highlight the legal aspects of business communication?

Marks: 10

Q.4 How can we make a presentation effective. Explain the role of active listening in enhancing communication?

Marks: 10

Q.5 (a) Explain the AIDA approach in writing business letters?

(b) You are consulting with a large pharmacy with stores in multiple states. This company has improved sales but the attrition rate is going high. Over the period of 6 months, 100 employees have resigned abruptly. As a facilitator how will you approach this issue?

(c) What are global business etiquette?

Total No. of Pages: 3

First Semester MBA (Business Analytics) Program

Supplementary Examination (Feb-2020)

Paper Code: MB 107 **Paper Title: Introduction to Business Analytics**

Time: 3 Hours *Max Marks: 60*

- *Marks carried by each question are indicated after the question.*
- *Use of scientific calculator is allowed.*

Q1. a) Differentiate between Business Analytics and Business Intelligence. (6 marks)

b) What do you understand by "Big Data"? How decision-making process is affected by "Big Data" in current business research? (6 marks)

Q2. a) An "International Journal of Business Analytics" subscriber survey asked some questions about subscriber characteristics and interests. State whether each of the following questions provides Nominal/Ordinal/Interval/Ratio data. (1 mark each)

i) What is your age?
ii) Are you male or female?
iii) When did you first start reading the IJBA?
iv) Occupation?
v) How long have you been in your present job or position?
vi) What type of vehicle are you considering for your next purchase?

b) What are characteristics of measures? What is the need for measurement? Describe SMART Test for ensuring metric relevance to business. (6 marks)

Q3. *SARAMONIC* a chain of stores that sells audio and video equipment has gathered the following information as below. These data concerns store sales volume in July ('000$) and the number of households (measured in '000):

No. of Households	30	45	35	42	52	58
Sales Volume	120	150	140	146	160	165

a) Develop a scatter diagram of the above data and interpret it. (2 marks)
b) Determine the least square regression equation of sales volumes generated by number of households. (4 marks)
c) Interpret regression coefficients *b0 and b1*. Does the interpretation of *b0* make practical sense? (2 marks)
d) Estimate the mean sales volume for 48 households in some store. (2 marks)
e) Compute coefficient of determination and interpret it. (2 marks)

Q4. Using only the information in the sensitivity report, answer the following questions:

a) Determine the optimal solution and the optimal objective function value. (2 marks)

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b) Explain the reduced cost associated with x. (2 marks)

c) Explain the shadow price associated with Constraint 2. (2 marks)

d) Find the range of values of the R.H.S. of constraint 2 for which the current basis remains optimal. (2 marks)

e) How do the optimal decision variables and objective function value change if the R.H.S. of constraint 1 increases by 20? (2 marks)

f) Find the range of values of the objective function coefficient of x for which the current basis remains optimal. (2 marks)

Maximize profit Z=40x+35y

s.t. 2x+3y<=60 lb of raw material

4x+3y<=96 hours of Labor

Variable Cells

Cell	Name	Final Value	Reduced Cost	Objective Coefficient	Allowable Increase	Allowable Decrease
B7	x	18	0	40	6.67	16.67
C7	y	8	0	35	25	5

Constraints

Cell	Name	Final Value	Shadow Price	Constraint R.H. Side	Allowable Increase	Allowable Decrease
D3	constraint1	60	3	60	36	12
D4	constarint2	96	8	96	24	36

Or

An engineering company has received a rush order for a maximum number of two types of items A & B that can be produced and transported during two-week. The sale price for each of the items is dependent upon the quantity to be produced. The sales-price relationships for these two items are as follows:

Items	Quantity produced	Unit Price
A	*1000-5p*	*p*
B	*3000-10q*	*q*

If x and y are the quantities produced for both the items respectively. The production costs for each of the items are $100x+0.3x^2$ and $500y+0.2y^2$. There is restriction on the production capacity of the items A and B which are 400 units and 600 units respectively. Similarly there is a restriction on man-power available. Total of 500 man-days are available. The production of one unit of A requires 1 man-day and one unit of B requires 2 man-days. Formulate the above problem as Non-Linear optimization model. (12 marks)

Q5. The owner of the readymade garments store sells two types of premium shirts known as ZEE shirts and STAR shirts. He makes a profit of Rs. 200 and Rs. 300 per shirt on ZEE and STAR shirts respectively. He has two tailors, A & B at his disposal to stitch the shirts. Tailor [illegible] types of shirts are stitched by both the tailors. The time needed for stitching a ZEE shirt is two hours by Tailor A and three hours by tailor B. Similarly, A STAR shirt requires 4 hours by tailor A and 3 hours by tailor B.

a) Formulate and determine the optimal number of shirts that should be stitched so as to maximize the total daily profit.(use Graphical method) (8marks)

b) Is the above problem Integer Programming Problem? (2marks)

c) In what conditions Integer and Binary linear models are used? (2marks)

Total No. of Pages - 3 Roll No.....

USME, DTU East Delhi Campus

FIRST SEMESTER MBA (Business Analytics)

SUPPLEMENTARY EXAMINATION *Feb-2020*

Paper Code:MB108 Title of Paper-Database Management Systems

Time: 3:00 Hours *Max. Marks : 60*

Note: Marks are indicated against each question. Parts of a question must be answered together.

Q1. Attempt any *five* questions out of the following: [5* 6marks = 30marks]

a) Describe the lost update and the dirty read problems with an example.

b) What is weak entity set? Explain identifying relationship with the help of an appropriate ER diagram.

c) Discuss open addressing and chaining methods for collision resolution?

d) What is a data model? Discuss relational data model in the context of student relation.

e) Differentiate between the following:

(i) Super key and candidate key

(ii) Logical data independence and physical data independence

(iii) *drop* and *delete*

f) What is normalization? Briefly explain transitive and partial functional dependencies.

Q2. Attempt any *two* questions out of the following: [2* 8 marks= 16 Marks]

a) Draw the ER diagram for the following description. Specify cardinality ratios and participation constraints clearly. Identify entities and types of relationships involved. Identify the primary keys.

(i) The company database keeps track of a company's employees, departments, and projects.

(ii) The company is organized into departments. Each department has a unique name, a unique number, and a particular employee who manages the department. We keep track of the start date when that employee began managing the department. A department may have several locations.

(iii) A department controls a number of projects, each of which has a unique name, a unique number, and a single location.

(iv) We store each employee's name, social security number, address, salary, gender, and birth date. An employee is assigned to one department, but may work on several projects, which are not necessarily controlled by the same department. We keep track of the number of hours per week that an employee works on each project. We also keep track of the direct supervisor of each employee.

(v) We want to keep track of the dependents of each employee for insurance purposes. We keep each dependent's first name, gender, birth date, and relationship to the employee.

b) Explain DBMS along with its advantages and disadvantages.

c) Describe the various components in the structure of DBMS with the help of an appropriate diagram.

Q3. For the given tables – *Employee* and *Department*, write SQL statements for the following queries: [14 Marks]

Department

Department_no	Department_name
10	Analytics
20	Finance
30	Sales
40	HR

Employee

Employee_no	Emp_name	Address	Age	Dept_no	Salary.	Manager_Id
1	James	London	24	40	230000	NULL
2	Adam	London	23	10	20000	1
3	Carol	Beijing	27	10	90000	1
4	Ronald	Sydney	26	40	50000	3
5	Dave	London	22	10	21000	4

7	Keith	Chicago	24	20	23000	4
8	Mia	Sydney	25	30	22000	6
9	Lucy	Beijing	19	20	10000	5
10	Samantha	Chicago	20	30	15000	5
			32	30	80000	3

(a) Create the Department and Employee tables as shown above.
(b) Identify primary keys and foreign keys.
(c) Display employee details along with the department name in which they work.
(d) Display employee details whose age is within the range 20 to 24.
(e) List the employee names managed by Manager_id=1.
(f) Display employee details whose Salary is greater than 20000 and who works in 'Analytics' department.
(g) List details of employees who live in Chicago.

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Total No. of Pages 2 Roll No. .....

IIIrd SEMESTER MBA(DA)

SUPPLEMENTARY EXAMINATION *Feburary-2020*

MB302 Machine Learning

Time: 3:00 Hours *Max. Marks: 60*

NOTE: Question 1 is compulsory. Attempt any 4 questions from the remaining. Assume suitable missing data , if any.

Q1. Answer the following:

[a] What is Bayes Theorem and maximum posterior hypothesis. [4]

[b] What is importance of the following terms (i) hidden layer (ii) stopping criterion. [4]

[c] Explain how do you calculate precision and recall with a confusion matrix for a 2-class classification problem? [4]

[d] Explain various issues of decision tree learning. How they are overcome? [4]

[e] What is bias-variance trade-off? [4]

Q2.[a] What is non-linearly separable problem? Design a two layer network of perceptron to implement X AND Y. [5]

[b] What is the procedure of building Decision Tree using ID3 algorithm with Entropy. Illustrate with the help of an example. [5]

Q3. [a] Find the association rules with 25% support and 70% confidence for the following set of transactions. [5]

TID	Items bought
1	C, O, Q , Z
2	C, O
3	B, Q, T, Q
4	B, C, D, E
5	B, C
6	Q, Z, C, O
7	B, C, O
8	C, D, E, Q, O
9	E, Q, T
10	B, C, O

[b] Consider the following dataset. Using 3-kNN with feature weighing, find the class label of the test point, x= 5.5. [5]

x	0.334	3.1	4.6	4.7	5.0	5.2	5.3	5.7
Class	-	-	+	+	+	-	-	+

Q4. Differentiate between divisive and agglomerative clustering. Also following data points with the help of k-Means clustering algorithm. Dra cluster after each cluster.

x	y
1	1
1.5	1.5
5	5
3	4
4	4
3	3.5

Q5.[a] What do you understand by multilevel association rule mining? Explain you use Apriori algorithm to find association at multiple levels.

[b] Consider following quantities for a confusion matrix: True Positive = 20, Fals = 80, True Negative= 100, False Negative = 300. Find Sensitivity, S Geometric Mean, Error rate, and Precision.

Q6.[a] What do you understand by rewards and actions in context to reinf learning? Also, differentiate between reinforcement learning and supervised lear

[b] For each of the Boolean functions given below, state whether the problem is separable. (i) A AND B AND C (ii) NOT A AND B

Q7 Compute the entropy for the age, income, student and credit-rating attributes the best attribute for splitting using entropy and construct the decision tree.

RID	Age	Income	Student	Credit-Rating	Buy Compute
R1	Youth	High	No	Fair	No
R2	Youth	High	No	Excellent	No
R3	Middle-age	High	No	Fair	Yes
R4	Senior	Medium	No	Fair	Yes
R5	Senior	Low	Yes	Fair	Yes
R6	Senior	Low	Yes	Excellent	No
R7	Middle-age	Low	Yes	Excellent	Yes
R8	Youth	Medium	No	Fair	No
R9	Youth	Low	Yes	Fair	Yes
R10	Senior	Medium	Yes	Fair	Yes
R11	Youth	Medium	Yes	Excellent	Yes
R12	Middle-age	Medium	No	Excellent	Yes
R13	Middle-age	High	Yes	Fair	Yes

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End-Term Supplementary Examination 2019-20

Course: MBA(BA) Semester: III

Subject: Big Data Analytics Subject code: MB303

Maximum Marks: 60 Maximum Time: 3 Hrs

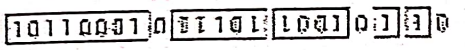
Note :-

1) Answer any 6 questions.
2) Please be brief in your answers.

Q1 a) What are some of the reasons why Big Data projects fall short of goals and expectations. Mention any 5 reasons.

b) Define innovation. Do you think traditional bureaucratic approach hampers innovation (5+2.5+2.5)

Q2 Employ the DGIM algorithm. Shown below is a data stream with N = 22 and the current bucket configuration. New elements enter the window at the right. Thus, the oldest bit of the window is the left-most bit shown.



(a). What is the largest possible bucket size for N = 22?

(b) What is the estimate of the number of 1's in the latest k = 15 bits of this window?

(c). The following bits enter the window, one at a time: 1 0 1 1 1 0 0 1. What is the bucket configuration in the window after this sequence of bits has been processed by DGIM?

(d). After having processed the bits from (c), what is now the estimate of the number of 1's in the latest k = 15 bits of the window?

(e) Work out the bit streams for the following stream of 8 numbers (oldest first): (125, 2, 77, 5, 13, 9, 99, 56). Compute the sum for k = 3. (2*5=10)

Q3 a) Trace the results of using the Apriori algorithm on the grocery store example with support threshold s=60% and confidence threshold c=80% Show the candidate and frequent itemsets for each database scan. Enumerate all the final frequent itemsets. Also indicate the association rules that are generated and highlight the strong ones, sort them by confidence.

