Code No. 11395/CBCS

FACULTY OF ENGINEERING

B.E. (Civil) III - Semester (CBCS) (Main & Backlog) Examination,
December 2018 / January 2019

Subject : Building Materials and Construction

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

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

PART – A (20 Marks)

1	What is seasoning of stones?	(2)
2	What are the uses of laminates?	(2)
3	How many types of mortars are generally used in buildings?	(2)
4	Explain the importance of bulking of sand.	(2)
5	What is the chemical composition of cement?	(2)
6	List out the various tests conducted on coarse aggregates.	(2)
7	What is the difference between plastering and pointing?	(2)
8	What do you mean by smart materials?	(2)
9	What is scaffolding?	(2)
10	Name the different types of joints in concrete.	(2)

PART- B (50 Marks)

11	(a) What is Quarrying? What are the various methods of Quarrying of stones?	(5)
	(b) Explain the process of burning of bricks in Hoffman's kiln with a neat sketch?	(5)
12	(a) What are the various tests for cement?	(5)
	(b) What are the characteristics of good coarse and fine aggregate for manufacturing of concrete?	(5)
13	(a) Difference between nominal mix and design mix.	(5)
	(b) How energy conservation can be done using smart materials in buildings?	(5)
14	(a) What are the various defects in plastering?	(5)
	(b) Explain the process of painting an old steel work.	(5)
15	(a) Explain the different types of formwork with neat sketches.	(5)
	(b) Explain the safety measures to be considered while erection and dismantling of a scaffolding.	(5)
16	(a) What are the different types of fires? Explain the methods to control it.	(5)
	(b) What are the causes and effects of dampness in building?	(5)
17	(a) Explain the types of joints in concrete.	(5)
	(b) What is the difference between structural and non-structural cracks? What are the causes of cracks in buildings? Explain.	(5)

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CODE NO: 11401/CBCS

FACULTY OF ENGINEERING

B.E (EE/Inst.) III-Semester (CBCS) (Main & Backlog) Examination,
December 2018/ January 2019

Sub: Digital Electronics and Logic Design

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. What is truth table?
2. Prove A.(B+C) = A B+AC.
3. Define Power dissipation of a logic gate.
4. What is decoder?
5. Define comparator. And explain which logic gate is a basic comparator?
6. How does the carry look ahead adder speeds up the addition process?
7. What are the Various methods of triggering flip – flops?
8. What are the applications of shift registers?
9. Differentiate ADC and DAC.
10. An 8-bit DAC Produces V_{out} = 0.05 V for a digital input of 00000001. Find the full – Scale output and resolution.

PART–B (50 Marks)

11. a) Minimize and implement the following multiple output functions. 8
    $f_1 = \sum m (1,2,3,6,8,12,14,15)$
    $f_2 = \prod M (0,4,9,10,11,14,15)$
    b) Apply demorgan's theorem to the following expression
    $\overline{\overline{AB}(CD+\overline{E}F)(\overline{AB}+\overline{CD})}$ 2

12. a) Using Quine McCluskey method of tabular reduction, minimize the given combinational function f(W,X,Y,Z) = $\sum m$ (0, 1, 5, 7, 8,10,14,15) 8
    b) Differentiate Multiplexer and demuttiplexer. 2

13. a) Design 4-bit magnitude comparator 7
    b) Discuss about half sub tractor 3

14. a) Explain the operation of up/down counters 6
    b) How does the denouncing switch works? Explain. 4

15. a) With the help of neat diagrams explain the working of 10
    a) R – 2R ladder network type DAC
    b) Tracking type ADC

16. a) Explain the working of TTL family 5
    b) Expand $A+B\overline{C}+AB\overline{D}+ABCD$ to minterms and max terms 5

17. Write short notes on the following: 10
    a) Full adder
    b) Ripple counters
    c) Advantages and disadvantages of flash – type DAC

