Code No. 2045

FACULTY OF ENGINEERING

BE 2/4 (Civil) II – Semester (Backlog) Examination, December 2019

Subject: Strength of Materials-II

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

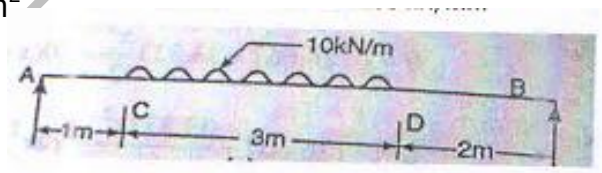
***Note*: Answer all questions from Part-A & any five questions from Part-B**

PART – A (25 Marks)

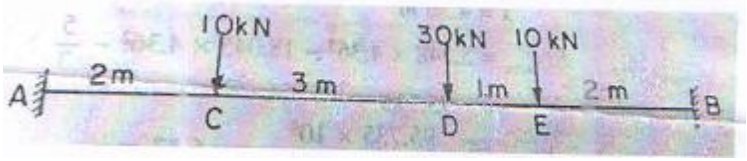
1. Draw Conjugate beam for a Cantilever of span 'l' subjected to a udl w per unit length. (2)
2. Using moment area method, find an expression for the deflection at the free end a cantilever subjected to vertical load 'w' at the free end. (3)
3. What is the difference between elastic and rigid prop? (2)
4. What are the fixed end moments of the fixed beam AB when support B sinks by ' '. (2)
5. What are the adverse effects of sinking of support of a continuous beam? (2)
6. Explain the importance of Shear Centre. (3)
7. Explain Maxwell Reciprocal Theorem. (3)
8. A closely coiled helical spring has 10 coils of mean radius 100 mm and the diameter of wire is 10 mm. Determine the stiffness of spring C = 80 GPa. (3)
9. What are the limitations of Euler's column theory? (2)
10. Write short notes on tension co-efficient method. (3)

PART-B (50 Marks)

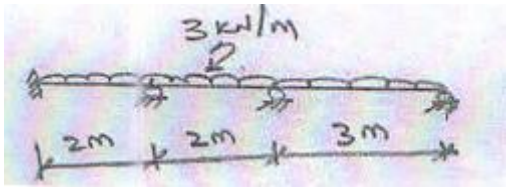
11. A beam AB is 6m long and has a moment of inertia of 450 x 10^6 mm^4. It is supported at A and B and carries a uniformly distributed load of 10kN/m from C to D as shown in Fig. Calculate: (i) Slope at A ii) Deflection at mid span, and iii) Maximum deflection Take E = 200 kN/mm^2



12. A beam AB of span 8m, fixed at each end carried the loading shown in fig. Find the fixing moments at the ends, the deflection under the load and the maximum deflection. Take E = 200 kN/mm^2 and I = 8.60 x 10^7 mm^4.

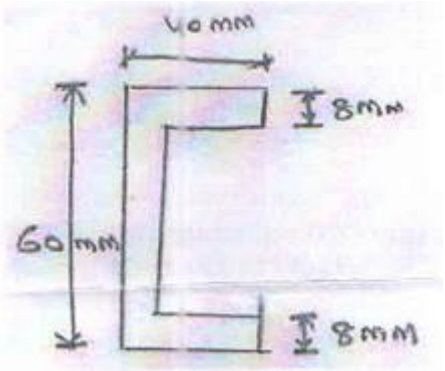


13. Draw SFD and BMD for the continuous beam shown.

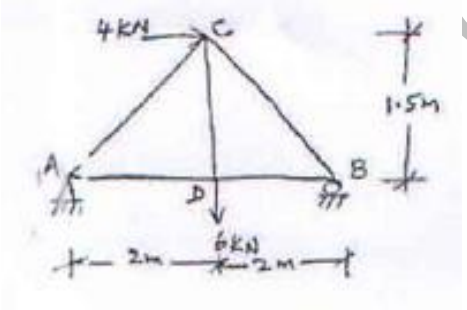


……2

14. Locate shear centre for Channel section shown.



15. State and prove Castigliano's theorem.
16. A hollow column cast from iron whose outside diameter is 200mm and has a thickness of 20 mm is 4.5m long and is fixed at both ends. Calculate the safe load by Rankines formulae using a factor of safety of 2.5. Find the ratio of Euler's to Rankine's loads. Take E = 1 x 10^5 N/mm^2 and Rankines constant = 1/1600 for both ends pinned case and f_c = 550 N/mm^2.
17. Using tension coefficient method evaluation the magnitude and nature of forces in the members of the truss given in fig.