Transaction ID	Items
T1	A,B,C,D,E,F

P. T. O

T2	B,C,D,E,F,G
T3	A,D,E,H
T4	A,D,F,I,J
T5	B,D,E,K

b) Explain how the SON algorithm lends itself to a parallel computing environment. Explain th input and output of each map and reduce function. (5+5

Q4 a) Explain consistent hashing with the help of an example.

b) Outline some basic parameters that should be kept in mind to handle the storage challenges face in a big Data environment (5+5)

Q5 a) Briefly describe cloud computing and grid computing

b) Consider this training data set. Examples are A-E, and the single attribute is X.

Example	A	B	C
Attribute Value (x)	-2	0	10

Suppose we apply k means clustering with k = 2. The Initial cluster centres are C1 = -4.0 and C2 = 1.0

a). Write down the cluster assignments that result. In which cluster do A, B, C get assigned.

b). Write the new cluster centroid or mean of the examples that were assigned in a) above.

c) After recomputing the cluster centroids (means) in b, you reassign the examples to the clusters to which they are closest (i.e., the example is assigned to the closest cluster centroid). Write down the cluster assignments that result.

d)Write the new recomputed cluster centroid

e) k-Means Clustering is guaranteed to find the same final clusters for the above three points, no matter what the initial cluster center values are. (True or False). (5+5)

Q6 a) Write short notes on

Hbase

Hive

b) Briefly explain the master slave architecture in HDFS. What is the function of the resource manager and node manager (5+2.5+2.5)

Q7 a) With the help of a neat labelled diagram, briefly explain neural networks

b) Attempt a classification of visual data analysis techniques (5+5)

Total No. of Pages - 2 Roll No.....

THIRD SEMESTER MBA (Business Analytics)

SUPPLEMENTARY EXAMINATION *Feb-2020*

Paper Code: MB304 Title of Paper-*R for Machine Learning*

Time: 3:00 Hours *Max. Marks : 60*

Note: Marks are indicated against each question. Parts of a question must be answered together.

Attempt any *six* questions out of the following: [6 * 10 marks =60]

Q1. Load the *BreastCancer* dataset from *mlbench* package and write *R* code to perform naïve bayes classification to predict if a given tumor is benign or malignant (variable *Class*) depending upon values of *Cell.size*, *Cell.shape*, *Cl.thickness*. Load *caret* and *e1071* packages and set 70:30 *train:test* ratio to partition the dataset and compute the accuracy of the classifier.

Q2. Write *R* function to display the remarks for the student based on the total marks percentage obtained by him/her.

Marks Percentage	Remarks
90-100	Outstanding
80-89	Very Good
70-79	Good
60-69	Average
50-59	Poor
40-49	Very Poor
Below 40	Fail

Q3.a) Load the dataset diamonds and use *dplyr* package functions and *pipe* operator for the following: (attempt any *two* parts)

(i) Create a new column that contains price to carat ratio for all records in the dataset.

(ii) Obtain subset of dataset where cut values are 'Ideal' or 'Good'.

(iii) Calculate average price for each type of cut and color in the dataset.

b) What is coercion? Discuss two types of coercion using *R* syntax with examples.

Q4. Briefly explain the utility of apply(), tapply(), lapply(), sapply() and mapply() functions in *R* using examples.

Q5. Write *R* code to show that *airquality* dataset contains missing values and to calculate total number of observations with and without missing values. Write a custom function which will replace all missing values in a vector with the mean value. Use that function to perform missing value imputation on *Ozone* column.

Q6.a) Load the *Orange* dataset. Write *R* syntax for the following:

i) Display the first 2 and last 2 rows of the dataset.

ii) Display records where age of tree is >1200 and circumference is less than 140.

iii) Arrange the records on the basis of ascending order of age.

b) Explain the usage of the *which*( ) and *rep* ( ) functions with an example each.

Q7. Write *R* code to create any five datatypes in *R* and also to illustrate the sub-setting (element(/s) referencing) for these datatypes by using examples.

Q8. a) Write *R* syntax to generate the following output using inbuilt R function.

"Year-2001" "Year-2002" "Year-2003" "Year-2004" "Year-2005"

b) Write a function *cube(m)* to print cube of all numbers from 1:*m* except for *m*=4.

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IIISEMESTER, **MB306**

SUPPLEMENARY EXAMINATION *FEB/Mar-2020*

MB306 Managing Financial Institutions and Market

Time: 3:00Hours *Max. Marks:6*

Note: All questions are compulsory
Q.1 and Q.2 have internal choice
Please keep answers to the point & observe word limit

Q.1 Write short notes on ***any three*** of following (5 Marks each)

a) Secondary Market
b) Statutory Liquidity Ratio
c) Open ended Mutual Funds
d) Commercial Banking (Max. 300 words)

Q.2

a) Briefly explain the financial reform witnessed by Indian economy in 1991. (5 Marks)

b) Elaborate phase I (Pre-1951 organisation) and phase II (post-1951 till mid-eighties) and phase III (Post 1991) of evolution of financial system in India.

OR

b) Elaborate phases of development of Commercial banking in India. (10 marks)

Q.3a). Briefly explain concept of saving and deficit economic unit (1 Marks)

b). New Issues Market are a significant source of raising funds for business in a country. Do you agree? In reference to the statement, explain three stages of floatation of securities in Primary Markets. (9 Marks)

Q.4

I. Given below are statements pertaining to various **financial market instruments.** Suggest and **briefly explain** the relevant instrument as applicable. (5 marks each)

a) Instrument that can be utilized by State/ Central Government to raise funds for funding various projects.

b) Notice money in Inter-Bank market

c) Repo as an instrument of monetary policy.

2. **Calculate the amount of *Credit Creation* done by Banking Industry in cycle given below.** Kindly only calculate the amount & don't explain the concept.. (5 Marks)

There are *two banks in a hypothetical economy* – Bank 1 and Bank 2. Reserve requirement to be maintained by banks is **10%** Given below is set of transactions done in both banks

- Bank 1 accepts deposit from A worth 2000 and lends B a sum of 1500.
- B buys good worth 1000 from C. C deposits the amount with Bank 2.
- Bank 2 further lends 800 to D who then uses the amount to pay off creditor E. E deposits the amount of 500 with Bank 1.

Total No. of Pages - 3

Roll No .....

End Semester Supplementary Examination : February 2020

Course: MBA (Business Analytics)

Semester: 3rd Semester

Subject: Marketing Analytics

Subject code: MB309

Maximum Marks: 60 marks

Maximum Time: 3 hours

Note: There are 3 sections in the question paper spread across 3 pages. All of them need to be attempted as per the instructions given in each of the sections.

Section 1: Understanding of the Fundamental Concepts **30 Marks**

Instructions: Attempt any 6 out of the 8 questions in this section. All questions carry 5 marks each.

Q1. As the e-mail marketing manager of Flipkart, you need to decide which e-mail of out 10 categories should be sent out to a particular customer at any point of time so as to achieve maximum engagement with the e-mails.

a. What kind of modelling construct can you use to tackle this problem? Illustrate with an example.
b. What are some of the other considerations that should be kept in mind?

Q2. Suppose you are the app marketing lead for BookMyShow, a company that tickets for movies and events online. What are the different ways that you can market your app effectively to new and existing customers? What key metrics would you use to evaluate the performance of the app?

Q3. Explain the concept of customer acquisition cost and lifetime value. What is the expression to calculate the lifetime value of a customer? Illustrate and compare the sensitivity of the lifetime value expression to various terms like discount rate, retention rate and growth rate.

Q4. What is the importance of segmentation? Illustrate with an example.how K-means clustering algorithm can be used to do segmentation?

Q5. a. What are the 3 different dimensions of Search Engine Optimization? Highlight the important aspects of each of them.

b. In relation to search marketing, explain the different kinds of keywords with relevant examples.

Q6. Give example of any 2 marketing analytics problems in day-to-day life and the how companies are able to solve them.

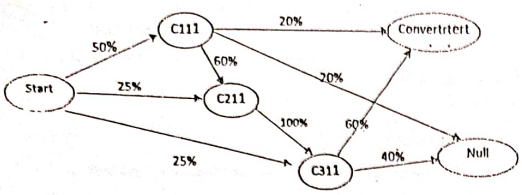
Q7. What are the different types of display ads – based on format, and based on where they appear on the website?

Q8. A primary way to achieve higher revenue from existing customers would be using cross-sell and up-sell strategies. Differentiate between the two. Suppose that you are creating a logistic regression model for cross-sell - What do you understand by a lift chart for the model? Explain its significance.

Section 2: Application of concepts through numericals **18 Marks**

Instructions: Attempt any 3 out of the 4 questions in this section. All questions carry 6 marks each.

Q9. Given below is the customer journey for conversion. Evaluate the weights of each of the channels using Markov Chain to solve the problem of Multi-Touch Attribution.



If you have decided to invest $50,000 across all the channels, what would be the individual investments for channels C1, C2 and C3?

Q10. Answer the following questions on the basis of association rule mining and apriori algorithm:

Transaction ID	Items
1	Banana, Noodles, Juice
2	Banana, Chicken, Juice
3	Banana, Noodles, Chicken, Juice
4	Noodles, Chicken, Juice
5	Banana, Juice, Noodles, Candy
6	Banana, Chicken, Candy

a. What is the support for the itemsets : {Banana, Chicken}, {Noodles}
b. What is the confidence of the rule : {Banana, Noodles) -> {Juice}
c. Considering a minimum support of 50% and a confidence of 75%, find the applicable rules using apriori algorithm

Q11. During the Holi Sale, major e-commerce players are trying to increase the sales for large Haier refrigerators. They are all bidding for the keyword 'Buy Haier Refrigeration 320L'. Answer the questions on the basis of the information below:

Advertiser	Bid	Quality Score
Amazon	$4.7	8
Flipkart	$5.2	6
Paytm Mall	$3.9	9
Tata Cliq	$4.2	7

a. What would be the rank order of the ads shown by Amazon, Flipkart, Paytm Mall and Tata Cliq?
b. Assuming that you know the bids of your competitors, what should be your bid as a marketer at Paytm Mall to ensure that your ad gets shown at the top?

Q12. As the marketing manager for "The Man Company", a men's grooming brand you spent $50,000 in 3 parts: 30% to create awareness, 30% to increase visits to the website and remaining 40% to generate sales. Your campaign reached out to and generated awareness for 250,000 users and also led to 4,000 visits to the website of The Man Company. It also led to 125 users purchasing The Man Company products worth $200 each.

a. Assuming that the CPM in your industry is $12, what is the brand awareness value created?
b. An average of 10,000 visitors typically lead to $50,000 sales. What is the website visits value created?
c. What is the overall return on marketing investment assuming brand awareness value, website visits value and additional sales generated?

Section 3: Application of concepts through a case study **12 Marks**

Instructions: Attempt the case in entirety. There is no choice in this section.

Q13. Given below is the data for some users and their movie ratings on a scale of 1-10 (1 being the lowest and 10 being the highest)

	Dil Se	DDLJ	K3G	Mohabattei n	Don	Swades	Chak De
A	6	5	6	6	3	8	1
B	7	7	6	1	7	2	2
C	1	6	1	2	4	9	3
D	6	4	4	7	1	3	8
E	1	4	10	8	5	2	7
F	4	8	6	3	10	5	6
G	2	8	6	10	5	1	6

Using your general understanding of **recommender systems**, along with the above data, answer the following questions:

a. What are recommender systems and where are they generally used apart from movie rating predictions? Differentiate between user based collaborative filtering and item based collaborative filtering algorithms. When should one be used over the other? (4)
b. How can you evaluate the performance of a recommender system? Explain accuracy and other key parameters to look at. (2)
c. Find whether "Chak De" is a good recommendation for E using User Based Collaborative Filtering. (Use 2 nearest neighbours and Cosine Similarity / Euclidean metric for similarity calculations) (6)

Note: Cosine Similarity can be calculated as

Euclidean Metric Similarity can be calculated as

,Where d is the Euclidean distance between 2 points.