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Code No: 11408/CBCS

FACULTY OF ENGINEERING

B.E.(ECE) III Semester (CBCS) (Main & Backlog) Examination, Dec. 2018/Jan. 2019

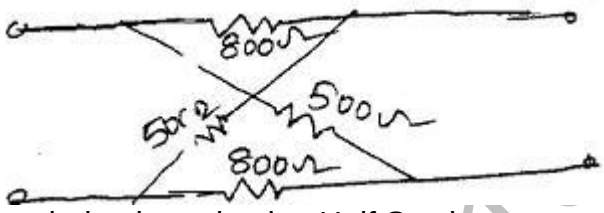
Subject: Network Analysis & Synthesis

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

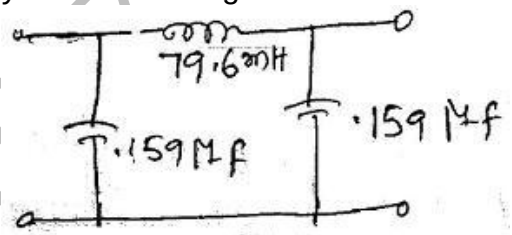
Note: Answer all questions from Part A & any five questions from Part B

PART – A (10x2=20Marks)

1. Define Image Transfer Constant and Propagation Constant of a network.
2. Find the Characteristics Impedance of the following Network.



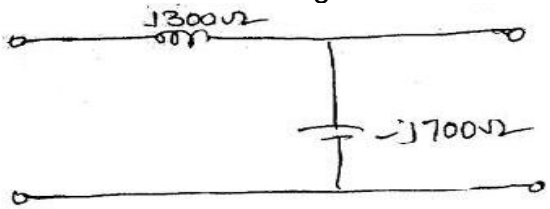
3. Justify that m-0.6 for m-derived terminating Half Sections.
4. Mention any Two important functions of an Equalizers.
5. Design a symmetrical ® Attenuator having an attenuation of 60dB and a nominal impedance of 600Ω
6. Test Whether the following polynomial is Hurwitz or not $s^4+s^3+3s^2+2s+12$.
7. Test Whether the following system is stable or Not using RH Criteria $s^5+4s^4+6s^3+3s^2+6s+5$
8. Mention the Properties of Positive Real Functions.
9. Find the cutoff Frequency of the following filter.



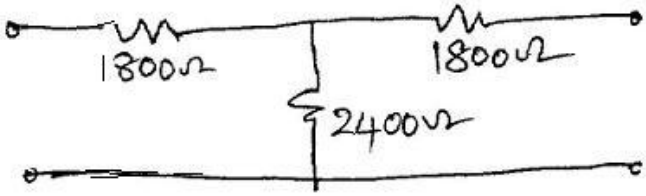
10. Derive the condition for a filter to lie in Pass Band.

PART – B (5x10=50 Marks)

11.(a) Find the Image Impedance of the following Network



(b) Find the Characteristics Impedance of the following Network. Derive the formulae you use.



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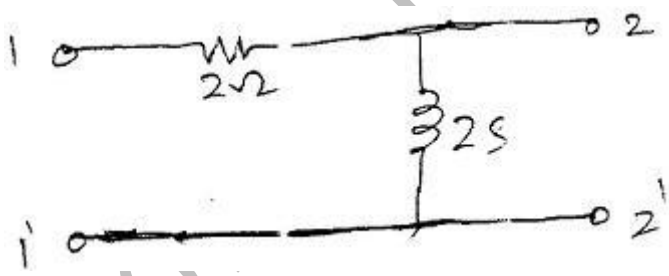
12 (a) Design a m-Derived High Pass Filter(T-Section) having a cutoff frequency of 4KHz and Frequency of Infinite attenuation 3KHz and a nominal Impedance of 500Ω.
(b) Design a Band Pass Filter with a Cut off Frequencies of 10KHz, 12 KHz and a Nominal Impedance of 600Ω

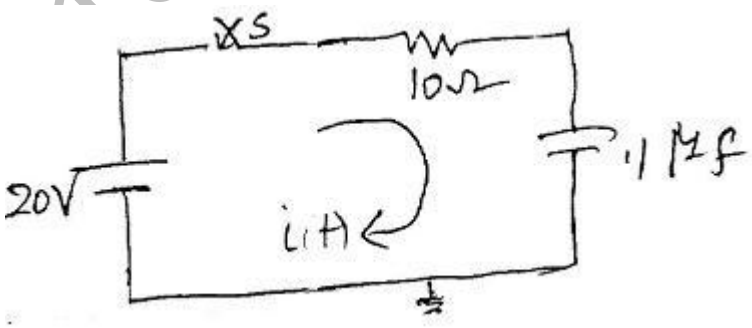
13 (a) Design a Composite High Pass Filter(® Section) having a Cutoff Frequency of 6 KHz Frequency of Infinite Attenuation is 5KHz, and a Nominal impedance of 600Ω.
(b) Find the Frequency at which Proto type T-section Low Pass Filter having a Cut off Frequency of f_c have an Attenuation of 15dB.

