Code No. 11044/BL

FACULTY OF ENGINEERING

BE 2/4 II – Semester (Backlog) examination, May 2019

Subject: Strength of Materials – II

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. What do you mean by tension coefficient? (2)
2. Define Modulus of resilience. (2)
3. Explain the concept of unsymmetrical bending. (2)
4. What are the limitations of Euler's theory. (2)
5. Calculate the fixed end moments of a fixed beam AB of span 4m due to sinking of support B by 2mm. EI=4000KN-m^2 (2)
6. Determine the maximum slope of a simply supported beam 6m long subjected to a central point load of 16KN. EI=20000KN-m^2 (3)
7. State castigliano's theorem-I. (3)
8. Differentiate between internal and external indeterminacy. What is the internal indeterminacy of a beam? (3)
9. What is a conjugate beam? How is the shear force of a conjugate beam related to a real beam? (3)
10. Describe the failure of long and short columns. (3)

PART – B (50 Marks)

11. A simply supported beam 6m long is subjected to a point load of 20KN at 2m from left support and a uniformly distributed load of 10KN/m over the entire span. Calculate deflection and slope at the centre of the beam. EI=30000 KN-m^2 . 10
12. A propped cantilever 6m long is propped at free end and subjected to two point loads of 8KN and 12KN acting at 2m and 4m from fixed support. Find the prop reaction and sketch BMD. 10
13. Analyse the continuous beam ABC shown in fig1. by theorem of three moments.

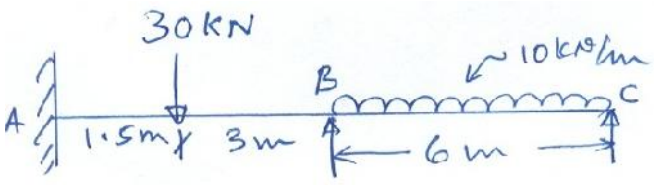

fig.1

14. A cantilever beam of span 'l' is subjected to a point load W at its free end. The beam has a diameter D from fixed end to mid span and the diameter is D/2 from mid span

contd…2

to free end. Calculate the deflection at free end by using strain energy method. 10

15. A hollow circular column of 180mm external diameter and 150mm internal diameter is 4m long with both ends hinged. It is subjected to a load of 120 KN at an eccentricity of 15mm. Calculate the maximum and minimum stress intensities induced in the section. Use Secant formula. 10

16. A closely coiled helical spring has mean coil diameter equal to 8 times of wire diameter. If the permissible shear stress and deflection under a load of 240 N are 60N/mm^2 and 50mm respectively, calculate the number of coils and the wire diameter. 10

17. Locate the shear centre of a channel section whose overall dimensions of flange and web are 15cm and 20cm respectively and thickness of channel section is 2cm. 10

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Code No. 11050/BL

FACULTY OF ENGINEERING

B.E. 2/4 (EEE) II - Semester (Backlog) Examination, May 2019

Subject : Electrical Circuits – 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 Draw the equivalent circuits for Inductor (L), and capacitor(C) for Steady state. (2)

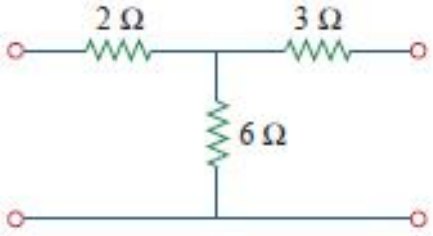
2 What is the Transient Current response of RL series circuit with impulse input voltage? Assume circuit is initially relaxed. (3)