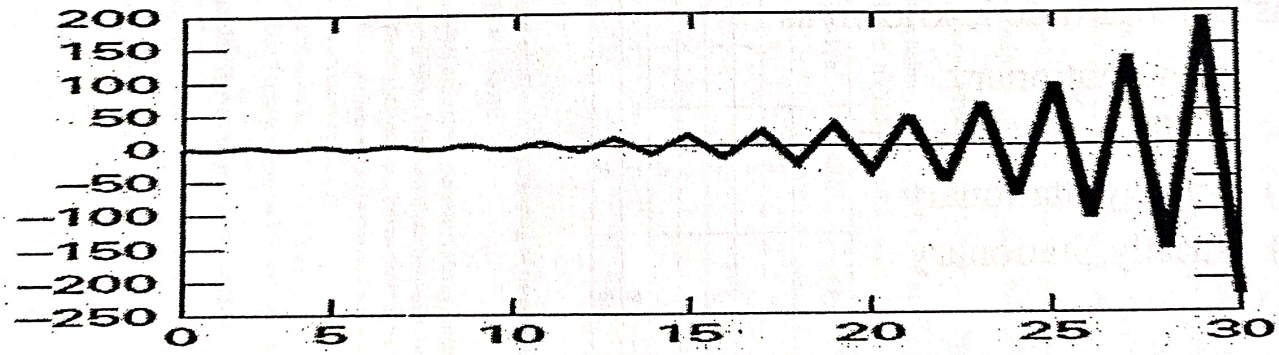
[c] A series that is inherently non-stationary is

(i) Random walk with drift
(ii) Random walk without drift
(iii) Both (a) and (b)
(iv) Neither (a) nor (b)

[d] A non-stationary series that becomes stationary on differencing the series twice is

(i) Integrated of order 0
(ii) Integrated of order 1
(iii) Integrated of order 2
(iv) Integrated of order 3

[e] Consider the following graph.



A possible equation that might have yielded the above graph is:

(i) $-0.5y_{t-1} + \varepsilon_t$
(ii) $-1.2y_{t-1} + \varepsilon_t$
(iii) $1.2\, y_{t-1} + \varepsilon_t$
(iv) $0.9y_{t-1} + \varepsilon_t$

SECTION B [1x5=5]

Q.2 Explain the following terms:

[a] White Noise Process
[b] Cross Sectional Data
[c] Autocorrelation function
[d] Difference equation
[e] Spurious Regression

SECTION C [5x4=20]

Attempt any four questions

Q.3 Explain the different components of a time series using a suitable diagram.

Q.4 Explain the meaning of order of integration. Find out the order of integration for the following models:

(a) $Y_t = \mu + 1.25Y_{t-1} - 0.25Y_{t-2} + \epsilon_t$

(b) $Y_t = 1.5Y_{t-1} + Y_{t-2} + \epsilon_t$

Q.5 Consider the second order difference equation:

$$y_t = a_0 + a_1 y_{t-1} + a_2 y_{t-2} + bt$$

Find a particular solution to this equation.

Q.6 Fit a linear trend equation to the following data:

Week	Sales
1	150
2	157
3	162
4	166
5	177

Q.7 Consider the first order difference equation:

$$y_t = a_0 + a_1 y_{t-1} + \varepsilon_t$$

(a) Find the solution to this equation using the method of iteration.

(b) What happens to the solution obtained in (a) if the initial value of y is unknown? Obtain a possible solution in this case.

(c) Verify that the solution obtained in (b) is actually a solution to the original difference equation.

SECTION D [10x3=30]

Attempt any three questions

Q.7 Consider the Random Walk Model $Y_t = \mu + \Phi Y_{t-1} + \varepsilon_t$

(i) Prove that for $\Phi = 1$, the model is non-stationary. Also, explain how the model can be made stationary.

(ii) Prove that for $0 < \Phi < 1$, the model is asymptotically stationary.

Q.8 Consider the second order homogeneous difference equation:

$$y_t = a_1 y_{t-1} + a_2 y_{t-2}$$

Find the solution of the equation for the following cases:

(i) $a_1^2 + 4a_2 > 0$
(ii) $a_1^2 + 4a_2 = 0$
(iii) $a_2 < 0$.

Also, comment on the stability conditions in each case.

Q.10 Explain the methodology and the steps involved in checking the stationarity of a time series using the following:

(i) Graphical Analysis – Time Series Plots
(ii) Correlogram
(iii) Dickey Fuller Test

Q.11 Consider the following model:

$$Y_t = \beta_1 + \beta_2 t + \beta_3 Y_{t-1} + u_t$$

Characterise the nature of the time series for the following cases:

(i) $\beta_1 = 0, \beta_2 = 0 \text{ and } \beta_3 = 1$
(ii) $\beta_1 \neq 0, \beta_2 = 0 \text{ and } \beta_3 = 1$
(iii) $\beta_1 \neq 0, \beta_2 \neq 0 \text{ and } \beta_3 = 0$
(iv) $\beta_1 \neq 0, \beta_2 \neq 0 \text{ and } \beta_3 = 1$
(v) $\beta_1 \neq 0, \beta_2 \neq 0 \text{ and } \beta_3 < 1$

MBA
END SEMESTER EXAMINATION (Supplem
PAPER CODE-FBE106 Februar
Business Communication

Time: 3:00 Hours **Max. Marks:**

Note : Answer all question by Selecting any two parts from each questions.
All questions carry equal marks.
Assume suitable missing data, if any.

Marks:

Q.1 (a) Explain the process of communication highlighting the role of feedback in ma communication complete
(b) What is the relevance of cross cultural communication?
(c) Highlight the importance of Non Verbal Communication?

Marks:

Q.2 (a) Explain the inductive and deductive approach to writing business letters?
(b) What is para language?
(c) Explain the essentials of a good resume?

Marks:

Q.3 (a) What are the Do's and don'ts of resume writing?
(b) Listening is an art or skill-comment?
(c) Highlight the legal aspects of business communication?

Marks:

Q.4 (a) Explain the AIDA approach in writing business letters?
(b) What are the strategies for negotiating in business communication?
(c) Discuss any two forms of non- verbal communication?

Total No. of Pages: 01

I SEMESTER BA (Hons.) Economics
Supplementary Examination (Feb-2020)

PAPER CODE BA 101- Introductory Microeconomics

Time: 3:00 Hours **Max. Marks: 75**

Answer 5 questions out of 8. All questions carry equal marks.
Draw neat diagrams. Simple calculators are allowed.

1. Critically analyse Robbin's definition. Explain with examples: Economic Choice; Opportunity Cost; Real Cost, Implicit and Explicit Cost.
2. "The three economic problems are based on scarcity and choice." Discuss. Explain with the help of a Production Possibility Frontier how these problems are resolved.
3. Explain axioms of Cardinal Utility Approach, in detail. How does the money measurement of utility help in deriving a Marshallian demand cure with the help of utility analysis?
4. Explain Demand and Supply functions and their determinants. How does market equilibrium take place?
5. Explain the properties of Indifference curves, in detail. Explain consumer equilibrium through ordinal utility analysis.
6. Discuss 'Law of Variable Proportions'. Explain the relationship between, MP_L, AP_L & TP_L.
7. Explain three 'Laws of Returns to Scale'. How do these 'Laws' help in determining optimum size of the firm?
8. Isoquants of production have certain properties. How do these properties explain producer's equilibrium?

b) If n is a natural number, let $n!$ be defined as

$n! = 1*2*3* \ldots\ldots\ldots\ldots\ldots(n-1)*n$

Show by method of mathematical induction

$$y = x^n \Rightarrow y^{(n)} = n!$$

c) Prove that following function has at least one solution in the given interval

$x^7 - 5x^5 + x^3 - 1 = 0$ in (-1,1)

Q7 a) Find the inverse of following function defined for $x \geq 1$

$f(x) = \sqrt{(x+1)} + \sqrt{(x-1)}$

b) Find the integral

$$I_K = \int_1^{\infty} \left(\frac{k}{x} - \frac{k^2}{1+kx}\right) dx$$

Where k is positive constant. Find the limit as $k \to \infty$, if it exists.

c) Show that the graph of Is a circle if $A^2 + B^2 > 4C$.

$x^2 + y^2 + Ax + By + C = 0$

$(A, B \text{ and } C \text{ are constants})$

Find its center and radius. What happens if $A^2 + B^2 \leq 4C$?

Total No. of Pages 4

I SEMESTER BA(H) Economics

SUPPLIMENTARY EXAMINATION *Feb 2020*

PAPER CODE BA 102

TITLE OF PAPER Mathematical Methods for Economics I

Time: 3:00 Hours *Max. Marks: 75*

Note : Attempt any 5 questions. Each question carries 15 marks.
Use of simple calculator is allowed.

Q1 a) Find the domain of following functions.

i) $y = \sqrt{\frac{x-1}{(x-2)(x+3)}}$ *ii)* $y = \frac{2x-1}{x^2-x}$

b) Draw graph of following equations and solve

i) $x - y = 5$ and $x + y = 1$

ii) $x + y = 2$ and $x - 2y = 2$ *and* $x - y = 2$

c) For following investment function, evaluate the integral.

$W(T) = \frac{K}{T}\int_0^T e^{-\rho t} dt$ (K, T and ρ are positive constants)

Prove that $W(T)$ takes values in the interval $(0, K)$ and is strictly decreasing.

Q2 a) Evaluate the following definite integrals:

i) $\int x\sqrt{ax+b}\, dx$

ii) $\int_0^1 (x^4 - x^9)(x^5 - 1)^{12} dx$

b) Discuss local extreme points for the function $f(x) = x^3 + ax + b$. Use the result to show that the equation $f(x) = 0$ has three different roots if and only if $4a^3 + 27b^2 < 0$.

c) A firm has two plants A and B located 60 kilometers apart at two points (0,0) and (60,0). It supplies one identical product priced at $p

a) Find the cost incurred by arbitrary purchaser for purchasing a unit from A and B. Can you comment upon which one is higher?

b) Find the equation for the curve that separates the markets served by two plans, assuming consumer buy from the firm for which total costs are lower.

Q3 a) Show that

$$\int_{-2}^{3}\left(\frac{1}{\sqrt{x+2}}+\frac{1}{\sqrt{3-x}}\right)dx = 4\sqrt{5}$$

b) Prove mathematically that continuous compounding is better than simple compounding.

c) A student has current income y_1 and expects future income y_2. He/she plans current consumptionc_1 and future consumption c_2 in order to maximise the utility function given by

$$U(c_1, c_2) = A + \ln(c_1) + \frac{1}{1+\delta}\ln(c_2)$$

where δ is the discount rate.

If current consumption is greater than current income then student borrows and in alternative scenario, the student puts money in bank account. Find the optimal borrowing or saving plan assuming that borrowing and saving interest rate are same.

Q4 a) Suppose that demand and supply equation in a market is given by the following:

$$D = a - b(P + t)$$

$$S = \alpha + \beta P$$

Where a, b, α and β are positive constants.

I. Compute rate of change of price received by the seller with respect to tax by implicit differentiation. What is its sign. What is the rate of change of price paid by consumer with respect to tax?

II. Compute tax revenue T as a function of t. For what value of t does the quadratic function reach its maximum?

functions with $f' < 0$ and $g' > 0$. Find an expression for $\frac{dr}{dt}$ by implicit differentiation and comment on its sign.

b) Find the derivative of following using logarithmic transformation

$$y = A\frac{x^{\alpha}(ax+b)^{\beta}}{(cx+d)^{\gamma}}$$

c) (i) A model occurring in the theory of efficient loan markets involves the function

$$U(x) = 72 - (4+x)^2 - (4-rx)^2$$

where r is constant.

Find the stationary point and through second order derivative test, find whether it is max or min.

Q5 a) Derive the product rule using definition of derivatives

b) The present discounted value of a payment D growing at a constant rate g with the discount rate being r is given by

$$\frac{D}{1+r}+\frac{D(1+g)}{(1+r)^2}+\frac{D(1+g)^2}{(1+r)^3}+\ldots\ldots\ldots$$

Where r and g are positive. What is the condition for convergence? Show that if the series converges with sum $P_0 = D/(r-g)$.

c) A saving account was opened with an initial deposit of \$100 at 12% per annum. What will be amount after a) 10 years b) 50 years, if compounding is done i) annually ii) monthly c) continuously.

Q6 a) Let f be defined by $f(x) = x^3 + \frac{3}{2}x^2 - 6x + 10$

i. Find $f'(x)$ and $f''(x)$

ii. Find the stationary points of f and the intervals where f is increasing.

iii. Find the inflection points of f and the intervals of concavity/convexity

Total No. of Pages 2

Roll No. .....

First Semester

B.A. (Economics)

SUPPLEMENTARY EXAMINATION
(FEBRUARY, 2020)

BA – 103 Environmental Studies

Time: 3:00 Hrs *Max. Marks: 75*

Note: Answer any SEVEN (7) questions.
All questions carry equal marks.
Question no. 8 is compulsory.
Assume suitable missing data, if any.