14 (a) Design a Symmetrical Bridge T Attenuator having an Attenuation of 60dB, and a Nominal Impedance of 600Ω. Derive the Formulae you use.
(b) Design a Full Series Equalizer for a Design Resistance of 600Ω and an attenuation of 12dB at 800Hz.

15 (a) For the Network shown Find the Driving Point Impedance, Transfer Impedance Z_{21}



(b) Find the Current i(t) in the following Circuit Using Laplace Transformations Switch closed at t=0, Assume all the initial conditions are zero.



16 (a) The Driving Point Impedance of LC Network is given by $Z(s)=s^4+4s^2+3/s^3+2s$ Synthesize using second Cauer Method.
(b) The Driving Point Impedance of RL Network is given by
$Z(s)=5(s+1)(s+4)/(s+3)(s+5)$
Synthesize using Foster First Method.

17 Answer any Two of the following
a) Properties of Positive Real Functions
b) Derive the Characteristic Impedance of a Lattice Network
c) Find the Laplace Transform of the following Waveform.

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Code No: 11415/CBCS

FACULTY OF ENGINEERING

B.E. III Semester (AE)(CBCS) (Main & Backlog) Examination, Doc. 2018/Jan.2019

Subject: Fluid Mechanics and Machinery

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

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

PART – A (10x2=20Marks)

1. A liquid has a specific gravity of 1.9 and kinematic viscosity of 6 stokes. What is its dynamic viscosity?
2. How are Manometers classified?
3. Distinguish between stream lines and steak lines.
4. Explain briefly the following heads:
   i)Potential head ii) Velocity head, iii) Datum head
5. What are the characteristics of a turbulent. How?
6. Define the terms: Major energy losses and minor energy losses.
7. How is specific speed of a turbine defined?
8. What are the functions of a draft tube.
9. How is the selection of pumps made.
10. What is a air vessel? Mention their uses.

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PART – B (5x10=50 Marks)

11. (a) Explain briefly the following:
    i)Surface tension ii) Capillarity
    (b) A plate 0.05 mm distance from a fixed plate moves at 1.2 m/s and requires a force of 2.2 M/m^2 to maintain this speed. Find the viscosity of the fluid between the plates.

12. Device Euler's equation of motion and obtain Bernoullis equation from it by stating their assumptions.

13. A horizontal venturimeter with intel diameter 200 mm and throat diameter 100 mm is employed to measure the flow of water. The reading of the differential Manometer connected to the inlet is 180mm of mercury. If the co-efficient of discharge is 0.98, determine flow rate.

14. A Franeis turbine with an overall efficiency of 76% is required to produce 149.26 kw. It is working under a head of 7.62 m. The peripheral velocity = $0.26\sqrt{2gH}$ and radial velocity of flow at inlet $0.96\sqrt{2gH}$. The wheel runs at 150 rpm and hydraulic loss in the turbine are 22% of the available energy. Assuming radial discharge determine.
    i) The guide blade angle, ii) The wheel vane angle at inlet, iii) Diameter of the wheel at inlet and iv) Width of the wheel at inlet.

..2

15. A centrifugal pump delivers water against a net head of 14.5m and a design speed of 1000rpm. The vanes are curved back to an angle of 30^{o} with the periphery. The impeller diameter is 300 mm and outlet width 50mm. Determine the discharge of the pump if Manometric efficiency is 95%

16. An oil of viscosity 0.02 poise and sp. gr. 0.8 is flowing through 50mm diameter pipe of length 500 m at the rate of 0.19 lts. Determine,
    i) Reynolds number of flow, ii) Center line velocity
    iii) Pressure gradient, iv) Wall shear stress, and
    v) Power required to maintain the flow.

17. (a) Write a short note on
    i) Single acting reciprocating pump
    ii) Gear pump
    iii) Vane pump

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Code No. 11423/CBCS

FACULTY OF ENGINEERING

B.E. (CBCS) III – Semester (I.T)(Main) (Backlog) Examination, December 2018/January 2019

Subject: Digital Electronics and Logic Design

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

Note: (i) Answer All Questions From Part-A & Answer Any five Questions From Part-B.

