

**(ELI20115)**

M.Sc. DEGREE EXAMINATION, APRIL 2017.

Second Semester

Electronics and Instrumentation

Paper I — MEASUREMENT PRINCIPLES AND  
MEASURING SYSTEMS

(Regulation 2015)

Time : Three hours

Maximum : 70 marks

UNIT I

1. (a) Explain the importance of calibration and standards in a measurement system. (6)
- (b) Distinguish between the salient features of proximity and non-proximity types of instruments and list some of their advantages. (8)

Or

- (c) How systematic errors are classified? Give suitable examples and explain the measures to minimize the errors. (8)
- (d) Discuss in detail about the principle and operation of digital weighing machine and list its major applications. (6)

## UNIT II

2. (a) Briefly explain the static and dynamic characteristics of a measuring system. (7)
- (b) Discuss in detail about the working of sensors for weather monitoring system and their implications. (7)

Or

- (c) Explain the concepts of range, resolution, reproducibility and operating environment of measuring systems. (7)
- (d) How do you measure the water quality using sensors and explain the process flow involved in it. (7)

## UNIT III

3. (a) Discuss in detail about the methods for measurement of torque and list its major areas of applications. (7)
- (b) Give a detailed account on the specifications of instruments used for measuring electrical parameters. (7)

Or

- (c) Explain the working of flow sensor for HVAC systems. (7)
- (d) Briefly discuss about different methods for measurements of temperature and pressure. (7)

## UNIT IV

4. (a) Explain the importance of calibration of measuring instruments. (4)
- (b) Discuss in detail about different methods for calibration of level sensors. (10)

Or

- (c) Distinguish the differences between primary and secondary calibrations. (4)
- (d) Write notes on periodic laboratory and field calibrations of humidity sensors. (10)

## UNIT V

5. (a) Explain the terms of physical variations and parallax errors with examples. (6)
- (b) Write notes on reporting errors in measurements with examples. (8)

Or

- (c) Briefly discuss about different methods of calculations with errors. (8)
- (d) Compare estimating errors of single measurements and repeated measurements. (6)

(ELI20215)

M.Sc. DEGREE EXAMINATION, APRIL 2017.

Second Semester

Electronics and Instrumentation

Paper II — STATISTICAL TOOLS

(Regulation 2015)

Time : Three hours

Maximum : 70 marks

Answer ALL questions.

1. (a) Find the median of the 5 variables A.E. shown below.

Person	Variable A	Variable B	Variable C	Variable D	Variable E
1	0	0	0	0	0
2	0	4	1	1	6
3	1	4	2	1	7
4	1	4	3	2	7
5	1	5	4	2	7
6	5	5	5	2	8
7	9	5	6	3	8
8	9	6	7	3	8
9	9	6	8	3	9
10	10	6	9	4	9
11	10	10	10	10	10

- (b) While bargaining for their new contract, the employees of 2 Dye 4 clothing asked their employers to provide day care service as an employee benefit. Examining the personnel files of the company's 50 employees, the management recorded the number of children under six years of age that each employee was caring for.

The following results were obtained :

0 2 1 0 3 2 0 1 1 0  
0 1 1 2 4 1 0 1 1 0  
2 1 0 0 3 0 0 1 2 1  
0 0 2 4 1 1 0 1 2 0  
1 1 0 3 5 1 2 1 3 2

Organize the data by creating a frequency distribution.

Or

- (c) Jim court right surveyed the price of unleaded gasoline (self-serve) at the gas stations in his neighbourhood. He found the following prices, in dollars per gallon: 1.269, 1.249, 1.199, 1.299, 1.239, 1.349, 1.289, 1.259. What percent of the data lies within one standard deviation of the mean?

- (d) Frequency distribution of Maze-Running times (recorded to nearest second) for 100 "Mase-Dull" Rats.

Time	Frequency
60.5–67.5	23
67.5–74.5	38
74.5–81.5	17
81.5–88.5	12
88.5–95.5	06
95.5–102.5	04

Calculate Skp, SK and kur of each set of data.

2. (a) Display the following data in a pie chart and pictogram.

