FACULTY OF ENGINEERING
B.E. 3/4 (Civil) II - Semester (Old) Examination, November / December 2018

Subject : Water and Waste Water Engineering

Time : 3 Hours   Max. Marks: 75

Note: Answer all questions from Part-A & any five questions from Part-B.

PART – A (25 Marks)

1. List out various factors affecting population forecasts. (2)
2. Define hardness and explain any one simple method for its removal. (2)
3. Write about breakpoint chlorination. (2)
4. Explain the mechanism of Back Washing. (2)
5. List out various sewer types and explain them. (2)
6. What are the various sources of water? (3)
7. State the advantages and disadvantages of a trickling filter. (3)
8. Draw a neat sketch of septic tank and explain its components. (3)
9. Explain use of Ozone and UV rays for disinfection and list out the disadvantages. (3)
10. The 5 day BOD of a waste 200 mg/lt and reaction rate constant = 0.17 d^{-1}.
    Find the ultimate BOD of the waste. (3)

PART – B (50 Marks)

11. (a) Explain Hardy cross method of solving the network by balancing flows by correcting assumed heads. Derive the expression used. (5)
    (b) The population of a locality as obtained from census report as follows: (5)

Year	1931	1941	1951	1961	1971	1981	1991	2001	2011
Population	10000	14000	19000	24500	31000	39500	49000	59000	68500

Estimate the population of the locality in the year 2021, 2031 and 2051 by arithmetic increase method.

12. (a) Draw the cross section of SSF, name different components and discuss he operation of SSF. (5)
    (b) Design a slow sand filter to treat 5 MLD. Also provide sand specification interms of effective size and uniformity coefficient. (5)

13. (a) Define BOD and explain the stages of biological decomposition with the aid of a neat sketch. How does the BOD result help us. (5)
    (b) A 350 mm diameter sewer is to flow at 0.35 depth on a grade of self cleaning equivalent to that obtained at full depth at a velocity of 0.8 m/sec. Find the required grade, associated velocity and the rate of discharge at this depth. (Given: Manning's rugosity coefficient = 0.014, proportionate HMD (r/R) = 0.7705). (5)

14. (a) Designed a secondary setting tank for an activated sludge process with the following design data:
    Average sewage flow   = 9 Mld
    MLSS concentration   = 300 mg / lt
    Peak flow factor   = 2.25
    Recycle rate   = 30% (5)
    (b) Write in detail about pressure filters. Mention its merits and demerits. (5)

..2

15 (a) Determine the ultimate BOD of a sample having a 5 – day BOD at 20°C as 180 mg/l at 20°C. Assume the base 10 rate constant as 0.10 per day. Also calculate the 2 days BOD for the sample. (5)

   (b) Explain in details the characteristics, treatment and disposal of solid waste. (5)

16 (a) Take 5 days BOD at 20°C is equal to 250 mg / lt. For three different samples, but the 20°C, K values are equal to 0.12 / day, 0.16 / day and 0.20 day. Determine the ultimate BOD of each samples. (5)

   (b) Determine the velocity of flow by Empirical formulae. What points should be kept in mind while designing sewers. (5)

17   Write short notes on any **two** of the following: (10)
     (a) Composition of solid waste
     (b) COD
     (c) TOC

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FACULTY OF ENGINEERING

B.E. 3/4 (Civil) II – Semester (Suppl.) Examination, November / December 2018

Subject: Environmental Engineering

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

Note: Answer all questions from Part – A and any five questions from Part – B .

PART – A (25 Marks)

1. What is the necessity of water supply schemes in present day life? (3)

2. Differentiate between dry and wet intake tower. (2)

3. State the purpose of sedimentation with coagulation process. (2)

4. Write the requirements of a good disinfectant. (3)

5. Write the main purposes of the chemical tests conducted on the sewage. (3)

6. Define the limiting velocity in sewer lines. (2)

7. What are the purposes of screening in sewage? (3)

8. What are the main objectives of treating sewage? (2)

9. List the sources of sludge in waste water. (2)

10. Write three points to be considered, while using sludge as fertilizer. (3)

PART – B (Marks: 50)

11 a) Lists the various types of intakes and discuss any one in detail. (5)

   b) Explain the factors affecting the per capita demand of water. (5)

12 a). Design the sedimentation tank of water works to treat 12×10^6 litres of water per day. Assume the velocity of flow in the sedimentation tank as 20 cm/min and the detention period as 11 hours. (5)

   b) Write short notes on (i) Slow sand filters (ii) Rapid sand filters. (5)

13 Design the section of a combined circular sewer from the following data.

   Area to be served = 150 hectares.

   Population of the locality = 50,000.

   Max permissible velocity = 3.2 m/s

   Time of entry = 5 min

   Time of flow = 20 min

   Rate of water supply = 270 litres /day / capita.

   Impermeability factor = 0.45. Assume suitably, any other data required. (10)

14 a) With the help of a neat sketch, describe the construction and working of an intermittent sand filter. (5)

   b) Write short notes on grit chambers. (5)

15 Explain sludge digestion with the help of a neat sketch. (10)

16 a) Design the activated sludge unit treatment with the following data for a town of population of 65,000.
   i)   Average sewage flow = 210 litres /capita /day.
   ii) BOD of raw sewage = 210 mg /litre.
   iii) Suspended solids in raw sewage = 300 mg/ litre
   iv) B.O.D removal in primary treatment = 40% (5)
   v) Overall B.O.D removal desired=90% (Assume suitably any other data required)

   b) Draw the outline of a typical water supply scheme and describe the essentials of a water supply scheme. (5)

17. Write short notes on: (10)
   a) Types of screens.
   b) Dewatering and drying of sewage.
   c) Different types of high rate trickling filters.