Part – A (20 Marks)

1. State De-Morgan's theorems
2. Realize EX-OR gates using minimum number of NAND gates
3. Compare and contrast between CPLD and FPGA
4. Design a full Adder circuit
5. Differentiate between PLA and PAL
6. What is decoder? Give the logic diagram of 2-to-4 decoder.
7. What is decade counter.
8. Write VHDL code for Up-Counter.
9. Define set up and hold time of a flip flop.
10. Distinguish between Moore and Mealy state model

Part – B (5x10=50 Marks)

11. Reduce the following expression to minimum cost SOP, draw the logic circuit using NAND gates only and write the corresponding VHDL code
    $F(x1,x2,x3,x4) = \Sigma m\ (5,6,9,10,12,13,14,15)+d(2,4)$ 10

12. a) Explain the architecture of CPLD 5
    b) Design 2x4 priority encoder 5

13. a) Explain the positive type Master slave edge triggered D flip flop 6
    b) Design a 3 bit Up-counter 4

14. Explain FSM as an arbiter circuit 10

15. a) What is synthesis? How is it different from analysis 5
    b) Give the state reduction procedure with an example 5

16. a) Explain the steps required to design a synchronous sequential circuits 5
    b) Discuss about algorithmic state machine charts. 5

17. a) Write about state assignment problem 5
    b) Write about Formal model of synchronous sequential circuits. 5

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Code No: 11044

FACULTY OF ENGINEERING

BE 2/4 II-Semester (Backlog) Examination, December 2018 / January 2019

Subject: Strength of Materials – II

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

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

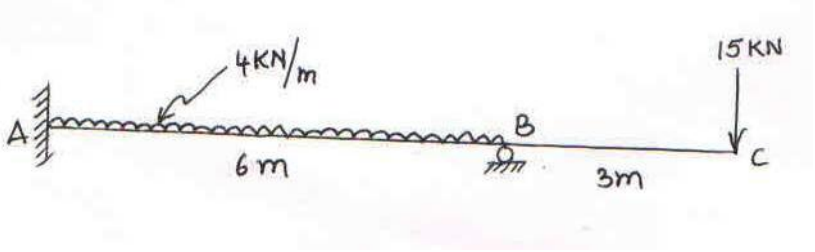
PART- A (25 Marks)

1. Define Modulus of Resilence and Proof Resilence. (2)
2. What is internal indeterminacy? Give an example of such type of truss (2)
3. Define Shear centre and shear flow. (2)
4. Write the expression for principal moment of inertia. (2)
5. Difference between laminated and Helical springs (2)
6. Write any two reasons for getting appropriate values of crippling load from Eulers and Rankines Formula. (3)
7. What are the merits of tension co-efficient method. (3)
8. State Mohr's first and second theorem. (3)
9. Determine the reaction of Prop when the Propped cantilever is subjected to udl throughout span 'l'. (3)
10. Define Torsional Stiffness and Modulus of Rupture. (3)

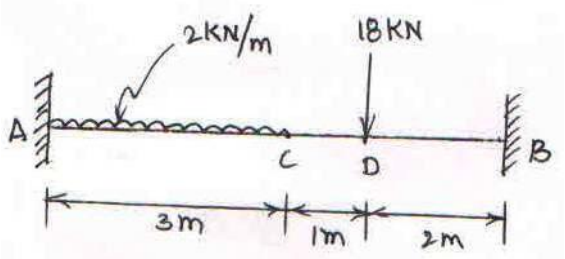
PART-B (50 Marks)

11. A Cantilever AB of length *l* and constant moment of Intertia I is fixed at A and free at B. If it supports a uniformly distributed load of intensity w/unit length for only half of its length from B, find the deflection at B and the slope developed there. Calculate their values if *l* = 3m, w = 20 KN/m, I = 54 x 10^{-5} m^4 and E = 210 GN/m^2. 10

12. Draw SFD and BMD of the given propped Cantilever beam. 10



13. Analyse the fixed beam loaded as shown below and draw SFD and BMD 10



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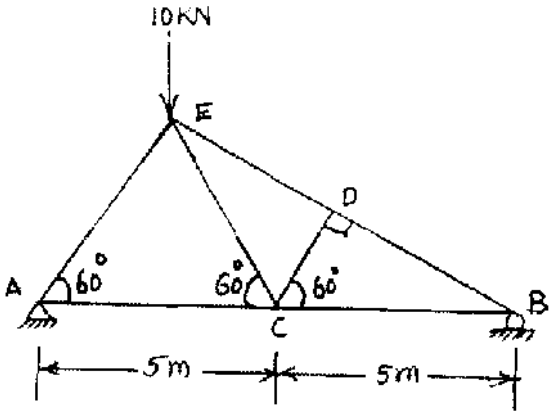
14. State and prove Castigliano's theorem – I and determine the central deflection of a simply supported beam of span 'l' carrying a central point load W, by using this theorem. 10