The total world wool production was distributed over various countries as following in 2014:

Country	% of wool world production produced
Australia	30%
USSR	30%
New Zealand	20%
Argentina	10%
South Africa	10%
Others	10%

- (b) During the term 10 pupils obtained the following scores in Mathematics and Science (out of 50)

Maths	29	38	22	27	32	41	20	32	36	31
Science	27	34	26	34	27	42	21	28	34	29

- (i) Draw a scatter graph to represent the data.  
 (ii) All pupil's score in mathematics and science correlated  
 (iii) Find the mean of the maths scores and the science scores to draw the line of best fit.

Or

- (c) Represent the following data in a line graph and comment on the trend. Number of pupils in a primary school 2008–2014.

Year	Number
2008	450
2009	435
2010	465
2011	478
2012	490
2013	510
2014	524

- (d) Represent the following data in a bar chart.

The percent of pupils obtaining a certain grade in a test are listed:

Grade	A	B	C	D	E	F	G
% of pupils	2	5	36	24	15	9	4

3. (a) Define secular trend of a time series and explain methods that are used in isolating it.  
 (b) The production data of steel in a factory in the past 10 years are given below:

Year : 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013

Production (Tonnes): 75 86 98 90 96 108 124 140 150 165

Fit a straight line trend and tabulate the trend values. What is the expected production in 2014 on the basis of the trend? ( $Y = 113.2 + 5.08X$ ;  $Y = 169.98$ )?

Or

- (c) What are the various methods for determining trend in a time series? Describe in detail the method of least squares for determining trend.  
 (d) Fit a straight-line trend by the method of least squares to the data given below and present them on graph and show also the trend line:

Year : 2008 2009 2010 2011 2012 2013 2014

Profits ('000 Rs.): 300 700 600 800 900 700 900

$[Y = 700 + 75X]$ .

4. (a) Let  $P$  be the plane in 3-space with equation  $x + 2y + z = 6$ . What is the equation of the plane  $P_0$  through the origin parallel to  $P$ ? Are  $P$  and  $P_0$  subspaces of  $R^3$ ?

Or

- (b) Show that the set of non singular 2 by 2 matrices is not a vector space. Show also that the set of singular 2 by 2 matrices is not a vector space.  
 (c) Describe the set of attainable right sides  $b$  for

$$\begin{bmatrix} 1 & 0 \\ 0 & 1 \\ 2 & 3 \end{bmatrix} \begin{bmatrix} u \\ v \end{bmatrix} = \begin{bmatrix} b_1 \\ b_2 \\ b_3 \end{bmatrix},$$

by finding the constraints on  $b$  that turn the third equation into  $0 = 0$  (after elimination). What is the rank? How many free variables, and how many solutions?

5. (a) The flash unit on a camera operates by storing charge on a capacitor and releasing it suddenly when the flash is set off the data at the left describe the change  $Q$  remaining on the capacitor (measured in micro coulombs) at time  $t$  (measured in seconds after the flash goes off). Use the data to draw the graph of this function and estimate the slope of the tangent line at the point where  $t = 0.04$  [Note: the slope of the tangent line represents the electric current flowing from the capacitor to the flash bulb (measured in micro amperes)].

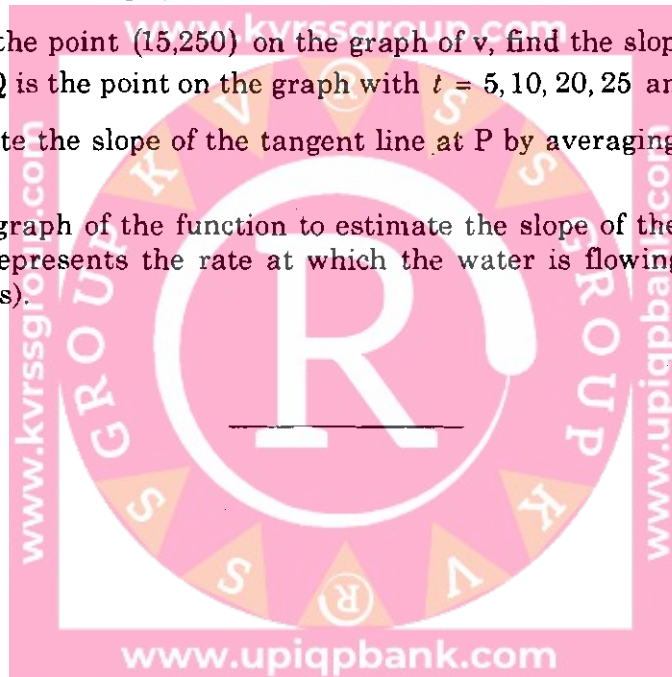
t	Q
0.00	100.00
0.02	81.87
0.04	67.03
0.06	54.88
0.08	44.93
0.10	36.76