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FACULTY OF ENGINEERING

B.E. 3/4 (Inst.) II-Semester (Suppl.) Examination, November / December 2018

Subject : Biomedical Instrumentation

Time : 3 hours   Max. Marks : 75

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1 Mention the general features of optical recorders.	3
2 Define a) Stability b) Range	2
3 Mention the working principle of ECG.	3
4 Define the various heart sounds in a phonocardiogram.	2
5 Draw and briefly explain the Endoscopy.	3
6 State the Doppler principle of blood flow measurement.	2
7 State the principle of Flourometry.	3
8 What is the use of auto-analyzer?	3
9 What re the electric Hazards during Bio-electric monitoring?	2
10 Mention the laser application in medical electronics.	2

PART – B (50 Marks)

11 a) Describe the special features of LVDT with neat diagram.   5
  b) Explain the need for carrier amplifier in a biomedical recording system.   5

12 Explain the operating principle with the block diagram of EMG machine. Mention the design consideration of EMG amplifiers.   10

13 a) Explain clearly the blood flow measurement using the electromagnetic principle.   5
  b) Explain the origin and characteristics of heart sounds.   5

14 a) Write short notes on Emission photometry.   5
  b) Explain in the working of chromatography with neat diagram.   5

15 Describe the safety, codes and standards governing the hospital design.   10

16 a) What are 10-20 Electrode system?   5
  b) Explain the techniques for in direct measurement of Blood Pressure.   5

17 Write short notes on following :   10
  a) X-ray
  b) EEG

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FACULTY OF ENGINEERING
B.E. 3/4 (ECE) II - Semester (Old) Examination, November / December 2018

Subject : Electronic Instrumentation

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

Note: Answer all questions from Part-A & any five questions from Part-B.

PART – A (25 Marks)

1 Define 'Sensitivity' and explain with an example.   (3)
2 List out the salient features of 'IEEE standards'.   (2)
3 What are the limitations of LVDT?   (2)
4 What is the transducer used for measurement of velocity and explain its
   principle?   (3)
5 Explain the principle involved in semiconductor thermometer.   (3)
6 List out the functions of 'microphones'.   (2)
7 What do you understand by 'virtual instrumentation'?   (2)
8 Give the advantage of GPLB interface.   (3)
9 List out the features of EMG.   (2)
10 What do you understand by "Biopotential electrodes"?   (3)

PART – B (50 Marks)

11 List out all the different types of Errors and explain about them in detail.   (10)

12 Explain in detail the operation of 'Strain gauge' and derive the expression for
   'Gauge factor'.   (10)

13 Draw the construction diagram of 'Thermocouple' and explain its operation
   and applications in detail.   (10)

14 With a neat block diagram, explain the operation of Delayed time base
   Oscilloscope.   (10)

15 Draw the block diagram of 'ECG' system, and explain its operating principle
   and list out the features of ECG waveform.   (10)

16 (a) Discuss in detail about ultrasonic Imaging system.   (6)
   (b) List out the salient features of 'Digital LCR meter'.   (4)

17 Write short notes on the following:
   (a) Photovoltaic transducer   (5)
   (b) EEG system   (5)

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FACULTY OF ENGINEERING

B.E. 3/4 (Mech.) II - Semester (Suppl.) Examination, November / December 2018

Subject : Control Systems Theory

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

Note: Answer all questions from Part-A & any five questions from Part-B.

PART – A (25 Marks)

1 Compare open loop and closed loop system.
2 Distinguish between block diagram and signal flow graph.
3 State masons gain formula in signal flow graph useful applications.
4 Evaluate the response of unity feedback system whose open loop transfer function is given by $G(S) = \dfrac{4}{s(s+5)}$ when the input is step input.
5 State various static error constants.
6. Define routh Hurwitz criterion.
7. List the advantages of bode plots.
8. State the Nyquist stability criteria.
9 List any three differences between state space and transfer function approach.
10 List the properties of STM (state transition matrix).

PART – B (50 Marks)

11 Evaluate the transfer function for armature controlled DC servo motor.
12 The open loop transfer function of a unity feedback system is given by

$G(S) = \dfrac{k}{s(sT+1)}$ where K and T are positive constant. Estimate By what factor the amplifier gain K be reduced, so that the peak overshoot of unit step response of the system is reduced from 75% to 25%.

13 a) Explain the limitations of Routh-Hurwitz criterion?
    b) Determine the range K for stability (Routh-Hurwitz criterion) of unity feedback system whose open loop transfer function is
    $G(s) = \dfrac{k}{s(s+1)(s+2)}$

14 Sketch the bode plot for the following transfer function and comment on stability
    $G(s) = \dfrac{20}{s(1+3s)(1+4s)}$

15 The transfer function of a control system is given by
    $G(s) = \dfrac{s^2 + 3s + 4}{s^3 + 2s^2 + 3s + 2}$

Check for controllability and observability.

16 Sketch the root locus for the unity feedback system whose open loop transfer function is

$$G(s) = \frac{k}{s(s^2 + 4s + 13)} \; .$$

17 Write a short note on any of **THREE** of the following
   a) Specifications of second order system
   b) Node, forward path and individual loop in signal flow graph
   c) Performance indices
   d) Experimental determination of transfer function
   e) Steady state error

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FACULTY OF ENGINEERING

BE 3/4 (AE) II-Semester (Suppl.) Examination, Nov/Dec 2018

Subject : Automotive Air Conditioning

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

Note: Answer all questions from Part-A & any Five Questions from Part-B.

PART- A (25 Marks)

1. What do you understand by the term psychrometry? List the different processes   3
2. Define (i) sensible heat factor and (ii) By-pass factor   2
3. Explain, what you understand by air- conditioning   3
4. Distinguish between summer and winter air conditioning system   2
5. State the function of thermostatic expansion valve   2
6. Distinguish between reciprocating and rotary compressor   3
7. Explain about coding system of refrigerants   2
8. Explain about automatic temperature control system   3
9. What are the causes for low refrigeration effect? Explain any three   3
10. What do mean by routing? List the methods available   2

PART- B (50 Marks)

11. A sample of moist air has dry bulb temperature of 25°C and a relative humidity of 50% The barometric pressure of 740mm of Hg, Calculate (i) Partial pressure of water vapour and dry air, (ii) Dew point temperature and specific humidity of air and (iii) Enthalpy of air per kg of dry air.   10

12. The following data refer to summer air conditioning of a restaurant

Inside design conditions	= 27°C DBT and 21°C WBT
Outside design conditions	= 38°C DBT and 27°C WBT
Sensible heat load	= 126000kJ/hr
Latent heat load	= 50,400 kJ/hr

The outside air is supplied at the 20 m^3/min directly in to the room through ventilators and by infiltration. The outside air is to be conditioned is passed through a cooling coil which has an apparatus dew point of 12°C and 60% of the total air is recalculated from the conditioned space and mixed with conditioned air after the cooling coil. Find. (a) Condition of air after the cooling coil before mixing with recalculated air (b) Condition of air entering the restaurant (c) Mass of fresh air entering the cooling coil, (d) By-pass factor of the cooling coil, and (e) Total refrigeration load on the cooling coil.   10

13. What are the components of Automotive Air conditioning system? Explain their functioning and importance with neat sketches.   10

14. Explain about ford air conditioning system with suitable sketch   10

15. Explain the procedure to trouble shooting is done for automotive air conditioning system   10

16. Explain working of thermostat expansion valve and its calibration in Air conditioning systems   10

17. What is a refrigerant? Which is the best refrigerant used now a days in automotive air conditioning. Explain its ideal properties.   10

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FACULTY OF ENGINEERING

BE 3/4 (CSE) II Semester (Old) Examination, November/December 2018

Subject: Principles of Programming Languages

Time: 3 Hours   Max. Marks: 75

Note: Answer All questions from Part-A & answer any Five questions from Part-B.

