# (ELI20115)

M.Sc. DEGREE EXAMINATION, APRIL 2018.

Second Semester

Electronics and Instrumentation

Paper I — MEASUREMENT PRINCIPLES AND MEASURING SYSTEMS

(Regulation 2015)

Time : Three hours Maximum : 70 marks

Answer the following questions.

Each question carries 14 marks.

1. (a) Explain in detail block diagram of fundamental elements of an Instruments. (8)

(b) List advantages of Digital type of Instruments. (6)

Or

(c) Mention typical applications of Instrument systems. (5)

(d) Explain Standard Deviation, Its properties and its uses. (9)

2. (a) Explain the principles and operation of Psycho meter for measurements of thermal comfort levels. (8)

(b) Explain in detail static characteristic for measurement of humidity. (6)

Or

(c) Explain principle and operation of smoke/fire detection. (8)

(d) Explain in detail sensors for water quality. (6)

3. (a) Explain in detail standardization of mechanical measurements. (14)

Or

(b) Explain about Carbon dioxide sensors for indoor air quality monitoring. (8)

(c) Write the difference between mass flow rate and volumetric flow rate. (6)

4. (a) Explain in detail about Periodic laboratory and filed calibration of level sensors. (8)

(b) Explain Types of calibrations of measuring instruments. (6)

Or



(c) Explain about triple point of calibration and its performance. (8)

(d) Explain different possibilities of errors in measurements. (6)

5. (a) Write a note on errors as uncertainties. (4)

(b) Explain about sources of errors and estimating errors. (10)

Or

(c) Explain in detail about estimating error propagation during design of Interfacing circuits. (8)

(d) Write a difference between absolute and relative errors with examples. (6)

# (ELI20215)

M.Sc. DEGREE EXAMINATION, APRIL 2018.

Second Semester

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Paper II — STATISTICAL TOOLS

(Regulation 2015)

Time : Three hours Maximum : 70 marks

Answer ALL questions.

1. (a) We can always compute an average of a group of numbers, but we also need to ask whether or not the average will make any sense. For example, the following numbers are provided by Western Mine Engineering, Inc. (www. westernmine. com) they represent the operating cost indices for surface mines in the United States from 1988 to 2000: 85.5, 90.4, 95.7, 97.7, 98.7, 99.0, 100.0, 102.4, 105.7, 107.0, 106.7, 108.7, 113.5.

(i) Compute the average of these 13 numbers.

(ii) Does this number estimate some population parameter? If so, what is it?

(iii) Compute the standard deviation of the numbers. What is the unit of measurement for the standard deviation?

(b) Consider the following sample of 24 observations: 10, 12, 13, 15, 18, 21, 24, 27, 29, 32, 33, 35, 36, 38, 42, 44, 45, 46, 48, 49, 51, 52, 53, and 56. Compute the mean and the standard deviation of the ungrouped data. Then put the data in classes of 10—19, 20—29, 30—39, 40—49, and 50—59 and compute the estimated mean and estimated standard deviation from the grouped data. Compare the results and comment.



Or

(c) Calculate appropriate measure of skewness from the following income distribution :

| Monthly income (Rs.) | Frequency |
|---|---|
| upto–100 | 9 |
| 101–150 | 51 |
| 151–200 | 120 |
| 201–300 | 240 |
| 301–500 | 136 |
| 501–750 | 33 |
| 751–1000 | 9 |
| above 1000 | 2 |
| N=600 | |

(d) Grade summaries for the second semester of the 200 1—2002 academic year at Purdue University were available online at the time of writing. Given below are the average Grade-Point Averages (GPA) for each type of engineering major and the number of students with each major. Determine the overall average GPA for all engineering majors.

| Major | Number | Average GPA |
|---|---|---|
| Freshman engineering | 1924 | 2.613 |
| Aero and Astro | 370 | 2.868 |
| Chemical | 379 | 2.984 |
| Civil | 399 | 2.938 |
| Construction | 142 | 2.886 |
| Land surveying | 6 | 2.804 |
| Industrial | 460 | 2.844 |
| Interdisciplinary | 87 | 2.886 |
| Materials | 60 | 2.962 |
| Mechanical | 784 | 2.862 |
| Nuclear | 71 | 2.871 |