Or

- (b) A tank holds 1000 gallons of water, which drains from the bottom of the tank in half an hour. The values in the table show the volume  $V$  of water remaining in the tank (in gallons) after  $t$  minutes.

t (min)	5	10	15	20	25	30
v (gal)	694	444	250	111	28	0

- (i) If  $p$  is the point  $(15, 250)$  on the graph of  $v$ , find the slopes of the secant lines  $PQ$  when  $Q$  is the point on the graph with  $t = 5, 10, 20, 25$  and  $30$ .
- (ii) Estimate the slope of the tangent line at  $P$  by averaging the slopes of two secant lines.
- (iii) Use a graph of the function to estimate the slope of the tangent line at  $P$ . (This slope represents the rate at which the water is flowing from the tank after 15 minutes).



**(ELI20315)**

M.Sc. DEGREE EXAMINATION, APRIL 2017.

Second Semester

www.kvrssgroup.com Electronics and Instrumentation

Paper III -- ALGORITHMS AND PROGRAMMING

(Regulation 2015)

Time : Three hours

Maximum : 70 marks

Answer ALL questions.

1. (a) Define algorithm and mention its properties. (6)

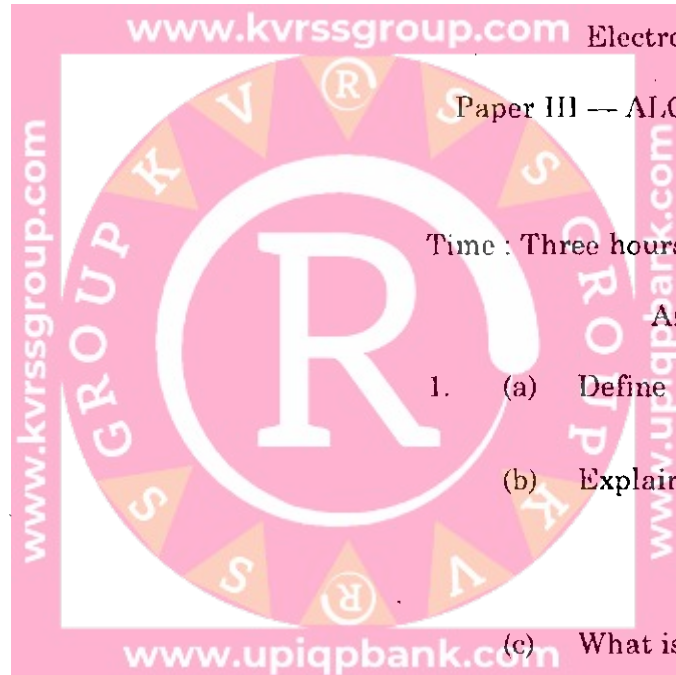
(b) Explain different operators with example. (8)

Or

(c) What is a Macro and its example. (3)

(d) Explain about storage clauses in C-Lang with an example. (8)

(e) Write an algorithm to generate Fibonacci numbers up to the given number. (3)



2. (a) Explain Branching statements in detail. (8)  
(b) Explain identifiers, keywords and data types of C-Lang. (6)

Or

- (c) Explain different loop statements with examples. (8)  
(d) Write a program to check whether the given number is Armstrong (or) not. (6)
3. (a) What is an array and explain with example. (8)  
(b) Write a brief note on structures, pointers and unions. (6)

Or

- (c) Write a program to read students marks record from user and display the list of failed students the student record includes student name, number, subject, marks (marks 1, marks 2, marks 3) if the marks are <35 then student is failed. (12)  
(d) Explain advantages of structures. (2)

4. (a) Explain the procedure for converting given infix expression into post-fix. (4)  
(b) What is stack? Write algorithm for PUSH, POP and DISPLAY operations on stack. (8)

Or

- (c) Define Queue, Circular Queue and write algorithms for insertion, deletion and display operations on circular queue. (14)
5. (a) Write algorithm for Quick sort and Heap sort. (14)

Or

- (b) Write algorithm for Merge sort. (7)  
(c) Write advantages and disadvantages of each sorting techniques w.r.t. time taken to sort out. (7)

**(ELI20415)**

M.Sc. DEGREE EXAMINATION, APRIL 2017.