PART – A (25 Marks)

1. Write the differences between imperative and declarative programming languages.   (3)
2. What are Syntax and Semantics?   (2)
3. Describe the difference between static and dynamic scoping.   (2)
4. What is alias? Give Example.   (3)
5. Explain slicing with respect to arrays?   (2)
6. Differentiate between structural and name type equivalence   (3)
7. Define Template. Give Example.   (3)
8. Write the uses of constructors and destructors in OOP.   (2)
9. Discuss higher order functions with example.   (2)
10. What is Horn clause? Give Example.   (3)

PART – B (50 Marks)

11. a) Explain language implementation methods with an example for each.   (5)

    b) What is Art of language design?   (5)

12. a) Discuss about static and dynamic binding.   (5)

    b) Explain Stack-based storage allocation mechanism.   (5)

13. a) Explain precedence and associativity rules of different programming languages.   (5)

    b) Discuss about Records (Structures) and Variants (Unions).   (5)

14. Explain various parameter passing methods with suitable examples.   (10)

15. a) What is an Event? Discuss in brief how events are implemented in programming languages.   (5)

    b) What are Initialization and Finalization mechanisms in OOP?   (5)

16. a) Discuss Terms and Goal statements in prolog with examples.   (5)

    b) Explain about List functions in Scheme.   (5)

17. Write short notes on:

    a) Dynamic Method Binding   (5)

    b) Tail Recursion   (5)

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FACULTY OF ENGINEERING

B.E. (I.T.) 3/4 II - Semester (Old) Examination, November / December 2018

Subject : Dataware Housing & Data Mining (Elective – I)

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

Note: Answer all questions from Part-A & any five questions from Part-B.

PART – A (25 Marks)

1	List the various stages of a KDD process.	(3)
2	Why do we preprocess the data? Give any two reasons.	(2)
3	What does a data warehouse provide for business analysts?	(2)
4	List various kinds of association rules with examples.	(3)
5	What is a decision trace?	(2)
6	State the principle of cluster analysis.	(2)
7	Define classifier accuracy measures.	(3)
8	Define inter-quartile range and five-number summary.	(3)
9	What is a sequence database?	(2)
10	What is web-mining? List the categories of web-mining tasks.	(3)

PART – B (50 Marks)

11 (a) Draw the architecture of a typical data mining system and explain the role of each component in it.   (5)
    (b) Write about various data mining functionalities.   (5)

12 (a) What is meant by data cleaning? Explain various methods of data cleaning.   (5)
    (b) Explain the techniques of data integration.   (5)

13 (a) Explain various types of multidimensional data model with examples.   (5)
    (b) Write about various types of OLAP operations.   (5)

14 Explain back propagation algorithm for classification.   (10)

15 (a) Discuss the categorization of major clustering methods.   (5)
    (b) Discuss the types of data in cluster analysis.   (5)

16 Explain text-mining approaches.   (10)

17 Write short notes on:
    (a) Concept hierarchies   (3)
    (b) Decision true pruning   (3)
    (c) Bayesian belief networks   (4)

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FACULTY OF ENGINEERING

B.E. 3/4 (IT) II – Semester (New) (Suppl.) Examination, Nov. / Dec. 2018

Subject: Computer Graphics (Elective – I)

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

Note: Answer all questions from Part – A and any five questions from Part – B.

PART – A (25 Marks)

1	Define vertical retrace and horizontal retrace	2
2	Draw 8-way symmetry of circle	3
3	Briefly describe about the curve attributes	3
4	Write about composite	3
5	What are the limitations of Sutherland-Hodgman polygon clipping algorithm?	2
6	Write the four-bit code to identify the nine regions of clip window	3
7	Write about the workstation filters	2
8	What are the six logical classifications of input devices?	2
9	What are spline representations?	3
10	Write about polygon meshes used in 3D object representation.	2

PART – B (5x10 = 50 Marks)

11	a)	Explain about inside-outside test to identify interior regions of polygon.	4
	b)	Write the Bresenham's algorithm to draw a line.	6
12	a)	What is reflection? What are the different types of reflections?	4
	b)	Derive the transformation matrix for the reflection of a point about the line y=mx + c.	6
13	a)	Describe about 2D viewing pipeline.	4
	b)	Explain about the Cohen-Sutherland line clipping algorithm with an example.	6
14	a)	Explain polygon shading.	5
	b)	Explain about hierarchical modeling with structures.	5

15 Write short notes on:
   i)   Back-Face Detection method
   ii) Area subdivision method.   10

16	a)	Describe about the boundary-fill algorithm.	5
	b)	Explain the rigid body transformations.	5

17 Write short notes on:
   a) B-Spline curves   5
   b) Homogeneous coordinates   3
   c) Pixel Addressing.   2

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FACULTY OF ENGINEERING

B.E. 3/4 (I.T.) II – Semester (Old) Examination, November / December 2018

Subject : Computer Graphics (Elective – I)

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

Note: Answer all questions from Part-A & any five questions from Part-B.

PART – A (25 Marks)

1 Distinguish between Computer Graphics and Interactive Computer Graphics.   (2)
2 What are the Issues in Image object Displaying?   (3)
3 Write the abbreviations for GKS, PHIGS, SBL, and AGL.   (3)
4 What is shearing and reflection?   (2)
5 Distinguish between global and local lighting.   (2)
6 What are the different types of parallel projections?   (3)
7 Define Clipping.   (2)
8 Distinguish between image-space approaches to hidden surface removal and ray tracing.   (3)
9 What is bit-block-transfer (bitbit) operation?   (2)
10 Write the transformation relation in 2-D for translation, rotation and scaling in matrix multiplication form.   (3)

PART – B (50 Marks)

11 Explain the construction of CRT display devices. What are its advantages and its disadvantages?

12 Contrast the efficiency of Cohen-Sutherland and Cyrus-Beck line clipping algorithms.

13 Define reflection. Write transformation relationship for reflection about x-axis, y-axis, line $y = x$ and line $y = -x$.

14 (a) Compare and contrast DDA and Bresenhams line drawing algorithms.
    (b) The end points of a given line are (0, 0) and (6, 18). Compare each value of y as x steps from 0 to 6 using DDA and Bresenhams algorithms and plot the resultant line.