1. Draw a neat and clean diagram of temperature based profile of atmosphere. In addition to this briefly discuss about lithosphere with a suitable diagram. **(10)**

2. Write the significance of genetic biodiversity in the ecosystem? Describe the different Ex and In-situ conservation methods to conserve the biodiversity. **(10)**

3. Describe biosphere and biome along with its subdivisions Discuss about different kinds of food insufficiency related global problems. **(10)**

4. Explain the difference between renewable and nonrenewable energy resources with suitable examples. Also write the national ambient air quality standards for SO_2, NO_2, CO, PM10 and PM2.5. **(10)**

5. What are the different types, sources and different methods for the disposal of solid wastes? Also explain in detail about the effects of thermal pollution. **(10)**

6. What are the major obstacles in the path of sustainable development in India? In addition to this, what kind of approach is required to attain environmental sustainability in Delhi. **(10)**

7. "India is mega diversity nation" discusses. Also throw light on the impact of modern agriculture on the environment. **(10)**

8. Write short notes on any three: **(15)**

   (i) Ecological Pyramids
   (ii) Pond Ecosystem
   (iii) Acid Rain
   (iv) Ozone Layer Depletion

Total No: of Pages 2

-60-

I SEMESTER, B.A (Eco)

Supplementary Exam : February - 2020

BA-104 FINANCIAL MARKETS & INSTITUTIONS

Time: 3:00 Hours *Max. Marks: 75*

Note: All questions are compulsory
Q.1 and Q.5 have internal choice
Please keep answers to the point & observe word limit

Q.1 Write short notes on *any three* of following: (5 Marks each)

a) Development Financial Institution (DFI)
b) Call Money
c) Mutual Funds
d) National Stock Exchange

(Max. 300 words)

Q.2 Elaborate various components of Indian Financial system (20 marks)

Q.3 Highlight the role played by Reserve Bank of India (RBI) as banker of last resort and monetary authority of India (10 Marks)

Q.4 Briefly outline process of credit creation performed by Banking system along with suitable examples (10 Marks)

Q.5 "The present-day commercial banking we see today is the result of slow and gradual evolution of banking over the years". Critically comment on the statement highlighting *different phases* of development of Indian Banking. (20 Marks)

OR

Mr. Vikas Khokher is the founder and CEO of Quickopay, an Indian payment system based in Pune. The tech-giant is the 2nd largest payment system by revenue and market share. Mr. Vikas has been evaluating a new business line which once launched successfully has a potential of giving competition to other players operating in the country. To finance the launch of this new business line as well as reducing promoters stake held by founder members, Quickopay has been evaluating the idea of going public.

Mr. Vikas is a veteran investor and also holds stakes in a range of companies in diversified industries. He has been tracking the primary markets activity and has been significantly impressed by newspaper headlines like "*In Europe, the Middle East, India and Africa region (EMEIA), BSE and SME exchanges recorded the highest proceeds worth $5.5 billion through 17 IPOs, the EY Global IPO Trends: 2019 (Q4) report added*".

(Kindly only consider facts above and not the current financial markets performance)

Based on facts highlighted above, answer following:

a) What do you understand by Primary Markets. Is it a wise option for Quickopay to raise funds through primary markets and not through loans/ credit lines. (5 Marks)

b) Explain Initial Public Offering and stages of flotation of shares through IPO. (15 Marks)

Down		

7.2.a.) Find the Nash equilibrium or equilibria.

7.2.b) Which player, if any, has a dominant strategy?

Total No. of Pages 2

Roll No.....

III SEMESTER

B.A (Hons.) Economics

SUPPLEMENTARY EXAMINATION *Feb-2020*

PAPER CODE BA201

TITLE OF PAPER INTERMDEIATE MICROECONOMICS I

Time: 3:00 Hours *Max. Marks : 75*

Note : Question no. 1 is compulsory
All questions carry equal marks. (15 marks)
Attempt 5 out of 7 questions

Q.1 Suppose that by some miracle the number of hours in the day increased from 24 to 30 hours (with luck this would happen shortly before exam week). How would this affect the budget constraint? (5marks)

Explain slutsky equation with endowment effect. (10 marks)

Q.2 Mr. X's utility function is $U(X; Y) = (X^2)(Y^2)$ where X is her consumption of good X and Y is her consumption of good Y. If price of both goods is Rs. 1 and income is Rs11. Please solve for demand of X and Y. Derive its Engel curve and indirect utility function. (10 marks)

Martha has the utility function $U = \min\{x, 2y\}$. Write down her demand function for x as a function of the variables m, p_x, and p_y, where m is income, p_x is the price of x, and p_y is the price of y. (5marks)

Q3)

3.1) Use a diagram to show that a quantity tax can make a person worse off even if he is rebated an amount of money equal to what he paid in. (10 Marks)

Q4)

4.1] (5marks)

Explain the Hicks version of income and substitution effects.

4.2] (5marks)

The U.S. currently imports about half of the petroleum that it uses. The rest of its needs are met by domestic production. Could the price of oil rise so much that the U.S. would be made better off?

4.3] (5marks)

Can decrease in the interest rate make a utility maximizing lender become a borrower? Explain with diagram, if it will make the borrower better off or worse off?

Q5)

5.1) (5 marks) What is St. Petersburg paradox. Draw a utility function that exhibits risk-averse behavior .

5.2) (10 Marks) Explain returns to scale. Can a fixed-proportions production function exhibit increasing or decreasing returns to scale? What would its isoquant map look like in each case?

6)

6.1) (5 marks)

The production function $q = K^a L^b$ where $0 \leq a, b \leq 1$ is called a Cobb-Douglas production function. This function is widely used in economic research. Using the function, show the following:

6.1.a.) Are marginal productivities diminishing for this production function?

6.1.b) Does the function exhibit diminishing RTS?

6.2) (10 marks)

Two students are preparing for their micro exam, but they seem confused:

Student A: "We learned that demand curves always slope downward. In the case of a competitive firm, this downward sloping demand curve is also the firm's marginal revenue curve. So that is why marginal revenue is equal to price."

Student B: "I think you have it wrong. The demand curve facing a competitive firm is horizontal. The marginal revenue curve is also horizontal, but it lies below the demand curve. So marginal revenue is less than price."

Can you clear up this drivel? Explain why neither student is likely to warrant a grade commensurate with his or her name

Q7)

7.1) (10 marks)

Suppose a firm had a production function with linear isoquants, implying that its two inputs were perfect substitutes for each other. What would determine the firm's expansion path in this case? For the opposite case of a fixed-portions production function, what would the firm's expansion path be?

7.2) (5 marks)

Consider a simultaneous game in which player A chooses one of two actions (Up or Down), and B chooses one of two actions (Left or Right). The game has the following payoff matrix, where the first payoff in each entry is for A and the second for B.

Total No of Pages 03 Roll No.....

THIRD SEMESTER **B.A (H) ECONOMICS**

SUPPLEMENTARY SEMESTER EXAMINATION FEB-2020

BA202 (INTERMEDIATE MACROECONOMICS I)

Time: 03:00 Hours **Max. Marks: 75**

Note : First two questions are mandatory.
Attempt any three out of remaining four questions.
All questions carry equal marks.

Q1. (a) Consider an economy with: $C = 100 + 0.8Y_D$, $I = 200 - 5i$, $G = 0$, $TR = 50$, $T = 100 + 0.2Y$, $X = 100$, (Import) $IM = 10 + 0.14Y$, $M^s = 184$, $L = 0.2Y - 10i$, $P = 2$.

(i) Derive IS and LM equations and solve for equilibrium level of income and equilibrium rate of interest.

(ii) If transfer payment (TR) increases by 75, calculate the new equilibrium values. And then calculate the amount of investment and the magnitude of output that has been crowded out.

(iii) How much should be the change in nominal money supply so that there is full multiplier effect when transfer payment increases by 75.

(iv) Continue with part (i), suppose full employment output (Y_F) of this economy is 800. Calculate the amount by which government should change its expenditure for the economy to achieve its full employment output level. (4+3+2+3)

(b) Suppose AS curve is defined by classical conditions and AD curve is downward sloping. In this scenario, how will output change when there is monetary expansion in AS-AD model? What can you conclude about neutrality of money in this context? (3)

Q2. (a) PIP (Policy Ineffectiveness Proposition) implies that central bank should not reveal its policy decisions if it wants to improve the economy's performance. Do you agree with this statement? Explain with diagram (s). How PIP will perform under adaptive expectations. (6)

(b) Suppose that the economy can be described by following three equations:

$u_t - u_{t-1} = -0.4(g_{yt} - \bar{g}_y)$ Okun's law

$\pi_t - \pi_{t-1} = -(\hat{u}_t - 6\%)$ Phillips Curve

Also it is given that:
Labor force growth rate is 2% and
Labor productivity growth rate is 1%
(i) What is normal rate of growth for this economy?
(ii) Suppose that the unemployment rate is equal to the natural rate, and inflation rate is 7%. What is the growth rate of output? What is the growth rat money supply?
(iii) Suppose that conditions are as in (ii), when, in year *t*, the authorities monetary policy to reduce the inflation to 4% in year *t* and keep it there. Gi this, what must happen to the unemployment rate, rate of growth of output rate of nominal money growth in year *t*, *t+1*, *t+2*, *t+3* and *t+4*? (1+2

Q3. (a) Assume economy is initially working at full employment. Now supp there is fiscal expansion in the economy. Explain how this change (using AS- and IS-LM model) would affect the economy both in the short run medium/long run. You need to explain the full dynamics of adjustment (in w and with diagrams).

(b) Suppose that a firm's markup over cost is 10% and Wage-Setting (equation is given by: W=P(1-u).
(i) What is the real wage as implied by Price-Setting equation?
(ii) What is the natural rate of unemployment?
(iii) Suppose that the markup of prices over cost increases to 20%. What happ to the natural rate of unemployment? Explain the economic logic behind y answer. (1+2

Q4. Answer following questions:
(a) Discuss the two cases/circumstances with diagrams when fiscal po multiplier in IS-LM will be zero.
(b) Prove that smaller the interest responsiveness of money demand, greater be change in income in case of monetary expansion.?
(c) What is arbitrage theory? How does it affect the exchange rate between t currencies in the two countries?

(d) Define Absolute Purchasing Power Theory (PPP) and Real exchange rate and, tell how the two are related with each other.

(e) As per Fischer and Taylor, disinflation will be painful even if monetary policy changes were credible and wage-setters have taken this aspect into account while forming their expectations. True or False? Explain (3+3+3+3+3)

Q5. (a) Empirical evidences suggest that devaluation (or depreciation) will always lead to improvement in current account balance? Do you agree with statement? Explain [Hint: j-curve effect] (6)

(b) Explain the difference between depreciation and devaluation. And tell which one is more prevalent in today's world? (2)

(c) Discuss the effectiveness of fiscal policy in a fixed and flexible exchange rate regime in the presence of perfect capital mobility and fixed prices. Explain with diagram (s) wherever needed. (7)

Q6. (a) Explain exchange rate overshooting through all the relevant diagrams and explanations when central bank unexpectedly increases nominal money supply by 10%, say from 100 billion rupees to 110 billion rupees. (7)

(b) Using the Asset market approach to balance of payment (BOP) under flexible exchange rate, explain how demand of domestic money, domestic bonds and foreign bonds will affected by each of the followings:

(i) Increase in foreign interest rate.

(ii) Foreign currency is expected to appreciate.

(iii) Increase in domestic price level.

(iv) Decrease in wealth. (2+2+2+2)

[10]

Q.11 [a] Prove that the correlation between two independent random variables is equal to zero. [5]

[b] Prove the following results: [5]

(i) $V(X+Y) = V(X) + V(Y) + 2Cov(X,Y)$

(ii) $Cov(aX, Y) = Cov(X, aY) = aCov(X,Y)$

Total No. of Pages: 8 *Roll No.....*

III SEMESTER **BA(H) Economics**

SUPPLEMENTARY EXAMINATION ***Feb 2020***

BA 203: Statistical Methods for Economics

Time: 3:00 Hours *Max. Marks : 75*

Note : 1. The question paper consists of four sections. All the sections are compulsory.
2. All parts within each section are to be answered in a continuous manner on the answer sheet.
3. Internal choice is given in some sections.
4. Use of statistical tables and simple calculator is allowed.

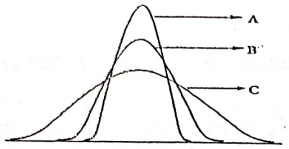
SECTION A [1 x 5 = 5]

Q.1 Choose the correct alternative:

[a] Mean Deviation of a given set of observations is minimum when taken from

(i) Arithmetic Mean
(ii) Geometric Mean
(iii) Mode
(iv) Median

[b] The first four central moments of a distribution are 0, 2.5, 0.7 and 8.75. Which of the following curves best represents the shape of the distribution?



(i) Curve A
(ii) Curve B
(iii) Curve C
(iv) The information is not sufficient to ascertain the shape of the distribution

[c] X is a continuous random variable with pdf

$$f(x; A, B) = \begin{cases} \frac{1}{B-A} & for\ A < X < B \\ 0, & otherwise \end{cases}$$

Then the probability f(X=3) is given by

(i) (B+A)/2
(ii) (B-A)/2
(iii) 0
(iv) 2B+A

SECTION D (10 x 2 = 20)
Attempt any two questions.