Second Semester

Electronics and Instrumentation

Paper IV -- MICROPROCESSORS

(Regulation 2015)

Time : Three hours

Maximum : 70 marks

Answer ALL questions.

1. (a) Explain the Harvard and Von Neumann architectures of a microcontroller and compare their salient features.
- (b) How do you describe Stack and Heap in microcontrollers?

Or

- (c) Compare the differences in features between CISC and RISC architectures.
- (d) Compare little and big-Indian modes in ARM processor.

2. (a) Write down the pin-outs and pin functions of an ARM processor.
- (b) Explain the architecture and working of ARM processor.

Or

- (c) Give a detailed account on the principle and operation of memory interface.
- (d) Write down the features Cortex family.
3. (a) Discuss the theory and working of PLL and its usage as frequency multiplier.
- (b) Explain the need of Watch dog in embedded systems with examples.

Or

- (c) Discuss in detail about the principle and working of Debugger.
- (d) Compare the salient features between SWJ, ARM and Cortex debuggers.
4. (a) Give a brief account on the need for analog and digital interfaces in microcontrollers.
- (b) Give examples on how voltages can be measured using a microcontroller.

Or

- (c) Discuss in detail about the working of PWM and its need in embedded systems.
- (d) What is meant by Internal RTC and how it can be used as peripheral in systems?

5.

- (a) Explain the working of programmable serial interface 8251 and list its uses.
- (b) Discuss the importance of programmable interrupt controller 8259.

Or

- (c) Explain the working of DAC interfacing and write program for square wave generation.
- (d) Give a detailed account on the working of a traffic light controller.

**(ELI20515)**

M.Sc. DEGREE EXAMINATION, APRIL 2017.

Second Semester

Electronics and Instrumentation

Paper V — DBMS AND BIG DATA

(Regulation 2015)

Time : Three hours

Maximum : 70 marks

Answer the following questions.

1. (a) Define DBMS. Why would we choose a strong data base system instead of simply storing the data in files? Explain the three tiered data base location architecture. (14)

Or

- (b) Define Data. What is Data model? List and explain different data models used under DBMS.

2. (a) What is E-R model. Give basic definitions related to integrity constraints normal forms. (14)

Or

- (b) Explain the functional dependencies and its uses under relational data model.

3. (a) Define big data. Explain the characteristics and key challenges for big data. (14)

Or

(b) List out different tools and techniques of big data and how it is important under DBMS.

4. (a) List use cases of all types of NOSQL Data base. Explain when we should not use them for all types of data base. Which database is suitable to a store user? (14)

Or

(b) Introduce NOSQL Explain the design and terminologies used under NOSQL data base. (14)

5. (a) Explain briefly the following cassandra. (7)

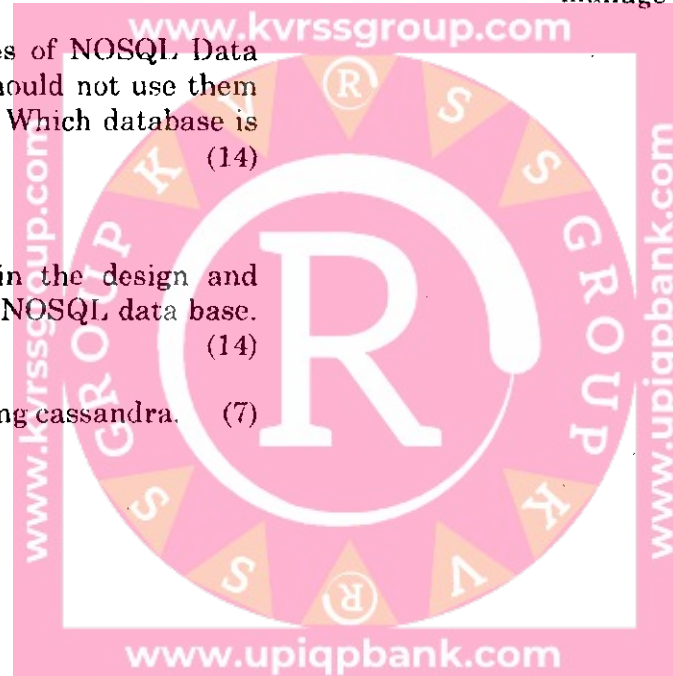
- (i) NODE
- (ii) Data centre
- (iii) Cluster
- (iv) Commit log
- (v) MEM Table
- (vi) SS Table.