3 Determine the Laplace transform of $\mathbf{t^2 cos3t\ u(t)}$. (2)

4 Find the inverse transform of $\frac{20}{s(s^2+8s+25)}$ (3)

5 Derive the symmetrical conditions for T port networks. (2)

6 Find the Z parameters for the given circuit. (3)



7 What is the Fourier transform of the signum function? (3)

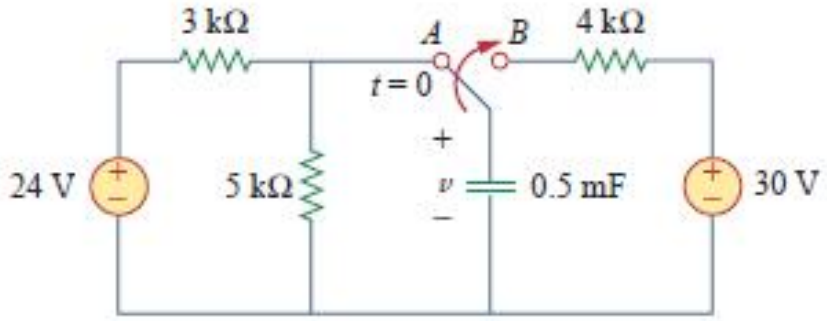
8 Write the Fourier coefficients for Odd symmetry. (2)

9 Find the value of **'a'** in P(s) so that polynomial is Hurwitz (3)
$\mathbf{P(s) = S^4 + 2S^3 + aS^3 + aS^2 + S + 5}$

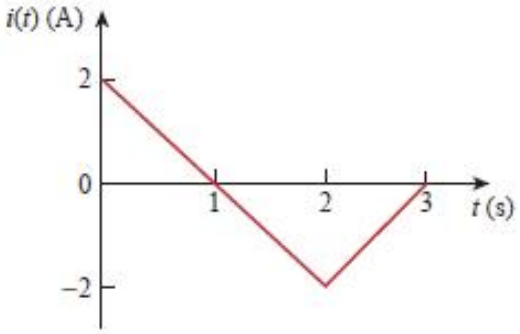
10 Write the significance of network functions. (2)

PART – B (50 Marks)

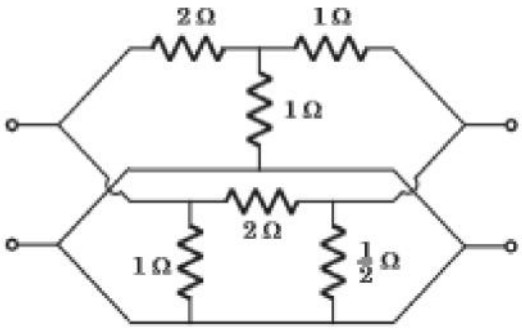
11 (a) The switch has been in position A for long time. At t = 0, the switch moves to B. Determine v(t) for t > 0 and calculate its value at t = 1 s and 4 s. (5)



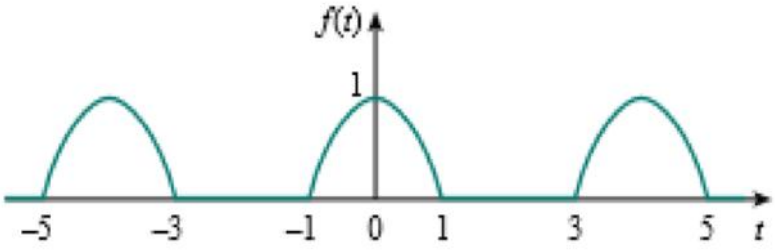
(b) Express i(t) in terms of singularity function. (5)



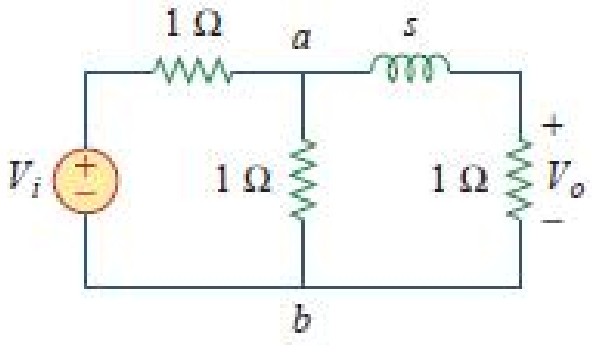
12 (a) Derive **Z** parameters in terms of other parameters (5)
(b) Find **[Y]** for the given circuit. (5)