****

Code No. 2051

FACULTY OF ENGINEERING

B.E. 2/4 (EEE) II - Semester (Backlog) Examination, December 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 Resistor(R), Inductor(L), and capacitor(C) for transient state. (3)

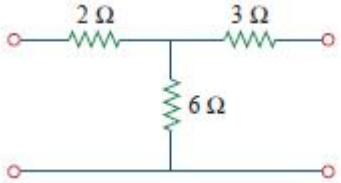
2 What is the Transient Current response of RL series circuit with step input voltage? Assume circuit is initially relaxed. (2)

3 Determine the Laplace transform of $t^2 \sin 2t\, u(t)$. (2)

4 Find the inverse transform of $(10S^2 + 4) / S(S + 1)(S + 2)^2$. (3)

5 Derive the reciprocity conditions for Z parameters. (2)

6 Find the T port network for the given circuit. (3)



7 State the Parseval's Theorem. (3)

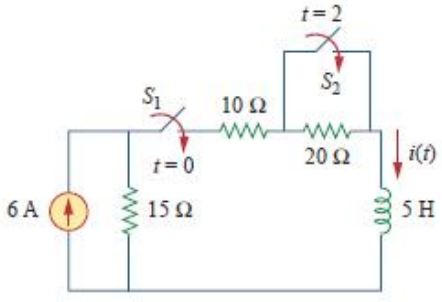
8 Write the Dirichlet's conditions for Fourier series. (2)

9 Test whether following function is positive real $\frac{(s^2+2)(S^2+8)}{s(s^2+4)}$ (3)

10 Write the properties of Positive real functions. (2)

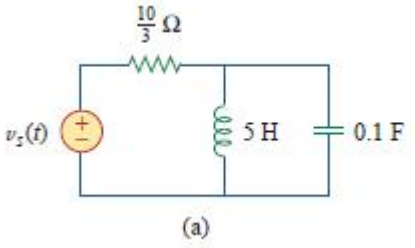
PART – B (50 Marks)

11 The switch S_1 is closed at t = 0 and switch S_2 is closed at t=2 s. Find i(t) for all time, i(1) and i(3). (10)



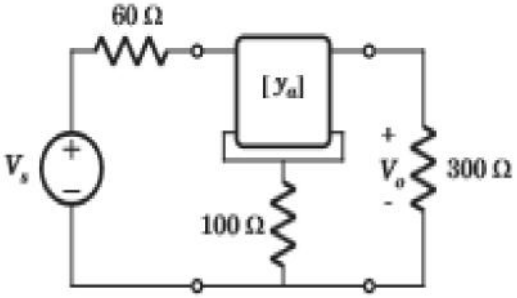
..2

12 Consider the given circuit find the current through inductor for all time t > 0. Assuming that the value of $V_s(t)$ = 10u(t) V and assume that at t = 0,-1 A flows through the inductor and + 5V is across the capacitor. (10)

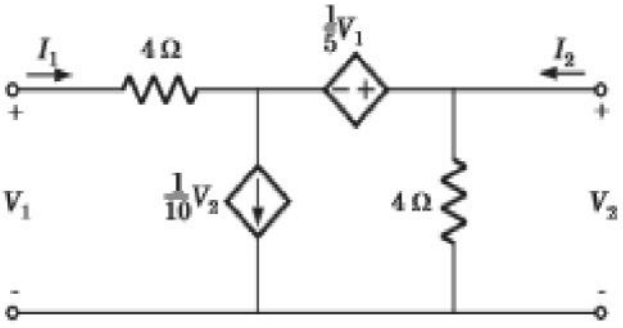


(a)