(b) Explain the difference between RDBMS and cassandra with an example. (7)

Or

(c) Design cassandra data base model to manage Adhar Card information to all citizens in India. (7)

(d) Design simple cassandra data base model for online store application like Flipkart to manage different product information. (7)



**(ELI206A15)**

**M.Sc. DEGREE EXAMINATION, APRIL 2017.**

**Second Semester**

**www.kvrssgroup.com** **Electronics and Instrumentation**

**Paper VI – BUSINESS SYSTEMS**

**(Regulation 2015)**

**Time : Three hours**

**Maximum : 70 marks**

**Answer the following questions.**

1. (a) Define value creation. How to create value to a stakeholder through innovation and creativity? (14)

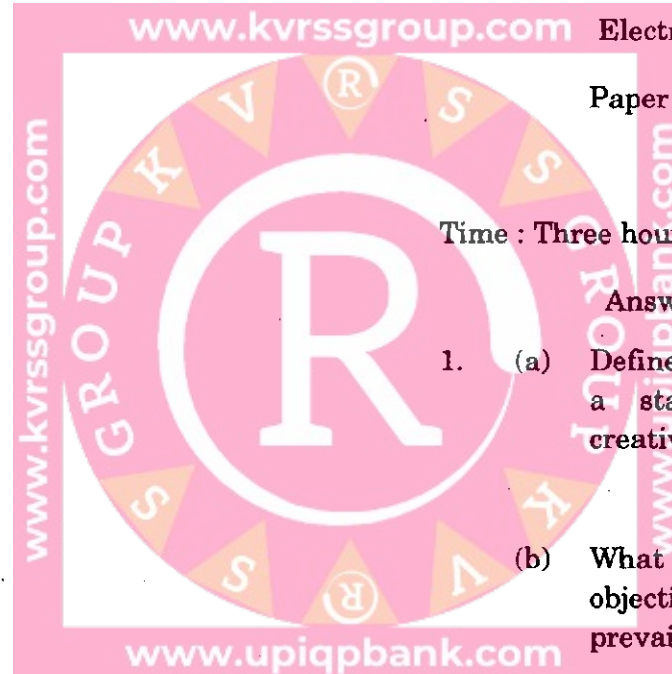
**Or**

(b) What do you mean by organisation? Explain objectives and forms of business organisation prevailing in India?

2. (a) Define marketing. Explain various types and functions of marketing. (14)

**Or**

(b) What do you mean by Market segmentation?



3. (a) Define Training. Explain different on the job and off the job training methods.

Or

- (b) Case study

Remedial Training :

Rajat Sharma has been employed for 6 months in the account section of a large manufacturing company at Faridabad, You have been his supervisor for the past three months. Recently you have been asked by the management to find out the contribution of each employee in the account section and monitor carefully whether they are meeting the standards set by you.

A few days back you have completed your formal investigation and with the exception of Rajat, all seems to be meeting the targets set by you. Along with numerous errors, Rajat's work is characterised by low performance - often he does 20% less then the other clerk in the department.

As you look in to Rajat's performance reviews sheets again, you begin to Wonder whether some sort of remedial training is needed for people like him,

Questions :

- (i) As Rajat's supervisor, can you find out whether the poor performance is due to poor training or to some other cause?
- (ii) If you find Rajat has been inadequately trained, how do you go about introducing a remedial training program?
- (iii) If he has been with the company six months, what kind of remedial programme would be best?
- (iv) Should you supervise him more closely? Can you do this without making it obvious to him and his co - workers?
- (v) Should you discuss the situation with Rajat? (14)

Or

4. (a) Explain about GAAP principles.

- (b) Discuss about the cost concepts and classification. (14)

5. (a) What do you mean by production? Briefly describe about the different types of prouction?

Or

- (b) Give a brief note on New Business development under the procedure of R & D?