15. A semi-ellyptical leaf spring is required to satisfy the following specification. L = 0.75m, W = 5 kN, b = 75mm, maximum stress 210 MN/m^2, maximum deflection 25mm, E = 200 GN/m^2. Find the number of leaves and their thickness, if the leaves become straight when the load is applied. Find the initial radius of curvature. 10

16. A hollow C.I column whose outside diameter is 200mm has a thickness of 20mm. It is 4.5m long and is fixed at both ends. Calculate the safe load by Rankine's formula using a factor of safety of 4. Calculate the slenderness ratio and the ratio of Euler's and Rankines Critical loads. For cast iron take F_c = 550 N/mm^2 and α = 1/1600, E = 8 x 10^4 N/mm^2. 10

17. Find the forces in the members of the truss shown below using tension co-efficient method. 10



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Code No: 11050

FACULTY OF ENGINEERING

B.E. II/IV (EEE) II Semester (Backlog) Examination, Dec. 2018/Jan.2019

Subject: Electrical Circuits - II

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

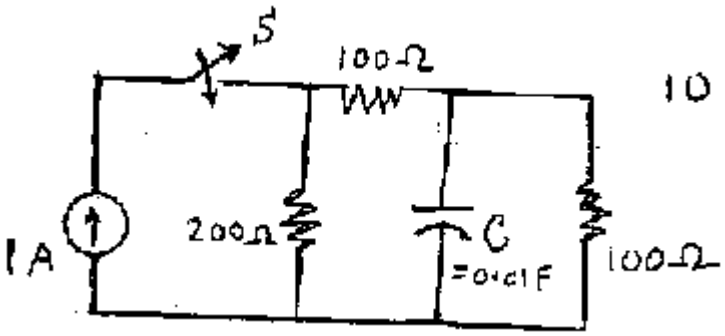
Note: Answer all questions from Part A and Any Five questions from Part B.

PART – A (25 Marks)

1. Draw the equivalent circuit of (a) capacitor (b) Inductor at t = o^+ and t=∞ 3
2. Distinguish between Zero input response and Zero state response 3
3. Draw a neat sketch of the signal $x(t) = -2r(t)$ 3
4. State the final value theorem of Laplace transform. 3
5. Draw the pole-zero plot of $F(s) = \frac{2S}{(s+1)(s^2+2s+4)}$ 3
6. For a two port network the three transmission parameters are given by A=6/5 , B =17/5 , C =1/5 . What is the value of D? 2
7. Define half-wave symmetry in Fourier Series. 2
8. If f(t) = 10 + 8cos t+ 4cos3t + 2cost 5t + ……., what will be the frequency of the sixth harmonic? 1
9. What is a positive real function? 2
10. What are the differences between Foster method and Chaucer method of Network Synthesis. 3

PART – B (10x5=50 Marks)

.11. In the circuit shown, the switch 'S' is closed at t=0. How long does it take the capacitor to attain 70% of its Final voltage. Assume the capacitor is initially uncharged. Find also the time constant of the circuit after the switch is closed. 10



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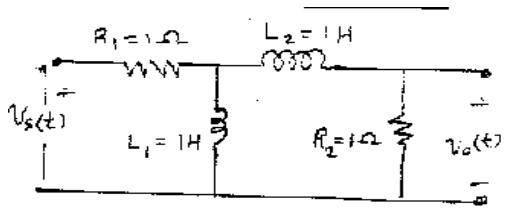
12. a) Find the Laplace transform of $f(t) = t^2 \sin 2t\, u(t)$ 5

(b) Find the inverse Laplace transform of

$$X(s) = \frac{2s+1}{(s+1)(s^2+2s+2)}$$ 5

13. In the circuit shown find the voltage transfer function and the input impedance function. Assume zero initial conditions.