13 Determine the Fourier series of half wave rectified cosine function shown in figure. (10)

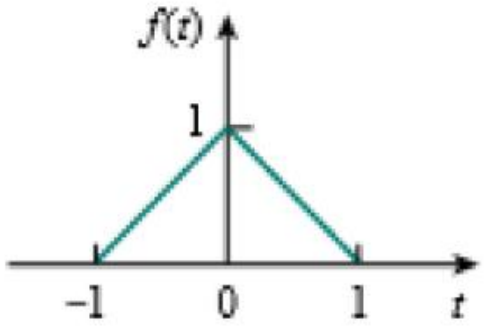


14 Find the Transfer function **$H(s) = I_1(s)/I_0(s)$** in the circuit shown in figure (10)

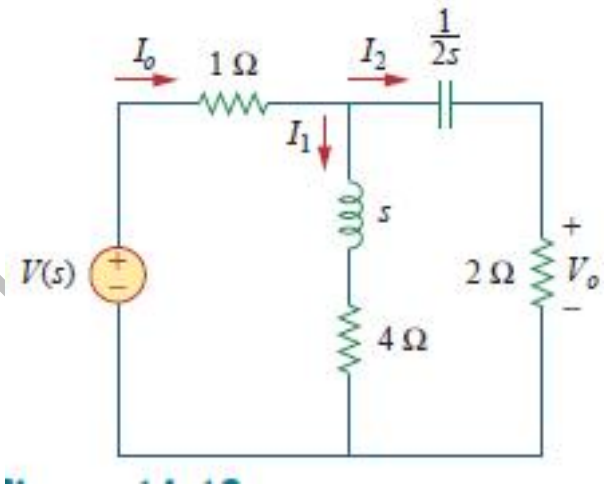


15 The admittance function is given by **Y(s)=** $Y(s)=\dfrac{(s+4)(s+6)}{(s+3)(s+5)}$ find the R-L network in Foster form. (10)

16 (a) Find the Fourier transform of the function represented in below figure (5)

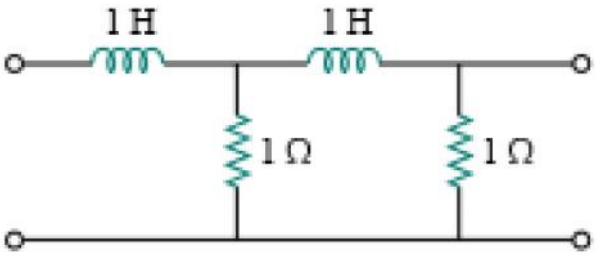


(b) Determine the transfer function **H(s)= $V_0(s)/I_o(s)$.** (5)



17 (a) Write the properties of Positive real (PR) Functions? (5)

(b) For the ladder network find **g**-parameters in s domain (5)



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Code No. 11056 / BL

FACULTY OF ENGINEERING

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

Subject : Transducer 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 What is the difference between RTD and Thermister? (2)
2 What is the guage factor of semi conductor strain gauges? (2)
3 Explain the principle of Thermal conductivity gauges is vaccum measurements. (2)
4 A certain transducer exhibiting first order response is subjected to a sudden temperature change of 0^oC to 100^oC. If it has a time constant of 15 secs what temperature will be indicated by it after 15 secs? (3)
5 Explain the principle of Capacitive Proximity sensors. (2)
6 What are the standards of Temperature calibration? (2)
7 Write the expressions for Quarter Bridge, half bridge and full bridge in strain measurements? (Only expressions). (3)
8 Explain the principle of Dead weight gauges. (3)
9 Write the mathematical expressions for standard test signals used for performance analysis of system. (3)
10 What are dynamic characteristics of measurement system? (3)