2. (a) Represent the following data in a Pie Chart

| Item | Rice | Chocolate | Milk | Drinks |
|---|---|---|---|---|
| Quality | 45% | 25% | 90% | 65% |

(b) Represent the following data in Line Graph

| | | | | |
|---|---|---|---|---|
| Time : | 3.30 | 4.00 | 4.30 | 5.00 |
| Frequency : | 2.78 | 5.76 | 1.9 | 5.76 |

Or

(c) Represent the following data in Scatter Diagram.

| | | | | |
|---|---|---|---|---|
| Hours of study | 2 | 3 | 5 | 7 |
| Scores | 50 | 75 | 85 | 95 |

(d) Represent the Following data in Histogram.

| | | | | | |
|---|---|---|---|---|---|
| Class interval : | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 |
| Frequency : | 1 | 3 | 6 | 4 | 2 |

3. (a) The following data relate to the number of passenger cars (in millions) sold from 2004 to 2011.

| Year : | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|
| Sales (in '000 Rs.) : | 6.7 | 5.3 | 4.3 | 6.1 | 5.6 | 7.9 | 5.8 | 6.1 |

(i) Fit a straight line trend to the data through 2009.

(ii) Use your result in (i) to estimate production in 2011 and compare with the actual production.

(b) Describe the method of link relatives for calculating the seasonal variation indices.

Or

(c) The price of a commodity during 2000 — 2005 is given below. Fit a parabola $Y = a + bX + cX^2$ to this data. Estimate the price of the commodity for the year 2010.

| Year : | 200 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|
| Price | 100 | 107 | 128 | 140 | 181 | 192 |

Also plot the actual and rend values on graph.

(d) Fit a straight line trend to the following data by least squares method. Also find an estimate for the year 2015 :

| Year : | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|---|
| No. of units : | 12 | 13 | 13 | 16 | 19 | 23 | 21 | 23 |

$[Y = 17.5 + 89.3X; Y_{2015} = 25.54]$

4. (a) Which of the following descriptions are correct? The solutions $x$ of

$$A_X = \begin{bmatrix} 1 & 0 & 2 \\ 1 & 1 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}.$$

From

(i) A Plane

(ii) A Line

(iii) A Point

(iv) A Sub space

(v) The null space of A

(vi) The column space of A.

Or

(b) Solve by elimination and back-substitution :

$$\begin{aligned} u+w&=4 \qquad & v+w&=0 \\ u+v&=3 \quad \text{and} & u+w&=0\,. \\ u+v+w&=6 \qquad & u+v&=6 \end{aligned}$$

5. (a) The radius of a spherical soap bubble is increasing uniformly at the rate of 1/10 inch per second. Find the rate at which the volume is increasing when the diameter is 3 inches.

(b) Find where the rate of change of the ordinate of the curve $y=x^3-6x^2+3x+5$, is equal to the rate of change of the slope of the curve.



Or

(c) The Slope of the tangent to a curve at any point is $-4x/9y$, and the curve passes through the point (3, 2). Find its equation.

(d) Discuss the convergence of the sequence $a^n=n!/n^n$ where $n!=1.2.3...n$.

**(ELI20315)**

M.Sc. DEGREE EXAMINATION, APRIL 2018.

Second Semester

Electronics and Instrumentation

Paper III — ALGORITHMS AND PROGRAMMING

(Regulation 2015)

Time : Three hours Maximum : 70 marks

Answer the following questions.

Each question carries 14 marks.

1. (a) What is a program and describe the program development cycle.

(b) Discuss the features of a good programming language.

Or

(c) Define an algorithm and write an algorithm for finding out largest of the numbers.

(d) Specify Flow chart symbols.

2. (a) Write a program and draw a flow chart for representing Fibonacci series.

(b) Explain the algorithm and draw a flow chart for Factorial of a given number.

Or

(c) Define the following with an example each.

(i) Storage classes

(ii) Data Types

(iii) User defined data types.

3. (a) Explain Macros and how do u declare them. Show it with an example.

Or

(b) Describe the need for Branching.

(c) Discuss the basic difference between If -Else and Switch Statements.

(d) Using one example explain the usage of switch statement.

4. (a) Explain the Break and continue statements with examples.

(b) Write a C program to identify whether the given number is a palindrome or not.

Or



(c) Explain Stack and write the difference between Stack and Queue operations.

(d) Discuss the following :

(i) Queue

(ii) Circular Queue.