13 (a) Evaluate $V_o / V_1, [Ya] = \begin{bmatrix} 2 & 0 \\ 0 & 10 \end{bmatrix}$. (5)

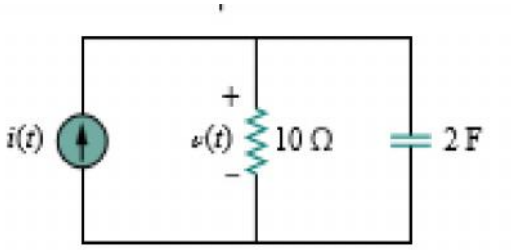


(b) Find [T] for the given circuit? (5)



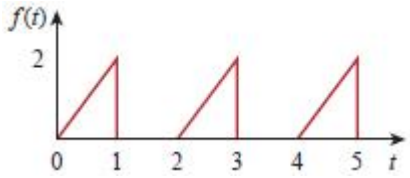
14 Determine the average power supplied to the given circuit shown in figure.

If i(t) = 2 + 10cos (t + 10) + 6cos (3t + 35). (10)

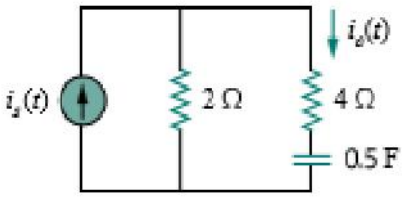


15 Find the Cauer form of RC network for the given driving point impedance $Z(s) = \frac{(s+3)(s+5)}{s(s+4)}$. (10)

16 (a) Find the Laplace transform of the periodic function shown in below figure. (5)

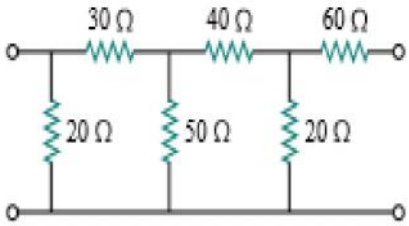


(b) Find the $i_0(t)$ in the circuit, when $i_s(t)=10\sin 2t$ by using Fourier transform (5)



17 (a) Write the properties of Hurwitz Polynomials. (5)

(b) Find the ABCD parameters of the given network. (5)



*****

Code No. 2057

FACULTY OF ENGINEERING

BE 2/4 (Inst.) II-Semester (Backlog) Examination, December 2019

Subject : Transducer 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	Define the following a) Span b) Hysteresis	2
2	Give the characteristics of measuring Instruments	3
3	Define the following i) Rise time ii) Peak time	2
4	Give an example of Second Order System	3
5	What are the advantages of Strain gauges?	2
6	What are the materials used for Thermocouple	3
7	Give classification of Electrical transducer	2
8	Explain the principle of RTD	3
9	Mention the special feature of capsule for pressure measurement	3
10	Explain the principle & features of Non-electrical type transducer	2

Part-B (50 Marks)

11.	a)	Draw the block diagram of generalized Instrumentation system and explain in detail	5
	b)	Derive the expression for time response of a first order when subjected to a unit step input. Sketch the response	5
12	a)	Define gauge Factor The resistance of a 100 ohm resistor changes to 100.56 ohms under strain with the gauge factor 2.0 then its train	5
	b)	The above strain gauge is used in a bridge to measure the strain. All resistances of the bridge are equal and the bridge is excited by a 6v battery. What is the out put voltage if the strain gauge resistance changes to 100.56 ohms under strain	5
13	a)	Explain why inductive transducer are mostly iron cored. Suggest important consideration to be applied while designing and using them	5
	b)	Show how the capacitive transducer can be design for surface strains of Large structures.	5
14	a)	Explain with a neat sketch the working principle of Thermistor. Mention the application of thermistor in detail. Draw VI characteristics of thermistors.	5
	b)	Write short notes on construction of thermocouple	5
15	a)	Discuss in detail the Bourdon tubes. How they are designed in various forms with neat diagrams	5
	b)	Explain why metallic plate diaphragms are popular in industry for pressure measurements. State the factors on which the range of pressure to be measured by each element is decided	5
16		Write short notes on the following a) Thermal conductivity gauge b) Bounded Strain guage	10
17	a)	Explain in detail LVDT working principle with suitable diagram	5
	b)	Write short notes on Manometer force balance transducer	5