PART – B (50 Marks)

11 Derive the response of second order system subjected to unit step input? Mark all the performance specifications in the response. (10)

12 Derive the expression for gauge factor for metal wire gauges? Derive the expression for strain in Poisson's bridge. (10)

13 (a) Explain the principle of Variable Inductive Transducers. (5)
(b) With a neat Diagram explain the working of Capacitive Hygrometer? (5)

14 (a) Explain the principle of variable resistive temperature sensors. (5)
(b) Explain with a neat diagram the Potentiometric Pressure transducer. (5)

15 What is a Thermocouple? Explain the different laws of thermocouples. (10)

16 Write short notes on :
(a) Mc leod guage (5)
(b) Dead weight guage (5)

17 Derive the expression for output voltage for Potentiometer with loading effect. (10)

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Code No. 11061 / BL

FACULTY OF ENGINEERING

BE 2/4 (ECE) II – Semester (Backlog) Examination, May 2019

Subject: Probability Theory & Stochastic Processes

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 'sample space' with an example with respect to probability. 2M

2 A card is picked up at random from a deck of 52 playing cards. Find the probability of the card turning out to be a black number card using the concept of statistically independent events. 3M

3 List any three properties of probability distribution function $F_x(x)$ of a random variable X.

4 Define characteristic function of a random variable X and state its application. 2M

5 State central limit theorem. 2M

6 Given the joint density function $f_{XY}(x,y) = \frac{1}{10} e^{\frac{-(x+y)}{10}}$ $0 \le x \le 2$, $0 \le y \le 5$

Find the marginal density function of Y. 3M

7 Distinguish between wide sense stationary random process and strict sense stationary random process. 3M

8 Define 'conditional expected value ' in the context of a sequence of random variables. 2M

9 Write the relation between the input and output power spectral densities of a linear system with random process inputs. 3M

10 Define the characteristic function of a sequence of random variable. 2M

PART – B (5x10 = 50 Marks)

11 a) Briefly explain Bayes theorem. 4M

b) A box contains 15 black balls and 5 red balls. Find the probability of drawing two black balls in succession from the bag when
i) The first ball drawn is replaced.
ii) It is not replaced. 6M

12 a) Write the equations to be satisfied for three events A, B and C to be independent. 4M

b) A dice is rolled once. Events A and B are defined as follows. $A = \{x \le 4\}$ $B = \{x \ge 2\}$
Find a) (A) b) P(B) c) P(A∪B) d) $P(A \cap B)$
Are A and B independent events? 6M

13 a) Define moment generating function of a random variable. How they are useful to find various moments of the random variable. 4M

b) Derive an expression for the moment generating function of a Poisson distributed random variable. 6M

..2

14 The probability density function of a random variable variable is given by

$f_X(x) = \frac{1}{5} e^{-x/5}$; $x \geq 0$ Find $F_x(x)$, mean $E(X)$ and variance of X. 10M

15 a) The joint probability density of two random variables X and Y is given by

$f_{XY}(x,y) = x(y+1.5)$ $0 < x < 1$

$0 < y < 4$

= 0; elsewhere.

Find the joint moments. m_{10}, m_{01}, m_{11} 6M

b) Define the joint characteristics function of two random variables? How is it useful to find joint moments? 4M

16 a) Define and discuss the following: 6M

a) Conditional expected value of a sequence of random variables.

b) Characteristic function of a sequence of random variables.

b) Discuss the mean square estimation of a random variable. 4M

17 Write short technical notes:

a) White noise and coloured noise. 4M

b) Cross power density spectrum and its properties. 3M

c) Response of product device to a random signal. 3M

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Code No: 11064

FACULTY OF ENGINEERING

B.E. 2/4 (M/P/AE/CSE) II – Semester (Backlog) Examination, May 2019

Subject: Mathematics – IV

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

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

PART – A (10x2 = 20 Marks)