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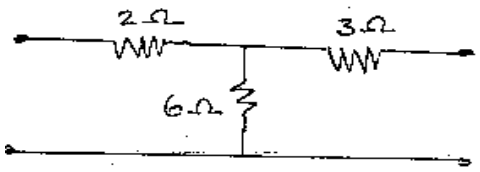
14. Find the hybrid parameters of the network shown



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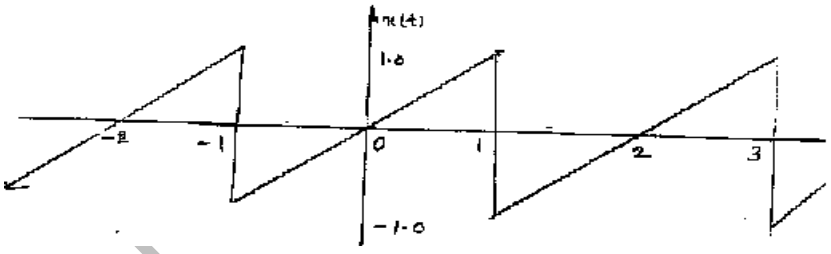
15. Find the trigonometric Fourier Series.



10

16. (a) Check whether the following is a positive real function

$$Z(s) = \frac{4s+1}{s+2}$$ 5

(b) Check whether the following polynomial is Hurwitz

$P(s) = S^4 + S^3 + 2S^2 + 3S + 2$ 5

17. Realize the network function in Cauer II form

$$Z(s) = \frac{(s^2+2)(s^2+4)}{s(s^2+3)}$$ 10

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Code No. 11056

FACULTY OF ENGINEERING

B.E. 2/4 (Inst.) II - Semester (Backlog) Examination, December 2018 / January 2019

Subject : Transducers 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 Define (a) Accuracy (b) Precision (2)
2 Give the characteristics of Measuring devices. (3)
3 Explain the Transfer function for sinusoidal I/P. (2)
4 Give an example of second order system. (3)
5 What are the variable inductive transducers? (2)
6 What is the working principle of capacitive transducer? (3)
7 Give classification of temperature measuring devices. (2)
8 What are diaphragms? (3)
9 Mention the special features of Ionization gauge. (3)
10 Explain the working principle of Ktuden gauge. (2)

PART – B (50 Marks)

11 (a) Draw the block diagram of Instrumentation System and explain in detail. Also define Hysterisis and threshold with an example.
(b) A 0-150V voltmeter has a guaranteed accuracy of 1 percent of full scale reading. The voltage measured by this instrument in 75V. Calculate the limiting error in percent. Comment upon the result.

12 (a) Derive the expression for time response of first order system when subjected to unit step input. (6)
(b) Also find the steady state error. (4)

13 (a) Explain in detail working of LVDT. Mention various applications. (5)
(b) Write short notes on Capacitive hygrometer. (5)

14 (a) Explain with a neat sketch the working principle of thermocouple. (5)
(b) Explain the working of pyrometers with suitable diagram. (5)

15 (a) Discuss in detail the various elastic elements for pressure measurement. (5)
(b) Explain the working of Dead weight gauges. (5)

16 Write short notes on : (a) Strain guages (b) RVDT (10)

17 (a) Explain the working principle of Potentiometers. (5)
(b) Write a short notes on measurement systems.

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CODE NO: 11061

FACULTY OF ENGINEERING

B.E 2/4 (ECE) II-Semester (Backlog) Examination, December 2018/January 2019

Subject: Probability Theory & Stochastic Process

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

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

PART-A (25 Marks)

1. Three horses A, B and C are in a race. A is twice as likely to win as B and B is twice likely to win as C. What is the probability that B or C wins? (2)
2. Define probability Mass function and list its properties? (3)
3. A noisy transmission channel has a per-digit error probability of 0.01. Calculate the probability of more than one error in 10 received digits. (3)
4. A Gaussian random variable X has μ_X =2 and σ_X =2.