****

Code No. 2059

FACULTY OF ENGINEERING

BE 2/4 (ECE) II – Semester (Backlog) Examination, December 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 A box contains 6 Red balls and 4 green balls. A ball is drawn first and without replacing it another ball is drawn. Find the probability of picking red ball first and green ball next. 2M

2 A fair dice is thrown once. Find the probability of count being less than 4 or count being odd. 3M

3 Find the mean value of a random variable with probability density function given by

$$f_X(x) = \frac{\pi}{6}\cos\left(\frac{\pi x}{8}\right) \quad -4 \le x \le 4$$

= 0 elsewhere 2M

4 Write any four properties of Joint Cumulative probability distribution function $F_{XY}(x, y)$. 3M

5 If $Y = 3X + 5$ and X is a uniformly distributed random variable between 2 and 6, find the mean of Y. 3M

6 State and explain chebychev's in equality. 2M

7 The power density spectrum of a random signal is $S_X(\omega) = \frac{N0}{2}$. Find its auto correlation function. 2M

8 State and discuss the modes of stochastic convergence of a sequence of random variables. 3M

9 Define a sequence of random numbers. 2M

10 Write the relation between input and output auto correlation function of a linear system with random inputs. 3M

PART – B (5x10 = 50 Marks)

11 a) A fair dice is tossed once. The events A and B are defined as follows: 5M

$A = \{x \le 4\}$ $B = \{x = even\}$

Find a) P(A) b) P (B) c) P (A∪B) d) P (A $\cap B$)

b) Box 1 contains 20 pens and 10 pencils, Box 2 contains 15 pens and 25 pencils, Box 3 contains 5 pens and 5 pencils. A box is chosen first at random and from the chosen box an object is pecked next. If the picked object is a pen find the probability that it comes from box 2. 5M

12 Three coins are tossed, heads is represented by 0 and tails by 1 . A random variables S is formed by adding the outcomes of the three coins. Find : $f_S(s), F_S(s)$, mean and variance of S. 10M

13 a) Define a random variable and list the conditions to be satisfied for a function to be a random variable. 4M

b) Find the mean and variance of a Binomial distributed random variable. 6M

14 a) Briefly explain:
i) Moments about Origin and
ii) Moments about mean 4M

b) Derive an expression for the characteristic function of a random variable with the probability density function $f_X(x) = K[u[x-2] - u[x-6]]$ 6M

15 a) List three properties of 4M
i) Joint probability density function , $f_{XY}(x,y)$
ii) Joint probability distribution function , $F_{XY}(x,y)$

b) The joint probability density of two random variables X and Y is given by
$f_{XY}(x,y) = \frac{xy}{9}$; $0 < x < 2$, $0 < y < 3$
$= 0$; *elsewhere.*
Show that X and Y are independent. 6M

16 a) Define:
i) Random Vector 7M
ii) Multivariate joint density function of a sequence of random variables
iii) Mean and Co-variance of sequence of n-random variables.

b) Explain any two applications of random numbers. 3M

17 a) Derive the relation between power density spectrum of output and power density spectrum of input for a linear system with random input process. 5M

b) The input to the high pass RL filter is a random noise process with power. Density spectrum Find the power density spectrum and average power of the response output across L. 5M

****

Code No: 2065

FACULTY OF ENGINEERING

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

Subject: Engineering Mathematics – IV

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

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

PART – A (10x2 = 25 Marks)

1) Find the constants $a,\ b,\ c$ such that the function $f(z)=-x^2+xy+y^2+i\left(ax^2+bxy+cy^2\right)$ is analytic. 3