Q.9 (a) Let X and Y be two random variables each taking three values -1, 0 and 1, and having the joint probability as given in the table below:

Y ↓ \ X →	-1	0	1
-1	0	0.1	0.1
0	0.2	0.2	0.2
1	0	0.1	0.1

Obtain the marginal probability distributions of X and Y and hence their expected values. [5]

(b) You are given the following continuous joint probability function:

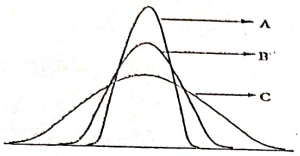
$$f(x,y) = \begin{cases} \frac{x+y}{k}, & 0 < x < 2\ and\ 0 < y < 2 \\ 0, & otherwise \end{cases}$$

(i) For what value of k is f (x, y) a valid joint pdf?
(ii) Find the expected value of y.
(iii) Derive marginal probability density function of x.
(iv) Are x and y independent?
(v) Find P (x < 1 and y > 0.5) [5]

Q.10 The joint pdf of two random variables X and Y is given by

$$f(x,y) = \begin{cases} 24xy, & 0 \le x \le 1, 0 \le y \le 1\ and\ x+y \le 1 \\ 0, & otherwise \end{cases}$$

[b] The first four central moments of a distribution are 0, 2.5, 0.7 and 8.75. Which of the following curves best represents the shape of the distribution?



(i) Curve A
(ii) Curve B
(iii) Curve C
(iv) The information is not sufficient to ascertain the shape of the distribution

[c] X is a continuous random variable with pdf

$$f(x; A, B) = \begin{cases} \frac{1}{B-A} & for\ A < X < B \\ 0, & otherwise \end{cases}$$

Then the probability f(X=3) is given by

(i) (B+A)/2
(ii) (B-A)/2
(iii) 0
(iv) 2B+A

SECTION D (10 x 2 = 20)
Attempt any two questions.

Q.9 (a) Let X and Y be two random variables each taking three values -1, 0 and 1, and having the joint probability as given in the table below:

X → / Y ↓	-1	0	1
-1	0	0.1	0.1
0	0.2	0.2	0.2
1	0	0.1	0.1

Obtain the marginal probability distributions of X and Y and hence their expected values. [5]

(b) You are given the following continuous joint probability function:

$$f(x,y) = \begin{cases} \frac{x+y}{k}, & 0 < x < 2\ and\ 0 < y < 2 \\ 0, & otherwise \end{cases}$$

(i) For what value of k is f (x, y) a valid joint pdf?
(ii) Find the expected value of y.
(iii) Derive marginal probability density function of x.
(iv) Are x and y independent?
(v) Find P (x < 1 and y > 0.5) [5]

Q.10 The joint pdf of two random variables X and Y is given by

$$f(x,y) = \begin{cases} 24xy, & 0 \le x \le 1, 0 \le y \le 1\ and\ x+y \le 1 \\ 0, & otherwise \end{cases}$$

[b] The maximum speed of mopeds follows a normal distribution with mean value 46.8 km/h and standard deviation 1.75 km/h.

(i) What is the probability that maximum speed is at most 50 km/h?

(ii) What is the probability that maximum speed is at least 48 km/h?

(iii) What is the probability that maximum speed differs from the mean value by at most 1.5 standard deviations? [5]

Q.8 [a] The weekly demand for propane gas (in 1000s of gallons) from a particular facility is a rv X with pdf [1+2+2]

$$f(x) = \begin{cases} 2\left(1 - \frac{1}{x^2}\right), & 1 \le x \le 2 \\ 0, & \text{otherwise} \end{cases}$$

(i) Obtain the cdf of X.

(ii) Compute E(X) and V (X). (Use ln 2 = 0.6931)

(iii) Obtain an expression for the (100p) th percentile. What is the value of the median?

[b] Suppose that 10% of all steel shafts produced by a certain process are nonconforming but can be reworked (rather than having to be scrapped). Consider a random sample of 200 shafts, and let X denote the number among these that are nonconforming and can be reworked. What is the (approximate) probability that X is [5]

(i) At most 30?

(ii) Less than 30?

(iii) Between 15 and 25 (inclusive)?

[d] Twenty one persons in a room have an average height of 5 feet 6 inches. A 22nd person enters the room. How tall would he have to be to raise the average height of all 22 persons by one inch?

(i) 7 feet 3 inches
(ii) 7 feet 4 inches
(iii) 6 feet 3 inches
(iv) 6 feet 4 inches

[e] The price of a commodity doubles in a period of 4 years. The average annual percentage increase is

(i) 15%
(ii) 19%
(iii) 22%
(iv) 25%

SECTION B [10 x 2 = 20]

Attempt any two questions.

Q.2 [a] An economy grows at the rate of 2% in the first year, 2.5% in the second year and 3% in the third year. What is the average rate of growth of the economy? [5]

[b] The standard deviation of a symmetrical distribution is 3. What must be the value of the fourth moment about the mean in order to make the distribution mesokurtic? [5]

Q.3 [a] Explain the concepts of negative and positive skewness using suitable examples. [5]

[b] Prove that for two series with n_1 and n_2 observations

$$\log GM = \frac{1}{n_1 + n_2}(n_1 \log G_1 + n_2 \log G_2)$$

where G_1 and G_2 are the geometric means of Series 1 and 2 respectively while GM is the geometric mean of the combined series. [5]

Q.4 [a] Prove that the sum of the squares of deviations of the given set of observations is minimum when taken from the arithmetic mean. [5]

[b] A batsman is to be selected for a cricket team. The choice is between two players X and Y. Consider their five previous scores: [5]

X	Y
25	50
85	70
40	65
80	45
120	80

Which batsman should be selected if the team wants a

(i) Higher run scorer
(ii) More reliable batsman

SECTION C [10 x 3 = 30]
Attempt any three questions.

Q.5 [a] Find the mean and variance of a random variable which follows a binomial distribution. [5]

[b] A particular telephone number is used to receive both calls and fax messages. Suppose that 25% of the incoming calls involve fax messages, and consider a sample of 25 incoming calls. What is the probability that

a. At most 6 of the calls involve a fax message?

b. Exactly 6 of the calls involve a fax message?

c. At least 6 of the calls involve a fax message?

d. More than 6 of the calls involve a fax message?

e. What is the expected number of calls among the 25 that involve a fax message? [5]

Q.6 [a] 2% of all births in New Zealand are twins. If there are 500 births in one week, calculate the following probabilities approximately:

(a) The probability that more than 10 births in one week would result in twins.

(b) The probability that at least 5 births result in twins. [5]

[b] The yield strength for A36 grade steel is normally distributed with mean = 43 and standard deviation =4.5. [5]

(i) What is the probability that yield strength is at most 40? Greater than 60?

(ii) What yield strength value separates the strongest 75% from the others?

Q.7 [a] The cumulative distribution function of a continuous random variable X is given by

$$F(x) = \begin{cases} 0, & x < 0 \\ \frac{x^2}{4}, & 0 < x < 2 \\ 2, & x > 2 \end{cases}$$

(i) Find the probability density function of X.
(ii) Find P $(0.5 < X < 2)$ [5]

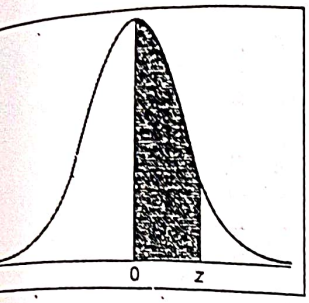


TABLE A Areas of a Standard Normal Distribution (Alternate Version of Appendix I Table 4)

The table entries represent the area under the standard normal curve from 0 to the specified value of z.

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359
0.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0753
0.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.1141
0.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
0.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
0.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
0.6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2517	.2549
0.7	.2580	.2611	.2642	.2673	.2704	.2734	.2764	.2794	.2823	.2852
0.8	.2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.3133
0.9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389
1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621
1.1	.3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.3830
1.2	.3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.4015
1.3	.4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.4177
1.4	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.4319
1.5	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.4441
1.6	.4452	.4463	.4474	.4484	.4495	.4505	.4515	.4525	.4535	.4545
1.7	.4554	.4564	.4573	.4582	.4591	.4599	.4608	.4616	.4625	.4633
1.8	.4641	.4649	.4656	.4664	.4671	.4678	.4686	.4693	.4699	.4706
1.9	.4713	.4719	.4726	.4732	.4738	.4744	.4750	.4756	.4761	.4767
2.0	.4772	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.4817
2.1	.4821	.4826	.4830	.4834	.4838	.4842	.4846	.4850	.4854	.4857
2.2	.4861	.4864	.4868	.4871	.4875	.4878	.4881	.4884	.4887	.4890
2.3	.4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.4916
2.4	.4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.4936
2.5	.4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949	.4951	.4952
2.6	.4953	.4955	.4956	.4957	.4959	.4960	.4961	.4962	.4963	.4964
2.7	.4965	.4966	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.4974
2.8	.4974	.4975	.4976	.4977	.4977	.4978	.4979	.4979	.4980	.4981
2.9	.4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	.4986	.4986
3.0	.4987	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990
3.1	.4990	.4991	.4991	.4991	.4992	.4992	.4992	.4992	.4993	.4993
3.2	.4993	.4993	.4994	.4994	.4994	.4994	.4994	.4995	.4995	.4995
3.3	.4995	.4995	.4995	.4996	.4996	.4996	.4996	.4996	.4996	.4997
3.4	.4997	.4997	.4997	.4997	.4997	.4997	.4997	.4997	.4997	.4998
3.5	.4998	.4998	.4998	.4998	.4998	.4998	.4998	.4998	.4998	.4998
3.6	.4998	.4998	.4998	.4999	.4999	.4999	.4999	.4999	.4999	.4999

For values of z greater than or equal to 3.70, use 0.4999 to approximate the shaded area under the normal curve.