15 (a) What are the basic transformation techniques in 3-D graphics? What are their respective matrix representation?
    (b) An objective is viewed from the point (5, 0, 0). Obtain a transformation matrix to get a projection of a point P (x, y, z) on the yz plane. Obtain the transformation matrix in the projection plane which is now $x + 10 = 0$.

16 Write short notes on :
    (a) SCENE GRAPH
    (b) A CUBE OBJECT

17 Write a program to recursively subdivide a tetrahedron to form 3D Sierpinski gasket. The number of recursive steps is to be specified by the user.

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FACULTY OF ENGINEERING

B.E. 3/4 (I.T.) II - Semester (Old) Examination, November / December 2018

Subject : Software Testing (Elective – I)

Time : 3 Hours   Max. Marks: 75

Note: Answer all questions from Part-A & any five questions from Part-B.

PART – A (25 Marks)

1	Different between testing and debugging.	(3)
2	Define verification testing.	(2)
3	What is software error?	(2)
4	What are test coverage analyzers?	(2)
5	What is software metric?	(2)
6	Differentiate between progression and regression testing.	(3)
7	How is object-oriented testing different from traditional software testing?	(3)
8	What is mutation testing?	(2)
9	Explain structure walkthrough.	(3)
10	Can you automate the complete software testing process? Yes / No. Justify your answer.	(3)

PART – B (50 Marks)

11 (a) What do you mean by verification of high-level design?   (5)
    (b) Discuss the goals of software testing.   (5)

12 Discuss the following black-box testing techniques in detail :   (10)
    (i) Boundary Value Analysis
    (ii) State Table-Based Testing

13 Classify the software metrics and discuss the concept of size metrics.   (10)

14 Discuss the issues and challenges in testing object-oriented software.   (10)

15 Write short notes on :   (10)
    (a) Scriting Language
    (b) Win Runner
    (c) JMeter

16 What are inspections? How are they different from technical reviews?   (10)

17 Differentiate between:
    (a) Effective Software Testing and Exhaustive Software Testing   (5)
    (b) Unit and Integration Testing   (5)

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FACULTY OF ENGINEERING

B.E. 3/4 (IT) II-Semester (New) (Supplementary) Examination,

November / December 2018

Subject : Software Testing (Elective-I)

Time : 3 hours   **Max. Marks : 75**

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1 Define   3
   a) Failure
   b) Defect
   c) Testware
2 Explain V-testing model with diagram.   3
3 What is Boundary Value Analysis (BVA) Testing Technique?   3
4 Briefly explain Basis Path Testing.   3
5 Explain structure of Testing Group.   3
6 What is Test Defect Backlog?   2
7 Explain the structure of a Test Case.   2
8 What is the significance of Debugging?   2
9 Explain features of Load Runner.   2
10 List few uses of JMeter.   2

PART – B (5 x 10 = 50 Marks)

11 Explain in detail verifications and validation (V & V diagram) using block diagram.   10

12 a) Explain Gilb's Inspection process using a diagram.   5
   b) Explain Humphrey's inspection process using a diagram.   5

13 a) Explain Software Metrics in detail.   5
   b) Explain Life cycle of a Bug with diagram.   5

14 a) How do we perform Software Testing for a Web Based Application?   5
   b) Explain Software Testing process for an Object Oriented Software.   5

15 Explain the architecture, features, and uses of Silk Test.   10

16 a) Explain Software Testing Life Cycle with diagram.   5
   b) Explain state of a Bug with diagram.   5

17 a) Explain Decision Table Based Testing process.   5
   b) Explain how Graph Matrices are used in testing software.   5

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FACULTY OF ENGINEERING
B.E.3 /4 (I.T) II sem.(old) Examination Nov./ Dec. 2018

Subject: Digital Instrumentation and Control (Elective-I)

Time:3 hours　　　　　　　　　　　　　　　　　　　　　　**Max.Marks:75**

Note: Answer all questions from Part A and any five from Part B

PART – A (25 Marks)

1. How can statistics interpret the validity of measurements?　　　　　　　[2]

2. Define the conversion resolution of ADCs and DACs?　　　　　　　　　[2]

3. Draw and label a typical stress-strain curve.　　　　　　　　　　　　[2]

4. Define thermal energy. How does relative temperature scale differ from the absolute scale ?　　　　　　　　　　　　　　　　　　　　　　　　　　　[3]

5. A source of green light has a frequency 6.5×10^{14} Hz. What is its wavelength in nanometers (nm) and ^{0}A?　　　　　　　　　　　　　　　　　　[3]

6. Draw the block diagram and define the elements of a final control operation.　[3]

7. Define self regulation.　　　　　　　　　　　　　　　　　　　　　[2]

8. Describe the modes of operation of the programmable controller.　　　　[3]

9. Explain as to how a two-position controller be made reverse acting.　　　[2]

10. Define the effects of aliasing in data sampling system.　　　　　　　　[3]

PART – B (50 Marks)

11. a) Design a Wheatstone bridge for resistance measurement.　　　　　　[5]
　　b) If the resistors in the bridge are $R_1 = R_2 = R_3 = 120$ and $R_4 = 121$. If supply voltage is 10v, find voltage offset.　　　　　　　　　　　　　　[5]

12. a) Describe EM radiation in terms of wavelength, speed of propagation and spectrum. [5]
　　b) Compare photoconductive, photovoltaic and photo emissive type photo detectors.   [5]

13. Explain the operation of programmable controller for discrete state control. Describe in detail the basic elements and drawbacks of relay logic controllers.　　　　[10]

14. What are pneumatic controllers? Describe the operation by which controllers are pneumatically implemented.　　　　　　　　　　　　　　　　　[10]

15. a) Compare and contrast microcomputers and mainframe computers as applied to Process control.　　　　　　　　　　　　　　　　　　　　　[7]
　　b) What is composite controller mode?　　　　　　　　　　　　　　[3]

16. a) Discuss any two applications of optical transduction techniques in process control. [4]
　　b) Draw block diagram of a process control loop and explain in detail its elements.　[6]

17. a) How would a derivative controller with $K_p = 4s$ respond to an error which varies as $e_p = 2.2\sin(0.04t)$?　　　　　　　　　　　　　　　　　　　[5]
　　b) Describe in detail the steps followed in design of temperature transducer of a process control system.　　　　　　　　　　　　　　　　　　　[5]

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FACULTY OF ENGINEERING

B.E. 3/4 (IT) II-Semester (New)(Supplementary) Examination, Nov. / Dec. 2018

Subject : Digital Signal Processing (Elective-I)