1) Show that the function

$f(z) = (x-y)^2 + 2i(x+y)$ is nowhere analytic. 2M

2) Evaluate $\int_c \frac{\sin ®z}{(z-2)^2} dz$ Where c is the circle $|z| = \frac{5}{2}$ 2M

3) Classify the singularity of the function $f(z) = \frac{1+z-e^z}{z^3}$ 3M

4) Find the image of the region $x > 1, y > 0$ under the mapping w = $\frac{1}{z}$ 3M

5) Evaluate $z\{\cos(n+1)^-\}$ 2M

6) Find the inverse z-transform $Z^{-1}\left\{\frac{Z}{(Z+1)(Z+2)}\right\}$ 3M

7) Find the finite Fourier Cosine transform of the function $f(x) = \left(1 - \frac{x}{®}\right)^2, 0 < x < ®$

8) Find $f(x)$ if its sine transform $\tilde{f}_s(s) = e^{-a5}$

9) Construct the backward difference table for the following data.

x	0	1	2	3	4
f(x)	-5	-3	1	7	15

10) Find an approximate root of $x^5 - 34 = 0$

PART – B (50 Marks)

11. a) Show that $u(r,^-) = -r^2 \sin 2^- + r \sin^-$ is a harmonic function. Also find $v(r,^-)$ such that $f(z) = u + iv$ is analytic function. 5M

b) Evaluate $\int_c \frac{\cos(e^z) dz}{z(z+2)(2z-1)}$ where c is the circle |z|=1 5M

12. a) Find the Laurent series of the function $f(z) = \frac{1}{(3-z)(z-4)}$ in the regions 5M

(i) 3 < |z| < 4 (ii) |z| > 4

b) Evaluate $\int_0^{2®} \frac{d^-}{5+4\sin^-}$ 5M

contd…2

13. a) Find the z-transform of the sequence $\{f_n\}$ when $f_n = n^2 e^n$ 5M

    b) Solve the difference equation $y_{n+2} + 4y_n = n + 4, y_0 = -1$ using z-transform 5M

14. a) Find the Fourier Cosine transform at $f(x) = \dfrac{e^{-ax}}{x}$ 5M

    b) Find the Fourier Transform of $f(x) = \begin{cases} 1 - x^2 & ,|x| \le 1 \\ 0 & ,|x| > 1 \end{cases}$ 5M

    and hence evaluate $\int_0^\infty \left(\dfrac{x\cos x - \sin x}{x^3} \right) \cos\dfrac{x}{2}\, dx$

15. a) Using Newton's divided difference formula, Find a cubic polynomial which fits the following data 5M

x	3	7	9	10
F(x)	168	120	72	63

    b) Find $\left(\dfrac{dy}{dx}\right)_{at\ x=0}$ from the following data 5M

x	0	1	2	3	4	5
y	4	8	15	7	6	2

16. a) Find the bilinear transformation which maps the points 1, 0, -1 of z-plane onto the points i,1, ∞ of w - plane

    b) If $y' = x - y, y(0) = 1$ then evaluate $y(0.5)$ by using Euler's method 5M

17. a) State convolution theorem for z-transform and verify it for $f_n = 2^n, g_n = 3^n$ 5M

    b) If the Fourier sine transform of the function $f(x)$ is $\tilde{f}_s$ then find the Fourier sine transform of $f(x)\sin ax$ 5M

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Code No. 11076

FACULTY OF ENGINEERING

B.E. 2/4 (I.T.) II – Semester (Backlog) Examination, May 2019

Subject: Probability and Random Processes

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

Note: Answer all question from Part – A & answer any 5 questions from Part – B

Part – A (2 x 10 = 20)

1. State and prove Addition Theorem for n events.
2. If A and B are independent events, Prove that A^c and B^c are also independent.
3. State the properties of Characteristic function.
4. Find the characteristic function of p.m.f.
   $P(x) = (e^{-\lambda}. \lambda^x) / x!$, $\lambda > 0$, $x >= 0$.
5. The joint pdf of (X,Y) is $f(x,y) = e^{-(x+y)}$, $x \geq 0$, y< . Are X and Y independent? Why?
6. State the properties of Cross Correlation.
7. Define AutoCorrelation and State its properties.
8. State Weiner-Khinchine Theorem.
9. Define Band-Limited White noise and State its properties
10. If A and B are independent events, Prove that A^c and B^c are also independent.