   Find P[X>1.0] and P[X≤ -1.0] (2)
5. Define conditional probability distribution function and write its properties. (3)
6. State central limit theorem. (2)
7. What is meant by stochastic convergence of probability? (2)
8. Statistically independent random variables X and Y have moments $m_{10}=2$, $m_{20}=14$ $m_{11}=-6$ and $m_{02}=12$. Find the moment μ_{22}. (3)
9. Check whether the function below is a valid power density spectrum or not. $\frac{\omega}{j\omega^6+\omega^2+3}$ (2)
10. The autocorrelation function of a random process is $R_{XX}(\tau)=ae^{-b|\tau|}$. Find its power density spectrum. (3)

PART-B (50 Marks)

11. (a) State and prove Bayes Theorem. (5)
    (b) Define the terms outcome, event, sample space, mutually exclusive events. Consider the experiment of rolling of two fair dice simultaneously and represent its sample space. Also give examples of terms mentioned above related to this experiment. (5)

12. Let X be a random variable with the following CDF:

$$F_X(x)=\begin{cases} +\frac{1}{2}(1-e^{-x}) & x\geq 1 \\ +\frac{1}{2}(1-e^{-x}) & 0\leq x<1 \\ 0 & x<0 \end{cases}$$

    (a) What kind of random variable is X? (2)
    (b) Find the generalized density function of X? (2)
    (c) Find P[X>0.5] using both CDF and PDF. (3+3)

…2

13. (a) A random process is defined as X(t)= A cos( ) ,where is uniformly distributed random variable in the interval (0,π/2). Check for its wide sense stationary while A and are constants.
(b) Classify Random process and Explain. (6+4)

14. Define Marginal density function? Find the marginal density functions of below joint density function $f_{XY}(x,y)=\frac{1}{12}u(x)u(y)e^{-x/3}e^{-y/4}$ (10)

15. (a) Let Z is the sum of two independent random variables X and Y . Find the PDF of Z.
(b) Two random variables X and Y have joint characteristic function $\Phi_{XY}(\mu_1,\mu_2)=\exp(-2\mu_1^2-8\mu_2^2)$. Show that X and Y are uncorrelated Zero mean random variables. (5+5)

16. (a) A random variable X can have values-4, -1, -2, 3 and 4, each with probability 0.2. Find (i) density function (ii) mean (iii) variance (1+2+2)
(b) Find the moment generating function of the random variable whose moments are m_r =(r+1) . (5)

17. A random process has autocorrelation function
$R_{XX}(\tau)=$ $|\tau| \quad |\tau| \le 1$ / $otherwise$ Find PSD and draw plots. (10)

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Code No. 11064

FACULTY OF ENGINEERING

B.E. 2/4 (M/P/AE/CSE) II-Semester (Backlog) Examination,

December 2018 / January 2019

Subject : Mathematics-IV

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 Evaluate $\int_0^{2+i} (\bar{z})^2 \, dz$ along the line 2y = x. 2

2 Show that f(z) = $|z|^2$ is not analytic at any point. 3

3 Classify the singularity of the function $f(z) = \frac{1-\cos z}{z^4}$. 2

4 Expand $f(z) = \frac{1+z}{z-4}$ around z = 3 as a Taylor series. 3

5 Find the z-transform of the sequence $\{f_n\}$ where $f_n = \cosh n\theta$. 2

6 Find f_0, f_1 of the sequence $\{f_n\}$, when $z\{f_n\} = F(z) = \frac{1}{z-4}$. 3

7 Find the finite Fourier cosine transform of $f(x) = x^2$, $0 < x < \pi$. 2

8 Find the Fourier sine transform of the function 3

$$f(x) = \begin{cases} 0 & 0 < x < a \\ x & a < x < b \\ 0 & x > b \end{cases}$$

9 If $y' = xy^2$, y(0) =2, then evaluate y(0.4) by using Euler's method with h = 0.2. 2

10 Construct the divided difference table for the following data.

x	-1	0	2	4
f(x)	3	6	36	138

..2

PART – B (50 Marks)

11 a) State Cauchy's integral formula and using it evaluate

$\int_C \frac{e^{z^2}}{(z-1)(z-2)} dz$ where C is the circle $|z| = 3$. 5

b) Find the analytic function f(z) = u + iv where $u(x, y) = x^2 - y^2 - y$. 5

12 a) Evaluate $\int_C \frac{6+5z}{z(z-6)(z-2)^2} dz$, where C is the circle $|z| = 3$ using Cauchy's Residue theorem. 5

b) Find the bilinear transformation which maps the points -1, ∞, 1 of z plane on to the points ∞, i, 1 of the w-plane. 5

13 a) Evaluate $z\{2n^2 + 3n + 5\}$. 5

b) Find the inverse z-transform of F(z), where $F(z) = \frac{z^2}{(z-3)(z-4)}$. 5