Time : 3 hours   **Max. Marks : 75**

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1	How is FFT faster?	2
2	List any four properties of DFT.	3
3	Draw the direct form realization of FIR system.	2
4	What are the advantages and disadvantages of FIR filter.	3
5	Write the properties of Butterworth filter.	3
6	Compare Digital and Analog filters.	3
7	What do you mean by pipeline conflicts?	2
8	List the functional units of programmable DSP processor.	3
9	Mention few applications of each of the families of TI DSPs.	2
10	Distinguish between the dual access RAM and single access RAM used in the on-chip memory of 5X.	2

PART – B (50 Marks)

11 a) Compute the FFT for the sequence $x[n]=n^2+1$ where N = 8 using DIF FFT algorithm.   6

    b) Write the properties of twiddle factor.   4

12 a) Design a FIR low pass filter using rectangular window with cut-off frequency of 1.2 rad./secs and N = 9.   6

    b) Compare IIR and FIR filters.   4

13 a) Design a Butterworth low-pass filter using impulse invariance concept for the following specifications :   6

$$0.9 \le \left| H\!\left(e^{j}\ \right) \right| \le 1, \quad 0 \le \left| \ \right| \le 0.2f$$

$$\left| H\!\left(e^{j}\ \right) \right| \le 0.18, \quad 0.3f \le \left| \ \right| \le f$$

Assume $T_d=1$. Also, assume additional data if required.

    b) For impulse invariant technique explain S-plane to Z-plane mapping.   4

14 a) Explain about architectural features of basic DSP with various computational blocks.   5

    b) With a neat block diagram explain the functions of address generation unit of DSP architecture.   5

15 a) Describe the MAC unit of TMS 320 C 54 xx processor with a neat block diagram. 5
   b) Identify the addressing modes of the operands in each of the following instructions and their operation 1) ADD B ;   2) ADD # 1234h ;   3) ADD 5678h ;   4) ADD+* addrreg   5

16 a) Explain overlapping add method of convolution with an example.   5
   b) Write the magnitude & phase function of FIR filters when impulse response is anti-symmetric & N is even.   5

17 Write short notes on :
   a) Bus structure of TMS320C54x DSP processor   5
   b) JPEG algorithm   5

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FACULTY OF ENGINEERING

B.E. 3/4 (IT) II – Semester (Suppl.) Examination, Nov. / Dec. 2018

Subject: Natural Language Processing (Elective – I)

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

Note: Answer all questions from Part – A and any five questions from Part – B.

PART – A (25 Marks)

1 State typical problems addressed by computational linguists in the study of language   3
2 Distinguish between Black Box Evaluation and Glass Box Evaluation   2
3 What are 'Open class words' and 'Closed class words'?   2
4 Relate conditional probability to sequential processing of words in a sentence   3
5 What do you need, to examine the structure of a sentence? Explain briefly.   2
6 Explain the augmented CFG rule given below:
    $NP \rightarrow ART\ N$ only when $NUMBER_1$ AGREES WITH $NUMBER_2$
   Is a feature defined in the above?   3
7 What is 'Logical form'? Give an example sentence and present its logical form.   3
8 Relate 'Basic Logical Form Language' to 'First Order Predicate Logic'.   2
9 State 'Markov Assumption', and explain briefly.   3
10 Estimate Bigram Probability for the case given below: 2

Category	Count at i	Pair	Count at i, i+1	Bigram	Bigram Probability Estimate
N	833	N, V	358	Pr(V/N)	?

PART – B (5x10 = 50 Marks)

11 a) State and explain seven different levels of language understanding that deal with structure, meaning, general world knowledge and reasoning.   6
   b) Write applications for Dialog based and Text based Natural Language Processing (NLP).   4

12 a) Present and discuss the following:
    i) Noun Phrase NP
    ii) Verb phrase VP
    iii) Adjective Phase ADJP
    iv) Adverbial Phase ADVP   6
   b) Explain one knowledge representation technique from the view point of semantics.   4

13 a) Present top-down parsing algorithm and explain.   5
   b) Sketch search tree for breadth-first strategy, given the following:
    Grammar G: 1 $S \rightarrow NP\ VP$ 2 $NP \rightarrow ART\ N$ 3 $NP \rightarrow ART\ ADJ\ M$
                4   $VP \rightarrow V$ 5 $VP \rightarrow V\ NP$
    Sentences: The $_2$Old $_3$man $_4$cried$_5$
    The ART; Old: ADJ, N: man: N, V; cried: V   5

14 a) Discuss 'Word senses' and 'ambiguity'.   6
   b) Explain thematic roles and present common realizations of major thematic roles.   4

                                                           ..2

15 a) State the assumptions and approximations that are made to simplify the calculation of $P_r(c_1, \ldots, c_4 \mid w_1, \ldots, w_T)$

Where $w_1, \ldots, w_T$ are sequence of words and $c_1, \ldots, c_T$ are sequence of lexical categories.

Discuss the use of maximization of $Pr(c_1 \ldots, c_T \mid w_1, \ldots, w_T)$ 6

   b) Describe a simple context-dependent Best-First Parser. 4

16 a) Present and discuss:
      i) Statistical models
      ii) Finite state models for NLP 5
   b) Write a note on semantic interpretation and compositionality. 5

17 Write short notes on:
   a) Augmented Transition Networks (ATN) 3
   b) Encoding ambiguity in logical form 3
   c) Bigram probabilities and lexical-generation probabilities. 4

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FACULTY OF ENGINEERING

B.E. (Civil) IV - Semester (CBCS) (Suppl.) Examination, November / December 2018

Subject : Strength of Materials - II

Time : 3 Hours   Max. Marks: 70

Note: Answer all questions from Part-A & any five questions from Part-B.

PART – A (20 Marks)

1 State Mohr's first Theorem for moment area method.
2 How do you use Conjugate beam method to find slope & deflection at any section of a given beam?
3 Define PROOF RESILIENCE?
4 State Maxwell Reciprocal theorem?
5 Define Principal stress & principal strain.
6 A leaf spring is made of 10 steel plates, 5cm wide and 6mm thick. If the bending stress is limited to 150N/mm^2, determine the length of the spring.
7 What are the limitations Euler's theory?
8 A fixed beam 6m long is carrying a point load of 50KN at its centre. Determine the fixed end moments. Take $I = 78 \times 10^6 \text{ mm}^4$ and $E = 2.1 \times 10^5 \text{ N/mm}^2$.
9 Distinguish between a statically determinate and a statically indeterminate structure with an example each.
10 Define carry over moments and carry over factors.