Part – B (5 x 10 = 50)

11. (a) A company produces chips in 2 plants (plant I and plant II) with a daily production of 1500 ar
    day's production is found to be defective, what is the probability that it came from plant II. 5M

    (b) State and prove Baye's Theorem. 5M

12. A box contains white and black balls. When two balls are drawn without replacement, suppose the probability that both are white is 1/3.

    (a) Find the smallest number of balls in the box. 5M

    (b) How small can the total number of balls be if black balls are even in number? 5M

13. Given $f_{xy}(x,y) = cx(x-y)$, $0 < x < 2, -x < y < x$, and 10M
    $= 0$, elsewhere

    a)Evaluate c b) Find $f_x(x)$ c) Find $f_{y|x}(y|x)$ and d) $f_y(y)$.

14. Given a random variable ω with density f(**ω**) and a random variable ϕ uniform in the interval (-π, π) and independent of ω, then prove that the process X(t) = acos(ωt+ ϕ) is a WSS process. 10M

Contd..2

15. Explain about
    a. Poisson Process
    b. White Noise
    c. Thermal Noise
    d. Colored Noise
    e. Band pass process. 10M

16. a) Define Axiomatic Definition of Probability. 5M

    b) We have four boxes. Box 1 contains 2000 components of which 5% are defective. Box 2 contains 500 components of which 40% are defective. Boxes 3 and 4 contain 1000 each with 10% defective. We select *at random* one of the boxes and we remove *at random* a single component. What is the probability that the selected component is defective? 5M

17**.** A random variable X has the following probability distribution

X	-2	-1	0	1	2	3
P(X)	0.1	K	0.2	2K	0.3	3K

i) Evaluate P(X<2) and P(-2<X<2) 3M

ii) Find c.d.f. (Culmulative Distribution Function) of X. 4M

iii) Evaluate E(X). 3M

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Code No. 11375/CBCS/S

FACULTY OF ENGINEERING

B.E. I - Semester (CBCS) (Backlog) Examination, May 2019

Subject : Computer Programming & Problem Solving

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 the use of Associativity of operators?
2 Write an algorithm to swap value of two numbers.
3 Discuss break and Go to statements with examples for each.
4 Mention the use of the qualifiers.
5 Mention different methods of parameter passing.
6 Write a program for transpose of a 2x2 matrix.
7 Distinguish between molloc ( ) and calloc ( ) memory function.
8 Compare string constant and character constant.
9 Give the format for initialization of structure.
10 Give the code for reading from a file.

PART – B (50 Marks)

11 (a) Explain various steps involved in the problem - solving. (6)
(b) Write an algorithm for converting decimal number to binary. (4)

12 (a) Write a C program that calculates the HCF and LCM of two number. (6)
(b) Explain Bitwise and logical operators with examples. (4)

13 (a) What is the difference between header files “Stdio.h” and “Stdlib.h”. (3)
(b) Write a C program to input ‘n’ number in an array, calculate the sum of all even numbers and all odd numbers in the array and print the larger sum. (7)

14 (a) Why C treats array parameters as pointers? (4)
(b) Discuss about string manipulation functions. (6)

15 (a) Discuss on self Referential structures. (4)
(b) Write short notes on the following with example. (3+3)
(i) Union (ii) type definition

16 Write short notes on :
(a) Void pointers (3)
(b) Selection sort with an example (7)

17 (a) Explain type conversion with examples. (4)
(b) Explain on standard library input / output function. (6)

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