LOGARITHMS

	0	1	2	3	4	5	6	7	8	9	Mean Difference 1	2	3	4	5	6	7	8	9
10	0000	0043	0086	0128	0170	0212	0253	0294	0334	0374	4	8	12	17	21	25	29	33	37
11	0414	0453	0492	0531	0569	0607	0645	0682	0719	0755	4	8	11	15	19	23	26	30	34
12	0792	0828	0864	0899	0934	0969	1004	1038	1072	1106	3	7	10	14	17	21	24	28	31
13	1139	1173	1206	1239	1271	1303	1335	1367	1399	1430	3	6	10	13	16	19	23	26	29
14	1461	1492	1523	1553	1584	1614	1644	1673	1703	1732	3	6	9	12	15	18	21	24	27
15	1761	1790	1818	1847	1875	1903	1931	1959	1987	2014	3	6	8	11	14	17	20	22	25
16	2041	2068	2095	2122	2148	2175	2201	2227	2253	2279	3	5	8	11	13	16	18	21	24
17	2304	2330	2355	2380	2405	2430	2455	2480	2504	2529	2	5	7	10	12	15	17	20	22
18	2553	2577	2601	2625	2648	2672	2695	2718	2742	2765	2	5	7	9	12	14	16	19	21
19	2788	2810	2833	2856	2878	2900	2923	2945	2967	2989	2	4	7	9	11	13	16	18	20
20	3010	3032	3054	3075	3096	3118	3139	3160	3181	3201	2	4	6	8	11	13	15	17	19
21	3222	3243	3263	3284	3304	3324	3345	3365	3385	3404	2	4	6	8	10	12	14	16	18
22	3424	3444	3464	3483	3502	3522	3541	3560	3579	3598	2	4	6	8	10	12	14	15	17
23	3617	3636	3655	3674	3692	3711	3729	3747	3766	3784	2	4	6	7	9	11	13	15	17
24	3802	3820	3838	3856	3874	3892	3909	3927	3945	3962	2	4	5	7	9	11	12	14	16
25	3979	3997	4014	4031	4048	4065	4082	4099	4116	4133	2	3	5	7	9	10	12	14	15
26	4150	4166	4183	4200	4216	4232	4249	4265	4281	4298	2	3	5	7	8	10	11	13	15
27	4314	4330	4346	4362	4378	4393	4409	4425	4440	4456	2	3	5	6	8	9	11	13	14
28	4472	4487	4502	4518	4533	4548	4564	4579	4594	4609	2	3	5	6	8	9	11	12	14
29	4624	4639	4654	4669	4683	4698	4713	4728	4742	4757	1	3	4	6	7	9	10	12	13
30	4771	4786	4800	4814	4829	4843	4857	4871	4886	4900	1	3	4	6	7	9	10	11	13
31	4914	4928	4942	4955	4969	4983	4997	5011	5024	5038	1	3	4	6	7	8	10	11	12
32	5051	5065	5079	5092	5105	5119	5132	5145	5159	5172	1	3	4	5	7	8	9	11	12
33	5185	5198	5211	5224	5237	5250	5263	5276	5289	5302	1	3	4	5	6	8	9	10	12
34	5315	5328	5340	5353	5366	5378	5391	5403	5416	5428	1	3	4	5	6	8	9	10	11
35	5441	5453	5465	5478	5490	5502	5514	5527	5539	5551	1	2	4	5	6	7	9	10	11
36	5563	5575	5587	5566	5611	5623	5635	5647	5658	5670	1	2	4	5	6	7	8	10	11
37	5682	5694	5705	5717	5729	5740	5752	5763	5775	5786	1	2	3	5	6	7	8	9	10
38	5798	5809	5821	5832	5843	5855	5866	5877	5888	5899	1	2	3	5	6	7	8	9	10
39	5911	5922	5933	5944	5955	5966	5977	5988	5999	6010	1	2	3	4	5	7	8	9	10
40	6021	6031	6042	6053	6064	6075	6085	6096	6107	6117	1	2	3	4	5	6	8	9	10
41	6128	6138	6149	6160	6170	6180	6191	6201	6212	6222	1	2	3	4	5	6	7	8	9
42	6232	6243	6253	6263	6274	6284	6294	6304	6314	6325	1	2	3	4	5	6	7	8	9
43	6335	6345	6355	6365	6375	6385	6395	6405	6415	6425	1	2	3	4	5	6	7	8	9
44	6435	6345	6454	6464	6474	6484	6493	6503	6513	6522	1	2	3	4	5	6	7	8	9
45	6532	6542	6551	6561	6571	6580	6590	6599	6609	6618	1	2	3	4	5	6	7	7	8
46	6628	6637	6646	6656	6665	6675	6684	6693	6702	6712	1	2	3	4	5	5	6	7	8
47	6721	6730	6739	6749	6758	6767	6776	6785	6794	6803	1	2	3	4	4	5	6	7	8
48	6812	6821	6830	6839	6848	6857	6866	6875	6884	6893	1	2	3	4	4	5	6	7	8
49	6902	6911	6920	6928	6937	6946	6955	6964	6972	6981	1	2	3	3	4	5	6	7	8
50	6990	6998	7007	7016	7024	7033	7042	7050	7059	7067	1	2	3	3	4	5	6	7	8
51	7076	7084	7093	7101	7110	7118	7126	7135	7143	7152	1	2	3	3	4	5	6	7	7
52	7160	7168	7177	7185	7193	7202	7210	7218	7226	7235	1	2	2	3	4	5	6	6	7
53	7243	7251	7259	7267	7275	7284	7292	7300	7308	7316	1	2	2	3	4	5	6	6	7
54	7324	7332	7340	7348	7356	7364	7372	7380	7388	7396	1	2	2	3	4	5	6	7	8
	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9

LOGARITHMS

	0	1	2	3	4	5	6	7	8	9	Mean Difference 1	2	3	4	5	6	7	8	9
55	7404	7412	7419	7427	7435	7443	7451	7459	7466	7474	1	2	2	3	4	5	5	6	7
56	7482	7490	7497	7505	7513	7520	7528	7536	7543	7551	1	2	2	3	4	5	5	6	7
57	7559	7566	7574	7582	7589	7597	7604	7612	7619	7627	1	2	2	3	4	5	5	6	7
58	7634	7642	7649	7657	7664	7672	7679	7686	7694	7701	1	1	2	3	4	4	5	6	7
59	7709	7716	7723	7731	7738	7745	7752	7760	7767	7774	1	1	2	3	4	4	5	6	7
60	7782	7789	7769	7803	7810	7818	7825	7832	7839	7846	1	1	2	3	4	4	5	6	6
61	7853	7860	7868	7875	7882	7889	7896	7903	7910	7917	1	1	2	3	4	4	5	6	6
62	7924	7931	7938	7945	7952	7959	7966	7973	7980	7987	1	1	2	3	3	4	5	6	6
63	7993	8000	8007	8014	8021	8028	8035	8041	8048	8055	1	1	2	3	3	4	5	5	6
64	8062	8069	8075	8082	8089	8096	8102	8109	8116	8122	1	1	2	3	3	4	5	5	6
65	8129	8136	8142	8149	8156	8162	8169	8176	8182	8189	1	1	2	3	3	4	5	5	6
66	8195	8202	8209	8215	8222	8228	8235	8241	8248	8254	1	1	2	3	3	4	5	5	6
67	8261	8267	8274	8280	8287	8293	8299	8306	8312	8319	1	1	2	3	3	4	5	5	6
68	8325	8331	8338	8344	8351	8357	8363	8370	8376	8382	1	1	2	3	3	4	4	5	6
69	8388	8395	8401	8407	8414	8420	8426	8432	8439	8445	1	1	2	2	3	4	4	5	6
70	8451	8457	8463	8470	8476	8482	8488	8494	8500	8506	1	1	2	2	3	4	4	5	6
71	8513	8519	8525	8531	8537	8543	8549	8555	8561	8567	1	1	2	2	3	4	4	5	5
72	8573	8579	8585	8591	8597	8603	8609	8615	8621	8627	1	1	2	2	3	4	4	5	5
73	8633	8639	8645	8651	8657	8663	8669	8675	8681	8686	1	1	2	2	3	4	4	5	5
74	8692	8698	8704	8710	8716	8722	8727	8733	8739	8745	1	1	2	2	3	4	4	5	5
75	8751	8756	8762	8768	8774	8779	8785	8791	8797	8802	1	1	2	2	3	3	4	5	5
76	8808	8814	8820	8825	8831	8837	8842	8848	8854	8859	1	1	2	2	3	3	4	5	5
77	8865	8871	8876	8882	8887	8893	8899	8904	3910	8915	1	1	2	2	3	3	4	4	5
78	8921	8927	8932	8938	8943	8949	8954	8960	8965	8971	1	1	2	2	3	3	4	4	5
79	8976	8982	8987	8993	8998	9004	9009	9015	9020	9025	1	1	2	2	3	3	4	4	5
80	9031	9036	9042	9047	9053	9058	9063	9069	9074	9079	1	1	2	2	3	3	4	4	5
81	9085	9090	9096	9101	9106	9112	9117	9122	9128	9133	1	1	2	2	3	3	4	4	5
82	9138	9143	9149	9154	9159	9165	9170	9175	9180	9186	1	1	2	2	3	3	4	4	5
83	9191	9196	9201	9206	9212	9217	9222	9227	9232	9238	1	1	2	2	3	3	4	4	5
84	9243	9248	9253	9258	9263	9269	9274	9279	9284	9289	1	1	2	2	3	3	4	4	5
85	9294	9299	9304	9309	9315	9320	9325	9330	9335	9340	1	1	2	2	3	3	4	4	5
86	9345	9350	9355	9360	9365	9370	9375	9380	9385	9390	0	1	1	2	2	3	3	4	4
87	9395	9400	9405	9410	9415	9420	9425	9430	9435	9440	0	1	1	2	2	3	3	4	4
88	9445	9450	9455	9460	9465	9469	9474	9479	9484	9489	0	1	1	2	2	3	3	4	4
89	9494	9499	9504	9509	9513	9518	9523	9528	9533	9538	0	1	1	2	2	3	3	4	4
90	9542	9547	9552	9557	9562	9566	9571	9576	9581	9586	0	1	1	2	2	3	3	4	4
91	9590	9595	9600	9605	9609	9614	9619	9624	9628	9633	0	1	1	2	2	3	3	4	4
92	9638	9643	9647	9652	9657	9661	9666	9671	9675	9680	0	1	1	2	2	3	3	4	4
93	9685	9689	9694	9699	9703	9708	9713	9717	9722	9727	0	1	1	2	2	3	3	4	4
94	9731	9736	9741	9745	9750	9754	9759	9763	9768	9773	0	1	1	2	2	3	3	4	4
95	9777	9782	9786	9791	9795	9800	9805	9809	9814	9818	0	1	1	2	2	3	3	4	4
96	9823	9827	9832	9836	9841	9845	9850	9854	9859	9863	0	1	1	2	2	3	3	4	4
97	9868	9872	9877	9881	9886	9890	9894	9899	9903	9908	0	1	1	2	2	3	3	4	4
98	9912	9917	9921	9926	9930	9934	9939	9843	9948	9952	0	1	1	2	2	3	3	3	4
99	9956	9961	9965	9969	9974	9978	9983	9987	9991	9996									
	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9

ANTILOGARITHMS

	0	1	2	3	4	5	6	7	8	9	Mean Difference 1	2	3	4	5	6	7	8	9
.00	1000	1002	1005	1007	1009	1012	1014	1016	1019	1021	0	0	1	1	1	1	2	2	2
.01	1023	1026	1028	1030	1033	1035	1038	1040	1042	1045	0	0	1	1	1	1	2	2	2
.02	1047	1050	1052	1054	1057	1059	1062	1064	1067	1069	0	0	1	1	1	1	2	2	2
.03	1072	1074	1076	1079	1081	1084	1086	1089	1091	1094	0	0	1	1	1	1	2	2	2
.04	1096	1099	1102	1104	1107	1109	1112	1114	1117	1119	0	1	1	1	1	2	2	2	2
.05	1122	1125	1127	1130	1132	1135	1138	1140	1143	1146	0	1	1	1	1	2	2	2	2
.06	1148	1151	1153	1156	1159	1161	1164	1167	1169	1172	0	1	1	1	1	2	2	2	2
.07	1175	1178	1180	1183	1186	1189	1191	1194	1197	1199	0	1	1	1	1	2	2	2	3
.08	1202	1205	1208	1211	1213	1216	1219	1222	1225	1227	0	1	1	1	1	2	2	2	3
.09	1230	1233	1236	1239	1242	1245	1247	1250	1253	1256	0	1	1	1	1	2	2	2	3
.10	1259	1262	1265	1268	1271	1274	1276	1279	1282	1285	0	1	1	1	2	2	2	2	3
.11	1288	1291	1294	1297	1300	1303	1306	1309	1312	1315	0	1	1	1	2	2	2	2	3
.12	1318	1321	1324	1327	1330	1334	1337	1340	1343	1346	0	1	1	1	2	2	2	3	3
.13	1349	1352	1355	1358	1361	1365	1368	1371	1374	1377	0	1	1	1	2	2	2	3	3
.14	1380	1384	1387	1390	1393	1396	1400	1403	1406	1409	0	1	1	1	2	2	2	3	3
.15	1413	1416	1419	1422	1426	1429	1432	1435	1439	1442	0	1	1	1	2	2	2	3	3
.16	1445	1449	1452	1455	1459	1462	1466	1469	1472	1476	0	1	1	1	2	2	2	3	3
.17	1479	1483	1486	1489	1493	1496	1500	1503	1507	1510	0	1	1	1	2	2	2	3	3
.18	1514	1517	1521	1524	1528	1531	1535	1538	1542	1545	0	1	1	1	2	2	3	3	3
.19	1549	1552	1556	1560	1563	1567	1570	1574	1578	1581	0	1	1	1	2	2	3	3	3
.20	1585	1289	1592	1596	1600	1603	1607	1611	1614	1618	0	1	1	2	2	2	3	3	3
.21	1622	1626	1629	1633	1637	1641	1644	1648	1652	1656	0	1	1	2	2	2	3	3	3
.22	1660	1663	1667	1671	1675	1679	1683	1687	1690	1694	0	1	1	2	2	2	3	3	4
.23	1698	1702	1706	1710	1714	1718	1722	1726	1730	1734	0	1	1	2	2	2	3	3	4
.24	1738	1742	1746	1750	1754	1758	1762	1766	1770	1774	0	1	1	2	2	2	3	3	4
.25	1778	1782	1786	1791	1795	1799	1803	1807	1811	1816	0	1	1	2	2	3	3	3	4
.26	1820	1824	1828	1832	1837	1841	1845	1849	1854	1858	0	1	1	2	2	3	3	3	4
.27	1862	1866	1871	1875	1879	1884	1888	1892	1897	1901	0	1	1	2	2	3	3	4	4
.28	1905	1910	1914	1919	1923	1928	1932	1936	1941	1945	0	1	1	2	2	3	3	4	4
.29	1950	1954	1959	1963	1968	1972	1977	1982	1986	1991	0	1	1	2	2	3	3	4	4
.30	1995	2000	2004	2009	2014	2018	2023	2028	2032	2037	0	1	1	2	2	3	3	4	4
.31	2042	2046	2051	2056	2061	2065	2070	2075	2080	2084	0	1	1	2	2	3	3	4	4
.32	2089	2094	2099	2104	2109	2113	2118	2123	2128	2133	0	1	1	2	2	3	3	4	4
.33	2138	2143	2148	2153	2158	2163	2168	2173	2178	2183	0	1	1	2	2	3	3	4	4
.34	2188	2193	2198	2203	2208	2213	2218	2223	2228	2234	1	1	2	2	3	3	4	4	5
.35	2239	2244	2249	2254	2259	2265	2270	2275	2280	2286	1	1	2	2	3	3	4	4	5
.36	2291	2296	2301	2307	2312	2317	2323	2328	2333	2339	1	1	2	2	3	3	4	4	5
.37	2344	2350	2355	2360	2366	2371	2377	2382	2388	2393	1	1	2	2	3	3	4	4	5
.38	2399	2404	2410	2415	2421	2427	2432	2438	2443	2449	1	1	2	2	3	3	4	5	5
.39	2455	2460	2466	2472	2477	2483	2489	2495	2500	2506	1	1	2	2	3	4	4	5	5
.40	2512	2518	2523	2529	2535	2541	2547	2553	2559	2564	1	1	2	2	3	4	4	5	5
.41	2570	2576	2582	2588	2594	2600	2606	2612	2618	2624	1	1	2	2	3	4	4	5	6
.42	2630	2636	2642	2649	2655	2661	2667	2673	2679	2685	1	1	2	3	3	4	4	5	6
.43	2692	2698	2704	2710	2716	2723	2729	2735	2742	2748	1	1	2	3	3	4	4	5	6
.44	2754	2761	2767	2773	2780	2786	2793	2799	2805	2812	1	1	2	3	3	4	5	5	6
.45	2818	2825	2831	2838	2844	2851	2858	2864	2871	2877	1	1	2	3	3	4	5	5	6
.46	2884	2891	2897	2904	2911	2917	2924	2931	2938	2944	1	1	2	3	3	4	5	5	6
.47	2951	2958	2965	2972	2979	2985	2992	2999	3006	3013	1	1	2	3	4	4	5	6	6
.48	3020	3027	3034	3041	3048	3055	3062	3069	3076	3083	1	1	2	3	4	4	5	6	6
.49	3090	3097	3105	3112	3119	3126	3133	3141	3148	3155	1	2	3	4	5	6	7	8	9
	0	1	2	3	4	5	6	7	8	9									