PART – B (50 Marks)

11 a) A cantilever beam 120mm wide and 200mm deep is 2.5m long. What is the uniformly distributed load which the beam can carry in order to produce a deflection of 5mm at the free end. Take $E = 200 \text{ GN/m}^2$.   (5)

    b) Find the deflection at 2m from the fixed end of a cantilever beam shown in fig. Take $E = 5000 \text{ kN - m}^2$.   (5)
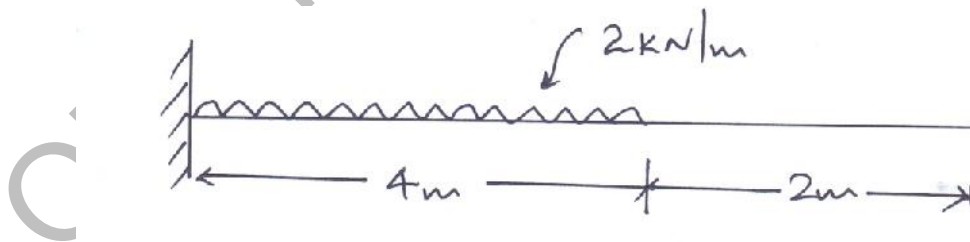

12 Find the deflection at the centre of the overhanging beam shown in fig. Take $E = 2.1 \times 10^5 \text{ N/mm}^2$; $I = 4.2 \times 10^8 \text{ mm}^4$.   (10)
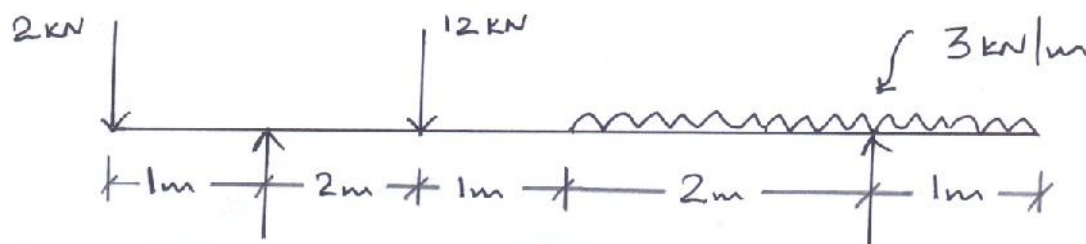
..2

13 a) A cantilever beam of span is provided with a prop at free end. It is subjected to a udl of 1kN/m over a span of 2m from the free end. Draw SFD & BMD.   (5)

b) A fixed beam AB of 6m length carries point loads of 160kN and 120kN at a distance of 2m and 4m from the left end. Find the fixed end moments.   (5)

14   A continuous beam ABC of uniform section, with span AB & BC as 4m each, is fixed at 'A' and simply supported at B and C. The beam is carrying a udl of 6kN/m over its entire length. Find the support moments and the reactions. Also draw the SFD & BMD.   (10)

15 a) A hollow shaft of external diameter 120mm transmits 300kN at 200 rpm. Determine the maximum internal diameter, if the maximum stress in the shaft is not to exceed 60N/mm^2.   (5)

b) A closed coiled helical spring of steel wire 10mm in diameter having 10 complete turns with a mean diameter of 12cm is subjected to an axial load of 200N. Determine the deflection of the spring and the maximum shear stress in the wire of the spring.   (5)

16 a) A tensile load of 60kN is gradually applied to a circular bar of 4cm diameter & 5m long. Determine the extension of the rod & the strain energy absorbed by the rod.   (5)

b) A weight of 10kN falls from a height of 30mm on a collar attached to a vertical bar 4m long and 1000 mm^2 in section. Find the instantaneous expansion of the bar. Take E = 210 GPa.   (5)

17 Use column analogy method to analyze the beam shown in fig. Draw the Bending moment diagram.   (10)

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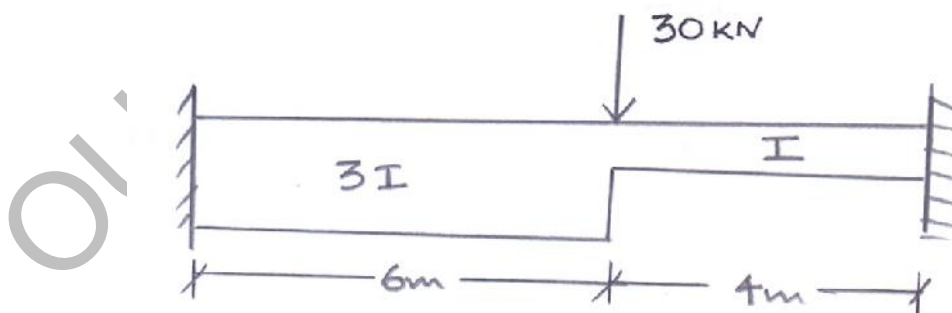
FACULTY OF ENGINEERING

B.E. (EE/Inst.) IV – Semester (CBCS) (Suppl.) Examination, Nov. / Dec. 2018

Subject: Power Electronics

Time: 3 Hours   **Max.Marks: 70**

Note: Answer all questions from Part – A and any five questions from Part – B.

PART – A (10x2 = 20 Marks)

1. What are the different types of power diodes? State the limitations of Schottky diodes.

2. Give constructional differences between MOSFET and IGBT.

3. Discuss latch-up in IGBT.

4. Define the following:
i) Input power factor
ii) Harmonic factor

5. Discuss the effect of source inductance on the performance of 1-ϕ full converter.

6. List the methods of forced commutation.

7. What is the effect of load inductance on the performance of AC voltage Controller?

8. Mention applications of Choppers.

9. Discuss the advantages and disadvantages of a Voltage source inverter compared to a current source inverter.

10. What are the performance parameters of inverters?

PART – B (5 x 10 M = 50 M)

11. a) Explain the working with neat structure of an n-channel power MOSFET and plot its output characteristics.   (5 M)
   b) Draw and explain two transistor analogy of SCR.   (5 M)

12. a) Discuss about UJT – triggering of an SCR with a circuit diagram.   (5 M)
   b) What is the purpose of $\frac{dv}{dt}$ protection and deduce related the expression.   (5 M)

13. a) Obtain expression for load voltage input power factor for 1-ϕ ac-dc full-controlled converter supplying R-L-E load with help of waveforms. Assume constant load current.   (5 M)
   b) Write about control strategies of choppers with relevant diagrams.   (5 M)