14 a) Find the Fourier cosine transform of the function $f(x) = \frac{1}{1+x^2}$. 5

b) Find the Fourier transform of the function $f(x) = e^{-x^2}$. 5

15 a) Using Newton's forward interpolation formula, find a cubic polynomial which fits the following data. 5

X	0	1	2	3
f(x)	1	8	33	88

b) If $y' = y - \frac{2x}{y}$, y(0) = 1 then evaluate y(0.1) by Runge-Kutta fourth order method. 5

16 a) If f(z) u + iv is analytic function of z, then show that

$\left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2}\right) |f(z)|^2 = 4|f'(z)|^2$. 5

b) Evaluate $\int_{-\infty}^{\infty} \frac{x^2 dx}{(x^2+4)(x^2+9)}$. 5

17 a) Solve $y_{n+3} + 2y_{n+2} - y_{n+1} - 2y_n = 1$, where $y_0 = 1$, $y_1 = -1$, $y_2 = 3$ using z-transform. 5

b) Find an approximate root of $x^3 - 9x + 4 = 0$ by using Bisection method which lies between 2 and 3. 5

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Code No: 11076

FACULTY OF ENGINEERING

B.E. 2/4 (I.T) II Semester (Backlog) Examination, December 2018/January 2019

Subject: Probability & Random Processes

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 If random variable x takes the values 1 and 0 with probability p and q =1-p. Show that the variance is equal to pq. 3

2. Write axiomatic definition of probability. 2

3. State the properties of characteristic function of a random variable. 2

4. If a random variable X is uniformly distributed over (0,10). Find its mean and variance. 2

5. Explain Joint Moments of a Random Variable. 3

6. If X, Y are random variables and a, b are constants then prove that Var (aX+bY) = a^2 Var(X) + b^2 Var(Y) +2 ab.Cov(X,Y) 3

7. Define Mean Ergodic & Correlation Ergodic process. 2

8. Write the properties of Autocorrelation. 3

9. What is White Noise and Colored Noise? 2

10. State Wiener-Kintchine theorem. 3

PART – B (10x5=50 Marks)

.11. a. Suppose box 1 contains a white ball and b black balls and box 2 contain c white balls and d black balls. One balls of known color is transferred from the first box into the second one and then a boll is drawn from the latter. What is the probability that it will be a white balls? 6

b. Two persons A and B alternatively throw a pair of die. A wins, if he gets the sum of two dice 7 before B gets 6. B wins if he gets the sum dice 6 bfore A gets 7. If A starts the game, filled with probability. 4

12 (a) In a game of rolling die a random variable X is defined as member on the die. Find the Moment 'Generating function of the random variable & hence compute its mean and variance. 6

(b) If a continuous RV 'X' has a pdf $F_X(x) = 2(x-1);\ 1<x<2$ find the pdf of Y and Y = $X^{2.}$ 4

Cont..2…

13. Find the following , if Joint density of two continuous random variables X & Y is given by $f(x,y) = k.(x^2 + y^2); 0 < x < 2 \ and \ 0 < y < 2$ 10

    i. k
    ii. Marginal density function of X
    iii. Marginal density function of X
    iv. Cov(X,Y)

14. a. Define stationary process. What are the necessary and sufficient conditions for a process to be stationary? 5

    b. If $X(t) = 5\cos(10t + ^{-})$ where^{-} is a uniformly distributed random variable in (0,2) Prove that X(t) is stationary in wide sense WSS 5

15. Consider a white Gaussian noise of zero mean and power spectral density No.2 applied to a low pass RC filter whose transfer function is given below. Find the auto-correlation function of the output random process.

$$H(f) = \frac{1}{1 + i\,2\,®\ f\ RC}$$ 10

16. (a) A person X speaks truth 3 out of 5 times. A die is rolled and he reports that it is a 1. Find the probability that it was actually a.1 5

    (b) Derive the expressions for mean and variance of binomial random variable. 5

17. (a) For the joint probability distribution of two discrete random variables X and Y is given below . Find

    i. Marginal distributions of X
    ii. Conditional distributions of X given the value of Y = 1
    iii. (X< 2, Y < 3)
    Iv. P(X + Y< 4)
    v. P(X< 2/ Y< 3) 10

X\Y	1	2	3	4	5
1	1/36	3/36	2/36	1/36	3/36
2	3/36	2/36	3/36	2/36	2/36
3	4/36	2/36	3/36	4/36	1/36

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