2) Evaluate $\oint_C \frac{e^z}{(z-1)^5}dz$, where $C:|z|=\frac{1}{2}$. 2

3) Find the Taylor series expansion of $f(z)=\sin z$ about $z=\frac{\pi}{2}$. 3

4) State Residue theorem. 2

5) Determine $Z\{(n+1)\}$. 3

6) If $Z\{f_n\}=\frac{z^2-3z+2}{(z-1)(z+3)}$, find $\lim_{n\to\infty} f_n$. 2

7) Find the Fourier sine transform of $f(x)=\begin{cases}k, & 0<x<a\\ 0, & x>a\end{cases}$ 3

8) State convolution theorem for Fourier transforms. 2

9) Solve $x^3-3x+1=0$ using bisection method. 3

10) Construct the divided difference table for the following data 2

x	5	6	9	11
y	12	13	14	16

PART – B (50 Marks)

11. a) Show that $u(x,y)=e^x\cos y$ is harmonic and find its conjugate harmonic function. 5

b) State and prove Cauchy's integral theorem. 5

12. a) Expand $f(z)=\frac{1}{(z-1)(z-2)}$ in the regions

i) $|z|>2$ and ii) $0<|z-1|<1$ 5

b) Evaluate $\int_{-\infty}^{\infty}\frac{dx}{\left(x^2+1\right)^2}$. 5

…2

13. a) If $Z\{f_n\} = \frac{z^2}{z^2+1}$, find f_0, f_1 and f_2. 5

b) Find $Z^{-1}\left\{\frac{z^2}{(z-1)(z-2)}\right\}$ using convolution theorem. 5

14. a) Find the Fourier transform of $f(x) = \begin{cases} 1, & |x| < 1 \\ 0, & |x| > 1 \end{cases}$ and hence evaluate $\int_0^\infty \frac{\sin x}{x} dx$. 5

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

15. a) Find $\frac{dy}{dx}$ at x = 0.1 from the following data 5

x	0.1	0.2	0.3	0.4
y	1.105	1.221	1.349	1.491

b) Find the approximate value of y(0.5) for $y' = y - x, y(0) = 2$ with $h = 0.1$. 5

16. a) Evaluate $\int_0^{1+i} (x - y + ix^2) dz$ along the straight line from $z = 0$ to $z = 1 + i$. 5

b) Find the bilinear transformation that maps the points $1, i, -1$ in the z – plane into the points $i, 0, -i$ in the w – plane respectively. 5

17. a) Apply Z transform to solve $y_{n+2} + 5y_{n+1} + 6y_n = 0$, $y_0 = 1$, $y_2 = 1$. 5

b) Find the root of the equation $3x - \cos x - 1 = 0$ which lies between 0 and 1 using Newton-Raphson method. 5

****

Code No: 2077/BL

FACULTY OF ENGINEERING

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

Subject : Probability and Random 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 If P(A) = 1/4 and P(A∩B) = 1/8 then find P(B/A). 3M

2 State Addition theorem for 2 events. 2M

3 State properties of Cumulative Distribution Function (CDF) of a random variable X. 2M

4 The probability that a driver will have an accident in one month equals 0.02. Find the probability that in 100 months he will have at least two accidents. 3M

5 Show that Covariance of two independent random variables is 0. 2M

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

7 What are the necessary and sufficient conditions for a process to be stationary? 2M

8 Write any three properties of Cross-correlation. 3M

9 Define Gaussian process. 2M

10 What is White Noise and Colored Noise. 3M

PART- B (50 Marks)

11. a. State & prove generalized form of Bernoulli theorem. Give an example to demonstrate its application 7M

    b. A box contains 4 white, 5 red & 6 black balls. Four balls are drawn at random From the box. Find the probability of drawing at least one ball of each color. 3M

12. The Probability Density Function (pdf) of a continuous random variable X that can take values between X=1 and X=4 is given by f(x) = k.(1+x) Find

    i) k ii) Mean iii) Variance

    iv) P(X<2) v) P(X>3) vi) P(2<X<3) 10M

13. Determine the following if f (x, y) = {k ; 0 < x < y <1
    {0; otherwise

    i) k ii) f (x/y) iii) f (y/x) iv) E [Y/X] 10M

14. Show that the process X(t) = 10cos(5t + θ),where θ is a uniformly distributed over (0, 2π) is

    i) Mean Ergodic ii) Auto-correlation Ergodic iii) WSS 10M

15. Consider a white Gaussian noise of zero mean and power spectral density No/2 applied to a low-pass RL filter whose transfer function is given below. Find the auto correlation function of the output random process. H(f) = $\frac{R}{R+12®fl}$ 10M