ANTILOGARITHMS

	0	1	2	3	4	5	6	7	8	9	Mean Difference 1	2	3	4	5	6	7	8	9
.50	3162	3170	3177	3184	3192	3199	3206	3214	3221	3228	1	1	2	3	4	4	5	6	7
.51	3236	3243	3251	3258	3266	3273	3281	3289	3296	3304	1	2	2	3	4	5	5	6	7
.52	3311	3319	3327	3334	3342	3350	3357	3365	3373	3381	1	2	2	3	4	5	5	6	7
.53	3388	3396	3404	3412	3420	3428	3436	3443	3451	3459	1	2	2	3	4	5	6	6	7
.54	3467	3475	3483	3491	3499	3508	3516	3524	3532	3540	1	2	2	3	4	5	6	6	7
.55	3548	3556	3565	3573	3581	3589	3597	3606	3614	3622	1	2	2	3	4	5	6	7	7
.56	3631	3639	3648	3656	3664	3673	3681	3690	3698	3707	1	2	3	3	4	5	6	7	8
.57	3715	3724	3733	3741	3750	3758	3767	3776	3784	3793	1	2	3	3	4	5	6	7	8
.58	3802	3811	3819	3828	3837	3846	3855	3864	3873	3882	1	2	3	4	4	5	6	7	8
.59	3890	3899	3908	3917	3926	3936	3945	3954	3963	3972	1	2	3	4	5	5	6	7	8
.60	3981	3990	3999	4009	4018	4027	4036	4046	4055	4064	1	2	3	4	5	6	6	7	8
.61	4074	4083	4093	4102	4111	4121	4130	4140	4150	4159	1	2	3	4	5	6	7	8	9
.62	4169	4178	4188	4198	4207	4217	4227	4236	4246	4256	1	2	3	4	5	6	7	8	9
.63	4266	4276	4285	4295	4305	4315	4325	4335	4345	4355	1	2	3	4	5	6	7	8	9
.64	4365	4375	4385	4395	4406	4416	4426	4436	4446	4457	1	2	3	4	5	6	7	8	9
.65	4467	4477	4487	4498	4508	4519	4529	4539	4550	4560	1	2	3	4	5	6	7	9	10
.66	4571	4581	4592	4603	4613	4624	4634	4645	4656	4667	1	2	3	4	5	7	8	9	10
.67	4677	4688	4699	4710	4721	4732	4742	4753	4764	4775	1	2	3	4	6	7	8	9	10
.68	4786	4797	4808	4819	4831	4842	4853	4864	4875	4887	1	2	3	5	6	7	8	9	10
.69	4898	4909	4920	4932	4943	4955	4966	4977	4989	5000	1	2	4	5	6	7	8	9	11
.70	5012	5023	5035	5047	5058	5070	5082	5093	5105	5117	1	2	4	5	6	7	8	10	11
.71	5129	5140	5152	5164	5176	5188	5200	5212	5224	5236	1	2	4	5	6	7	9	10	11
.72	5248	5260	5272	5284	5297	5309	5321	5333	5346	5358	1	3	4	5	6	8	9	10	11
.73	5370	5383	5395	5408	5420	5433	5445	5458	5470	5483	1	3	4	5	6	8	9	10	12
.74	5495	5508	5521	5534	5546	5559	5572	5585	5598	5610	1	3	4	5	7	8	9	10	12
.75	5623	5636	5649	5662	5675	5689	5702	5715	5728	5741	1	3	4	5	7	8	9	11	12
.76	5754	5768	5781	5794	5808	5821	5834	5848	5861	5875	1	3	4	5	7	8	10	11	12
.77	5888	5902	5916	5929	5943	5957	5970	5984	5998	6012	1	3	4	6	7	8	10	11	13
.78	6026	6039	6053	6067	6081	6095	6109	6124	6138	6152	1	3	4	6	7	9	10	11	13
.79	6166	6180	6194	6209	6223	6237	6252	6266	6281	6295	1	3	4	6	7	9	10	12	13
.80	6310	6324	6339	6353	6368	6383	6397	6412	6427	6442	2	3	5	6	8	9	11	12	14
.81	6457	6471	6486	6501	6516	6531	6546	6561	6577	6592	2	3	5	6	8	9	11	12	14
.82	6607	6622	6637	6653	6668	6683	6699	6715	6730	6745	2	3	5	6	8	9	11	13	14
.83	6761	6776	6792	6808	6823	6839	6855	6871	6887	6902	2	3	5	6	8	10	11	13	15
.84	6918	6934	6950	6966	6982	6998	7015	7031	7047	7063	2	3	5	7	8	10	12	13	15
.85	7079	7096	7112	7129	7145	7161	7178	7194	7211	7228	2	3	5	7	8	10	12	13	15
.86	7244	7261	7278	7295	7311	7328	7345	7362	7379	7396	2	3	5	7	9	10	12	14	16
.87	7413	7430	7447	7464	7482	7499	7516	7534	7551	7568	2	4	5	7	9	11	12	14	16
.88	7586	7603	7621	7638	7656	7674	7691	7709	7727	7745	2	4	5	7	9	11	12	14	16
.89	7762	7780	7798	7816	7834	7852	7870	7889	7907	7925	2	4	6	7	9	11	13	15	17
.90	7943	7962	7980	7998	8017	8035	8054	8072	8091	8110	2	4	6	8	9	11	13	15	17
.91	8128	8147	8166	8185	8204	8222	8241	8260	8279	8299	2	4	6	8	10	12	14	15	17
.92	8318	8337	8356	8375	8395	8414	8433	8453	8472	8492	2	4	6	8	10	12	14	16	18
.93	8511	8531	8551	8570	8590	8610	8630	8650	8670	8690	2	4	6	8	10	12	14	16	18
.94	8710	8730	8750	8770	8790	8810	8831	8851	8872	8892	2	4	6	8	10	12	15	17	19
.95	8913	8933	8954	8974	8995	9016	9036	9057	9078	9099	2	4	6	8	11	13	15	17	19
.96	9120	9141	9162	9183	9204	9226	9247	9268	9290	9311	2	4	7	9	11	13	15	17	20
.97	9333	9354	9376	9397	9419	9441	9462	9484	9506	9528	2	4	7	9	11	13	16	18	20
.98	9550	9572	9594	9616	9638	9661	9683	9705	9727	9750	2	5	7	9	11	14	16	18	20
.99	9772	9795	9817	9840	9863	9886	9908	9931	9954	9977	2	5	7	9	11	14	16	18	20
	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9

SUPPLEMENTARY EXAMINATION : February 2020

PAPER CODE: BA206
Time: 3:00 Hours

TITLE OF PAPER- INVESTMENT MANAGEMENT
Max. Marks: 75

TIME: 3 HRS

MAX.MARKS: 75

Attempt any five question. All question carry equal marks.

Q1. a) Define the term investment. How is it different from speculation? (5)

b) The expected return and standard deviation for two investments are as follows:

	Project X	Project Y
Expected return	15%	25%
Standard deviation	10	15

Advice the investor? (10)

Q2. a) What do you mean by risk-return trade-off? Why have different investment varying degree of expected return? (8)

b) What is indirect investing? How it is different from direct investing? Give suitable example to support your question. (7)

Q3. a) What is meant by financial system? What are the functions of sound financial system? (7)

b) Write short notes on: (8)

(i) Financial markets (ii) financial instruments.

Q4. a) What factors should an investor consider while making investment decision? (5)

b) Mr. Z had purchased a bond at a price of Rs.800 with a coupon payment of Rs. 150 and sold it for Rs.1,000. (i) What is his holding period return? And (ii) If the bond is sold for Rs. 750 after receiving Rs. 150 as coupon payment, then what is his holding period return?

End-Term Examination (Supplementary - Feb-2020

Course: BA (H) Economics
Subject: Development Economics I
Maximum Marks: 75

Semester: V
Subject code: BA 302
Maximum Time: 3 Hours

Instructions:
(1) All questions carry equal weight.
(2) Answer any five questions.

1. What are the different paths of Political Development? Explain the difference between democracy and non-democracy.

2. Discuss the relation between political equality and economic equality. Why is political equality considered essential for democracy?

3. Discuss the three models that theorise the relation between natural resources and individuals of society.

4. Based on Amartya Sen's view on Capability deprivation and Economic deprivation, discuss the social deprivation and issue of unemployment.

5. Discuss differences between absolute and relative poverty. In light of the same, explain the idea of poverty line.

6. If the production function is denoted by $Y = A\ K^{\theta}\ L^{(1-\theta)}$, then prove that labour share of Income is $(1-\theta)$.

7. Calculate growth rate of per capita physical capital (k) and per capita human capital (h). Assume "h/k = r" i.e. r denotes the ratio of human to physical capital in the long run. ($y = k^{\alpha}h^{1-\alpha}$).

PTO

Subject Code: BA 302

Subject: Development Economics I

Semester: V

Programme: BA (H) Economics

Teacher: Manish Kumar

Total No. of Pages: 6

Roll No.....

BA(H) Economics

V SEMESTER

SUPLLEMENTARY EXAMINATION *February 2020*

BA 304: Applied Econometrics

Time: 3:00 Hours *Max. Marks : 75*

Note : 1. Attempt any five questions.
2. All parts within each question are to be answered in a continuous manner on the answer sheet.
3. Internal choice is given in some questions.
4. Use of statistical tables and calculator is allowed.

Q.1 (a) State and explain the assumptions of the Classical Linear Regression Model (CLRM) using matrix notation. [5]

(b) Prove the following results:

(i) $\hat{\beta} = (X'X)^{-1}X'y$

(ii) var-cov $(\hat{\beta}) = \sigma^2(X'X)^{-1}$ [5]

(c) Obtain the regression equation of Y on X using the matrix method for the following data: [5]

X	Y
6	9
2	11
10	5
4	8
8	7

Q.2 [a] Explain the concept of dummy variable trap. Briefly explain the two methods used to avoid the problem of dummy variable trap in regression analysis. Which of the two methods is preferable? [5]

[b] Prove that in a regression model involving only dummy variables, the intercept term is equal to the average of the observations in the base category while the slope coefficient is equal to the difference in the average of the observations in the two categories. [5]

[c] Using data for 526 individuals, the following model of wage determination was estimated:

$$LOG(W)_i = B_0 + B_1 D_i + B_2 EDU_i + B_3 (D * EDU)_i + u_i$$

where

W : Daily wages in rupees

D : Dummy variable for gender, D = 1 for females and 0 for males

EDU : Years of education

D*EDU : Interactive dummy

The table below gives the estimated regression coefficients and their standard errors:

	Estimated Coefficients	Standard errors
CONSTANT	0.3890	0.1190
D	-0.2270	0.1680
EDU	0.0820	0.0080
D*EDU	-0.0056	0.0131

$$\hat{C}_t = 1.88 + 0.086YD_t + 0.911C_{t-1}$$

(4.49) (.028) (.0304)

$DW = 1.569 \quad R^2 = 0.999$

Which test should be used to test the presence of AR (1) error process in this model? Describe the test and perform this test at 5% level of significance. [5]

Q.6 [a] Explain the concept of omitted variable bias. State and explain the conditions under which the bias disappears. [5]

[b] What are the desirable properties of an instrumental variable? [5]

[c] Consider a simple model to measure the effects of taking a preparatory course (a binary variable, course) on eventual score on a college admissions exam:

score = $\beta_0 + \beta_1$course + u

(i) Why might course be correlated with u?