14. a) A 1-ϕ full controlled bridge rectifier is supplied from a 230 V ac source with a load resistance of 10 ohms. If the firing angle is 30^0 find i) the average load voltage ii) the average load current iii) RMS load current and iv) Power supplied to the load.   (6 M)
   b) Derive load expression for Boost chopper.   (4 M)

15. a) Sketch input voltage, input current for a 1-ϕ ac controller supplying R-L load for $<$ where $w = tan^{-1}\left(\dfrac{\check{S}L}{R}\right)$. (4 M)

   b) Explain the working of 1-φ to 1-φ step-down cyclo-converter and draw relevant waveforms. Assume inductive load, continuous conduction and load voltage frequency as $f_s/2$. (6 M)

16. a) Explain 120^0 conduction mode of 3-phase bridge inverter. (5 M)

   b) Brief about techniques of Pulse width modulation of Inverters. (5 M)

17. Write short notes on

   a) Non – Circulating current mode of single-phase dual converter. (5 M)

   b) Turn-Off mechanism in IGBT. (5 M)

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FACULTY OF ENGINEERING

BE IV Semester (CBCS) (ECE) (Suppl.) Examination, November/December 2018

Subject: Analog Electronic Circuits

Time: 3Hoursr   Max.Marks:70

Note: Answer All Questions From Part – A & Any Five Questions From Part – B.

Part – A (20 Marks)

1. Derive the effect of negative feedback on gain stability?   2M
2. Draw the π model of CE amplifier and give typical values of each component?   2M
3. What is tuned amplifier? Classify?   2M
4. Explain series voltage regulator?   2M
5. Compare class A, class B, class AB, class C amplifiers?   2M
6. Give classification of amplifiers?   2M
7. Derive the relation between A_f and A for feedback amplifiers?   2M
8. A class B amplifier provides a 20V peak output signal to 15 load. The system
   Operates on the power supply of 25V.Determine the efficiency of the amplifier?   2M
9. For single stage tuned amplifier calculate f_0 if L=12.5mH and C=10pf?   2M
10. Differentiate LC and RC Oscillators?   2M

Part – B (50 Marks)

11. Draw the equivalent circuit of RC coupled BJT amplifier in the mid frequency and
    low frequency range and derive an expression for voltage gain in? each case?   10M

12. With the help of neat circuit diagram analyze two stage voltage series feedback
    amplifier to determine A_{vf}, R_{if}, R_{of}, R_{of}' ?   10M

13. (a) Derive an expression to find the maximum efficiency in case of class B amplifier? 5M
    (b) Sketch the circuit diagram of push pull power amplifier and explain
        cross over distortion?   5M

14. Draw the circuit diagram of Hartley oscillator and explain its working. Derive the
    expression for frequency and condition of oscillation?   10M

15. (a) What are the characteristics of – Ve feedback. Explain how Band width is
        increased with feedback   6M
    (b) Why LC oscillators are not suitable for low frequency applications?   4M

16. (a) Draw the circuit of a double tuned voltage amplifier using BJT Derive the
        expression for its voltage gain at the centre frequency?   10M

17. Discuss about   10M
    a. Shunt voltage regulator.
    b. Neutralization in tuned amplifiers
    c. Crystal Oscillator

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FACULTY OF ENGINEERING
B.E. IV-Semester (CBCS) (Suppl.) Examination, November / December 2018

Paper : Electrical Circuits & Machines

Time:3 Hours   Max Marks :70

Note: Answer all questions from Part-A & Any five questions from Part-B.

Part - A (20 Marks)

1. Explain Norton's theorem   2
2. Define RMS value of sinusoidal quantity   2
3. What are the applications of   i) dc series motor ii) dc shunt motor   2
4. Why is transformer rated in KVA? Justify   2
5. Two watt meters connected to a three phase motor indicate the total power input to

   be 12KW. The power factor is 0.6 .determine reading of each wattmeter.   2
6. What is meant by slip in a three phase induction motor   2
7. Mention various losses in three phase induction motor   2
8. Why single phase induction motor not self-starting   2
9. What are classifications of dc generator based on excitation   2
10. Mention types of transformer   2

Part - B (50 Marks)

11. a) In circuit below find the voltage across A & B (Resistances ranges are in ohms)   5
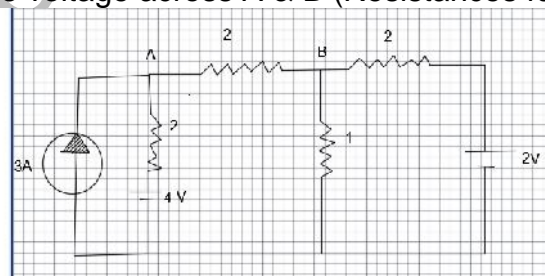
    b) A series circuit with R=10 ohms, L=50mH, and C= 100micro farads, is supplied with 200v, 50Hz.calculate 1. Impedance 2. Current 3. Active power, reactive power 4. Power factor 5. Voltage cross resistor and inductor   5

12. a) With neat diagram give the constructional features of DC machine   5
    b) The armature of 6 pole generator has a wave winding containing 664 conductors. Calculate E.M.F when flux per pole is 60mwebers and speed is 250 rpm.   5

13. a) Derive the fundamental the emf equation of a single phase transformer.   5
    b) The following data apply to a single phase transformer Output: 100 KVA; secondary voltage 400v; primary turns 300; secondary turns 40; neglecting the losses. Determine i) primary applied voltage ii) turns ratio, transformation ratio.   5

..2

14. a) Explain star–delta starter of three phase induction motor with neat schematic diagram. 5

   b) Explain production of rotating magnetic field in produced in three phase induction motor. 5

15. Explain capacitor run motor with help of neat circuit diagram and mention its application. 10

16. Derive emf equation of three phase alternator and give construction details of three phase alternator. 10

17. Write a short note on following
   a) Power factor from 2-watt meter method in three phase balanced circuit. 5
   b) Auto transformer 5

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FACULTY OF ENGINEERING

B.E. (AE) IV - Semester (CBCS) (Suppl.) Examination, November / December 2018

Subject : Automotive Petrol Engines

Time : 3 Hours   Max. Marks: 70

Note: Answer all questions from Part-A & any five questions from Part-B.

PART – A (20 Marks)

1   Draw the actual indicator diagram of an Otto cycle.
2   What are the advantages of actual valve timing's to theoretical valve timing in an engine?
3   What are the mixture limits of inflammability?
4   What is MPFI?
5   What is the main functioning of spark plug?
6   Write down the possible faults in conventional ignition system.
7   What is meant by abnormal combustion?
8   List the stages of combustion in SI engines.
9   Define viscosity index.
10 What is meant by SAE 10W/30?