5. (a) Explain Function with an example.

(b) Describe in short Linked Lists.

Or

(c) Write a program to explain Quick sort and bubble sort.

# (ELI20415)

M.Sc. DEGREE EXAMINATION, APRIL 2018.

Second Semester

Electronics And Instrumentation

Paper IV — MICROPROCESSORS

(Regulation 2015)

Time : Three hours Maximum : 70 marks

Answer the following questions

Each question carries 14 marks.

1. (a) Discuss the difference between Microprocessor and Microcontroller.

(b) Explain CISC Architecture.

Or

(c) Describe interfacing of memory and other peripherals with examples.

2. (a) Explain the block diagram of CORTEX M3 processor architecture.

Or

(b) Define Interrupts. Explain their need with examples.

3. (a) Describe LPC1769 memory mapping.

(b) Explain Boot sequence and its need in LPC1769.

Or

(c) Write short note on the following (i) ARM processor (ii) Standard Debuggers.

4. (a) Describe the significance of DMA Controller.

(b) Give a note on LED interfacing.

Or

(c) Explain in detail the need for analog interfaces in Microprocessors.

(d) Write a program to generate a Sin Wave.

5. (a) Define Synchronous and Asynchronous serial protocols and differentiate them.

Or

(b) Discuss about the challenges in design communication.

(c) Give a note on concept of Memory Management.

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**(ELI20515)**

M.Sc. DEGREE EXAMINATION, APRIL 2018.

Second Semester

Electronics And Instrumentation

Paper V — DBMS AND BIG DATA

(Regulation 2015)

Time : Three hours Maximum : 70 marks

Answer the following questions

Each questions carries 14 marks.

1. (a) What is a DBMS? Discuss the Advantages of using the DBMS approach. (8)

(b) Write a note on Evolution of Database Systems. (6)

Or

(c) Explain about Data Model and Data Independence. (8)

(d) Discuss about Three-Tiered Database location Architecture. (6)

2. (a) Explain the functional dependency with multi-valued dependencies with example. (6)

(b) Give syntax for DML commands? Show their operations with an example? (8)

Or

(c) Explain 3NF with example and Compare BCNF and 2NF. (8)

(d) Explain about Entity-Relationship model with an example. (6)

3. (a) Explain about Characteristics of Big data. (6)

(b) How Big data contributes to Health care and public sector. (8)

Or

(c) How to overcome the Real-key Challenges in Big data. (8)

(d) Explain about Importance of Big data. (6)

4. (a) Explain about NoSQL database design and Terminology.

Or

(b) Discuss about Column Family stores and Key-value Database.



5. (a) Discuss about Cassandra Data Model and Design Patterns. (8)

(b) Explain about ACID and BASE. (6)

Or

(c) Discuss about CURD Operations and CQL Data types. (8)

(d) Write a note on Data Model for IoT with Vehicle examples. (6)

**(ELI206A15)**

M.Sc. DEGREE EXAMINATION, APRIL 2018.

Second Semester

Electronics And Instrumentation

Paper VI — BUSINESS SYSTEMS

(Regulation 2015)

Time : Three hours Maximum : 70 marks

Answer the following questions

Each question carries 14 marks.

1. (a) Describe about Principles of Management. (7)

(b) Write a note on Design Thinking with suitable example. (7)

Or

(c) Explain Concept of organization. (6)

(d) Discuss about forms of Business Organization. (8)

2. (a) Explain about Forecasting techniques in sales. (7)

(b) Discuss about birect Marketing. (7)

Or

(c) Describe about Human Resource Planning and selection process. (8)

(d) Write a note on Performance Appraisal process. (6)

3. (a) Explain about Pricing Methods and Pricing decisions in costing. (14)

Or

(b) Discuss about Ledger and Balance sheet. (8)

(c) Explain about Process and documentation of Bank Lending. (6)

4. (a) Explain about New product development and Maintenance in R and D.

Or

(b) Discuss about the Stratification analysis and Managing hypothesis. (10)

(c) Describe industrial design rights. (4)



5. (a) Discuss about Flow methods and QMS standards. (8)

(b) Explain LEAN Management. (6)

Or

(c) Discuss about ABC Analysis and EOQ in Inventory techniques. (8)

(d) Write a note on Logistics and Transportation decisions. (6)