(ii) Is course likely to be related to parents' income? If so, does this mean parental income is a good IV for course? Explain. [5]

males and females separately.

(b) The returns to education are measured by the percentage increase in wages due to an extra year of education. Using the results from part (a), find the returns to education, for females and males.

(c) Is the difference between returns to education for males and females statistically significant at 5% level of significance? [5]

Q.3 [a] Explain the steps involved in executing the Chow Test to test for the presence of structural change in a dataset. What are the limitations of this test? How can the dummy variable technique be used to overcome these limitations? [10]

[b] Consider the regression model, $BILL_t = B_1 + B_2\left(\frac{1}{FRIENDS_t}\right) + B_3 D_t + u_t$

where *BILL*: bill paid by a student for a post-paid mobile connection for the month of July, 2015 (in rupees)

FRIENDS: number of close friends of the student

$D_t = 1$ if the student's parents live in the same city

= 0 otherwise

The regression results are reported as follows:

$$\widehat{BILL}_t = 539 - 45\left(\frac{1}{FRIENDS_t}\right) - 134 D_t$$

(p-value) = (0.025) (0.003) (0.012) n=45

(a) Is the data time series or cross section?

(b) Write the regression equations for the students whose parents stay in the same city and for students whose parents do not stay in the same city.

(c) What are the upper limits to the bill paid for the two categories of the students?

(d) Test the statistical significance of B_3 at 5% level of significance. State the null and alternative hypothesis. [5]

Q.4 [a] Prove that in the case of Koyck Model, the Mean and Median lags are given by the following relationships:

(i) Mean Lag $= \frac{\lambda}{1-\lambda}$

(ii) Median Lag $= -\frac{\ln 2}{\ln \lambda}$

Where λ is the rate of decline/decay [5]

[b] Consider the following regression model:

$$Y_t^* = \beta_0 + \beta_1 X_t + u_t$$

where Y_t^* is the desired or long-run business expenditure for new plant and equipment, X_t is sales and t represents time. Using the stock adjustment model, and data on fixed plant and equipment in manufacturing and sales for the period 1970-1991, the following results were obtained:

Dependent variable: Y_t
Method: Least Squares
Observations 1971-1991 (T = 21)

	coefficient	std. error	t-ratio	p-value
const	-15.1040	4.72945	-3.194	0.0050 ***
X_t	0.629273	0.0978191	6.433	4.70e-06 ***
Y_t (-1)	0.271676	0.114858	2.365	0.0294 **
Mean dependent var.	109.2167	S.D. dependent var		51.78550
Sum squared resid.	690.5208	S.E. of regression		6.193728
R-squared	0.987125	Adjusted R-squared		0.985695
F(2, 18)	690.0561	P-value(F)		9.72e-18
Log-likelihood	-66.47341	Akaike criterion		138.9468
Schwarz criterion	142.0804	Hannan-Quinn		139.6269
Rho	0.229740	Durbin-Watson		1.518595

(i) Show how the stock adjustment's hypothesis regarding Y_t^* has been used to transform the model into an autoregressive model. Write down the transformed model and outline its features.

(ii) What is the estimated coefficient of adjustment? Explain what it means.

(iii) Write down the estimated long- and short run demand functions for expenditure on new plant and equipment. [5]

[c] Explain how the adaptive expectations hypothesis be used to estimate the following model:

$$Y_t = \beta_0 + \beta_1 X_t^* + u_t$$

Where Y = demand for money

X^* = expected rate of interest

u = error term [5]

Q.5 [a] What is meant by a fixed effects model (FEM)? Since panel data have both time and space dimensions, how does FEM allow for both dimensions? [5]

[b] When is Hausman Test used? Briefly explain the steps involved. [5]

[c] Based on 147 quarterly observations, an aggregate consumption function is estimated wherein aggregate consumption expenditure Ct is regressed on disposable income YDt and one period lagged dependent variable.

The estimated least squares equation is as follows (standard errors in parantheses):

V SEMESTER

Roll No.....

B.A. (H) Economics

SUPPLEMENTARY EXAMINATION

PAPER CODE: BA308 : February-2020

TITLE OF PAPER: MONEY AND FINANCIAL MARKETS

Time: 3:00 Hours

Max. Marks: 75

Note: Answer any *FIVE* questions.
All questions carry equal marks.

1. Derive deposit multiplier and complete money multiplier. Will deposits, currency holdings and money stock rise / fall / remain the same if the central bank sells Rs 1 lakh worth of government securities from open market, and by how much amount, when: (9 + 6 = 15)
   i. Required Reserve Ratio = 15%
   ii. Desired Excess Reserve Ratio = 10%
   iii. Desired Currency to Deposit Ratio = 20%

2. [a] Buying an asset in cash market is better than buying the same asset through a call option. Critically analyze. (7)
   [b] Discuss various reforms taken place in the following sectors/ markets during the period of 1991-2003 in India: (8)
   i. Primary and secondary stock market reforms
   ii. Government securities market

3. [a] What are bank strategies for countering the problems of asymmetric information? (7)
   [b] Critically analyze targeting nominal GDP as an intermediate target for the central bank's monetary policy actions, in both short-run and long-run. Substantiate your answer with the help of diagram(s). (8)

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moral hazard problems in financial markets? (6)

[b] Suppose the only source of income for various operations of central bank is the interest income that it receives from the holdings of government securities. (9)

i. If central bank increases money supply in the economy, will it necessarily increase the income of central bank from its securities portfolio?

ii. Other things equal, would you expect the central bank to favour increases in monetary base or decreases in the reserve ratio as a means of increasing the money supply? Discuss.

5. [a] Determine whether the following scenarios are most consistent with the expectations, segmented-markets, or preferred hypothesis. Give reasons for your answers. (6)

i. Rahul's sole criteria in choosing among bonds with varying maturities is the expected yield he will earn on the bonds.

ii. Raj wishes to earn a high expected return on his investments but has a preference for five-year bonds. He will, however, consider purchasing shorter or longer-term bonds if they offer a substantial higher yield.

iii. Jay prefers one-year bonds even if they have a lower yield than any other bond.

[b] Whenever central bank takes any monetary policy action, changes in money supply do not translate into changes in aggregate demand immediately. Discuss the possible reasons for the same. (9)

6. [a] BUS, Inc., has a Rs1 million bond outstanding that will mature in one year. The bond pays a coupon rate of 10%, which equals the default-free market interest rate. (10)

i. If investors believe BUS is certain to meet its payment obligations, how much will they be willing to pay for this bond?

BUS bonds?

iii. Suppose now, a recent report reveals a 2% chance that BUS will not make any debt payments.

A. How much will a risk-neutral investor pay for a BUS bond?

B. What is the yield to maturity on this bond given the new information?

C. What is the default risk premium given the new information?

D. Would your answers in parts (ii) and (iii) differ if investors were risk averse? Explain

[b] Assuming market interest rate is 9%, determine the price and yield of the following: (5)

i. A Rs10000 treasury bill that matures in one year

ii. A Rs1000 coupon bond that has a coupon rate of 10% and matures in one year

7. [a] Central bank sometimes gets wrong on its predictions about the model that can represent the economy in the best way. Consider the following cases and explain how can the central bank's policy decisions be adversely influenced by its use of the wrong model? Explain your answer through diagram(s). (10)

i. The economy is best represented by the long-run model, but the central bank thinks the aggregate supply curve is upward sloping.

ii. The economy is best represented by a model with upward sloping aggregate supply, but the central bank thinks the aggregate supply curve is vertical.

[b] Rich people often worry that others will seek to marry them only for their money. Is this a problem of adverse selection? Discuss (5)

8. [a] What were the policy responses under Basel III norms for tackling the Global Financial Crisis of 2007-08? (12)

[b] Write short note on Benchmark Prime Lending Rate System.(3)

V[th] SEMESTER

B.A. (H) Economics

SUPPLEMENTARY EXAMINATION February 2020

PAPER CODE: BA309 TITLE OF PAPER: Public Economics

Time: 3:00 Hours *Max. Marks: 75*

Note: Attempt any five questions out of seven.
All questions carry equal marks.

Q.1 [a] How has Tiebout responded to the conclusion given by Samuelson that the individuals do not reveal their preferences for public goods? Explain his model with a diagram. (8)

[b] Write short notes on the following theories of public sector growth:

(i) Wagner's law (ii) Ratchet effect (7)

Q.2 [a] The source of market inefficiency is the divergence between private and social benefits (costs). How can we eliminate such divergence through Pigouvian taxation? Use diagram to support your answer. (8)

[b] Explain the decentralization theorem in context of welfare gains from multiple fiscal units. (7)

Q.3 [a] Why are taxes distortionary in nature? The amount by which price rises depends on the shape of the demand and supply curves, not on whom the tax is levied. In this background, explain the relationship between elasticity and tax incidence. Use diagrams to support your answer. (8)

$P = 100 - 2Q$
$P = 10 + Q$

A specific tax of $ 15 is levied on the consumers:

i) Find the pre-tax and post-tax market equilibrium. (2)
ii) Show that the tax incidence is invariant to a commodity tax of $ 15 levied on consumers or producers. (3)
iii) Who among the consumers and the producers bears the greater burden of the tax and why? (2)

Q.4 [a] How goods can be classified as public goods, private goods or mixed goods on the basis of degree of indivisibility and size of interacting group? Explain with a diagram. (8)

[b] Derive the numerical expression for calculating dead weight loss associated with commodity taxation, clearly specifying the various elements involved. (7)

Q.5 [a] How is lump sum tax different from per unit commodity tax? Compare between a lump sum tax and a commodity tax on a good when the two tax instruments raise the same level of revenue. Explain your answer in terms of income effect substitution effect and the deadweight loss. Use diagram to support your answer. (8)

[b] Explain with diagram how the provision of a public good takes place. What is the unique feature of such provision vis-à-vis the provision of a private good? (7)

Q.6 [a] Compare the tax schedule and the average and marginal tax rates of a proportional and a progressive flat rate income tax. Support your answer with a diagram. (8)

[b] There are large number of commuters who decide to use either their car or a bus. Assuming that commuting by bus is increasing with the proportion of commuters using car (traffic congestion). Let the commuting time by bus be $B(x) = 40 + 20x$ and the commuting time by car be $C(x) = 20 + 60x$, where x is the proportion of commuters taking their car, $0 \leq x \leq 1$.

(i) What is the proportion of commuters who will take their car if everyone is taking their decision independently so as to minimize her own commuting time?

(ii) What is the proportion of car users that minimize the total commuting time? (7)

Q.7 [a] Explain with the help of an economic model how existence of bureaucracy can lead to excessive public expenditure? (8)

[b] Explain the tax compliance game with reference to audit and tax evasion. (7)

3RD _____ SEMESTER [redacted]

END SEMESTER EXAMINATION = February-2020

PAPER CODE-AE009

Soft skills and personality development

Time: 3:00 Hours *Max. Marks : 75*

Note : Answer all question by Selecting any two parts from each questions.
All questions carry equal marks.
Assume suitable missing data, if any.

Q.1[a]Soft skills are mutual respect skills. Explain the role of empathy in making leadership effective?

[b] Discuss the essentials of a good report and how to avoid making it too lengthy?

[c] Everything begins with goal setting- comment?

Q.2 [a] Why is it important to answer the question-Who is a self aware person. What are the assumptions of a self aware person?

[b] What is the difference between mentoring and coaching?

[c] Communication is an art or skill- comment highlighting the role of effective listening?

Q.3 [a] Self Confidence can be developed. Comment?

[b] Explain the stages of a Career plan?

[c] What is the impact of Non Verbal Communication in an interview and group discussion?

Q.4 [a] What is the importance of ethical communication?

[b] Explain the KISS rule and its relevance in written communication?

[c] Discuss the components of speech?

Q.5 [a] Explain the term self esteem highlighting the facets of low and high self esteem?

[b]Discuss semantic and language barriers in communication?

[c]Explain the do' and dont's of Resume writing?