PART – B (50 Marks)

11 Why actual cycle efficiency is less than the air stand cycle efficiency? Explain in detail.

12 (a) With a neat sketch explain the working principle of Solex carburetor.
    (b) What are the advantages of petrol injection system?

13 (a) Why a Spark advance is required? Explain.
    (b) With a neat sketch explain the working principle of centrifugal advance mechanism.

14 (a) Explain the various factors that influence flame speed.
    (b) What are the factors to be considered while designing a combustion chamber in a S.I. engine.

15 (a) Differentiate between air cooling and water cooling system.
    (b) What are the merits and demerits of dry sump lubrication system over wet sump lubrication system?

16 (a) Define volumetric efficiency. Explain various methods that can be adopted to increase the volumetric efficiency.
    (b) What is the voltage required to generate a spark in a S.I. Engine? Explain how it is obtained.

17   Write short notes on the following:
       (a) Mist lubrication system
   (b) Fuel feed pumps
       (c) Types of combustion chambers

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FACULTY OF ENGINEERING

B.E. (CSE) IV – Semester (CBCS) (Suppl.) Examination, November / December 2018

Subject: Signals & System Analysis

Time: 3 Hours   **Max.Marks: 70**

Note: Answer all questions from Part – A and any five questions from Part – B.

PART – A (20 Marks)

1 Determine the power and rms value of the signal $x(t) = u(t)$.   2M

2 Sketch the following signals: where $r(t)$ is a unit ramp signal.

     (i) $x(t) = r(-t+2)$ (ii) $x(t) = r(2t-4)$ 2M

3 State and prove the following properties of Fourier Transform

   i) Duality property   ii) Modulation Property.   2M

4 Obtain Fourier transform of Signum function.   2M

5 Define signal bandwidth and system bandwidth   2M

6 What is an LTI system? Derive an expression for the transfer function

   of an LTI system.   2M

7 Obtain the relation between convolution and correlation.   2M

8 Write the properties of convolution.   2M

9 Obtain the Z-transform and its associated ROC for the sequence

   $x(n) = a^{-n} u(-n)$ 2M

10 Explain the mapping between S-domain and Z-domain   2M

PART – B (50 Marks)

11 A rectangular function defined by $f(t) = 1; \quad 0 < t <$

                            $= -1; \quad < t < 2$

   approximate the above function by a single sinusoid sin t, Evaluate mean square error in this approximation. Also show what happens when more number of sinusoids are used for approximations.   10M

12 a) Find the Fourier transform of   6M

     i) $x(t) = \dfrac{1}{t}$ ii) $x(t) = \dfrac{1}{1+t^2}$

   b) State and prove convolution property of Laplace transfoerm.   4M

13 a) Find the exponential fourier series of the periodic pulse train shown in figure below. 6M
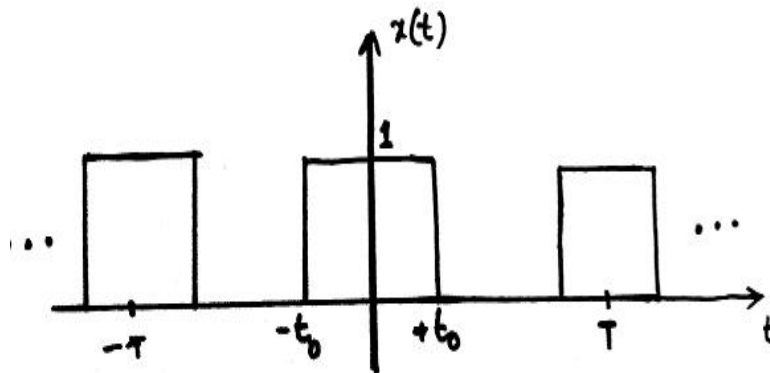
b) Find the Fourier transform of $x(t) = 5 \sin^2(3t)$ 4M

14 a) State and prove sampling theorem for low pass signals. 6M

b) Classify discrete time system. 4M

15 a) Find the autocorrelation and Energy spectral Density of the signal $x(t) = e^{-t}u(t)$ using the relationship between convolution and correlation. 6M

b) Find the convolution of the following signals using graphical analysis

$x_1(t) = e^{-3t}u(t)$ and $x_2(t) = u(t-3) - u(t-5)$ 4M

16 a) Using partial fraction expansion method, obtain all possible inverse Z-transform of

the $X(z) = \dfrac{4 - 3z^{-1} + 3z^{-2}}{(z+2)(z-3)^2}$ 6M

b) Using properties of Z-transform, find the Z-transform of

$x(n) = n^2 \left(\dfrac{1}{3}\right)^n u(n-3)$ 4M

17 Write short notes on:

a) Detection of periodic signals in the presence of noise by autocorrelation. 5M

b) Causality, physical realizability of a system and Paley-Wiener criterion. 5M

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FACULTY OF ENGINEERING
BE IV-Semester(CBCS)(I.T) (Suppl.)Examination , Nov/Dec 2018

COMPUTER ORGANISATION AND MICROPROCESSOR

Time: 3 Hours **Max. Marks: 70**

Note: Answer all questions from Part-A and any five questions from part-B.

Part –A (20 Marks)

1. List the various phases of instruction cycle.
2. How many address bits are required to address 128K X 8 memory. What is the size of each word.
3. Differentiate between multiprocessor and multicomputer systems.
4. Draw the Block diagram of I/O Interface for the input device and explain.
5. Define SPEC Rating.
6. What is a Subroutine. List the various instructions used for Subroutines.
7. List the branch instructions of 8085.
8. Define Hit Ratio.
9. Write briefly about the significance of Virtual Memory.
10. Write the functions of 8253.

Part- B (5x10=50 Marks)

11. a. Explain the various functional units of a computer system. (5)
    b. Draw the Block diagram of Interrupt Hardware and Explain. (5)

12. Explain in detail about cache memory Mapping techniques. (10)

13. Discuss the internal architecture of 8085 with a neat diagram. (10)

14. a. Explain various addressing modes of 8085 with examples. (5)
    b. Write an ALP to subtract two 16-bit numbers. (5)

15. Explain about 8257 (DMA Controller) with a neat Block Diagram. (10)

16. a. Explain about the basic interfacing concepts. (5)
    b. Explain about A/D and D/A convertor with a suitable Block Diagram (5)

17. Write short notes on any two of the following (10)
    a. Magnetic disk
    b. Explain about 8279 with a neat sketch.
    c. Explain about RS 232C Standard.

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