…2

16. a. A speaks truth in 70% of cases and B speaks truth in 80% of cases. Find the probability that they contradict each other while speaking the same incident. 4M

b. A discrete random variable has the following probability distribution.

x	1	2	3	4	5	6
P(X= x)	k	3k	5k	7k	9k	11k

Find i) k ii)Mean iii) Variance iv) P(1<X<5 6M

17. a. If X, Y are two independent exponential random variables with common parameter 1. Find the marginal density function of U & V such that U=X+Y, V=X-Y. 6M

b. For a random process having Autocorrelation $R_{xx}(\tau) = 2.\ e^{-3|\tau|}$. Find its Power spectral density. 4M

****

Code No: 2557/CBCS

FACULTY OF ENGINEERING

BE (Civil) IV-Semester (CBCS) (Suppl.) Examination, December 2019

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. Write a relation between slope, deflection and radius of curvature 2
2. State Mohr's theorem-I 2
3. What is a propped cantilever beam? 2
4. List the advantages of continuous beams over simply supported beams 2
5. A hollow shaft is subjected to a torque of 50 kNm and a bending moment of 30 kNm. Find the equivalent bending moment 2
6. Define a proof load for carriage spring 2
7. Differentiate between resilience and modulus of resilience 2
8. Draw a load-deformation curve for suddenly applied load 2
9. What is an analogous column? 2
10. List the failure modes of a column 2

PART- B (50 Marks)

11. A beam is hinged at A and rests on support B, 6m from A. The beam has a rectangular cross-section 100 mm wide and 200 mm deep. A concentrated load of 30 kN acts at C, 4 m from A. Using double integration method, determine the deflection at C and also the maximum deflection and its position. Take E=25 kN/mm^2. 10
12. A steel beam AB of span 8 m is fixed at the ends. And is 50 mm wide and 100 mm deep. The beam is subjected to uniformly distributed load of 4 kN/m over an entire span. If the support B sinks by 3 mm, determine the fixed end moments. Also, draw the S.F and B.M diagrams. Take E=200 kN/mm^2. 10
13. A solid steel shaft is subjected to a torque of 60kNm. If the angle of twist and the shear stress is not be allowed to exceed I degrees per meter length and 105MPa respectively. Shear modulus of the material of steel shaft is 85GPa. Find the diameter of the shaft and hence calculate maximum shear stress, angle of twist and maximum shear strain in the shaft. 10
14. An open coiled helical spring. Made out of 10 mm diameter steel rod, has 5 complete turns at a mean diameter of 100mm. the angle of helix being 15o. Compute deflection under the load, maximum intensities of direct and shear stresses induced in the section of the sire. 10
15. a) Derive an expression for strain energy of a prismatic bar subjected to gradually applied load. 5

…2

b) Two bars each of length L and of the same material are each subjected to the same gradually applied axial tensile load P. The first bar has unoiform diameter. The second bar has a diameter d for length L/2 and a diameter d/2 for the remaining length. Compare the strain energies of the two bars. 5

16 Write the assumptions of Euler's buckling theory and derive the expression for critical load of a column with one end is fixed and the other end is free 10

17 A cantilever beam ABC of 5m span is subjected to a concentrated load of 20 kN and 30 kN at free end C and at mid-span B respectively. The beam has a rectangular cross-section with a constant width of 150 mm throughout the span. The depth of the beam for AB span is 300 mm and for BC span is 200 mm. Using conjugate beam method, determine the deflection and rotation at the free end of the beam. Take E=20 GPa. 10

******

Code No. 2564 / CBCS

FACULTY OF ENGINEERING

B.E. (EE/Inst.) IV – Semester (CBCS) (Suppl.) Examination, December 2019

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 Give Shockeley diode equation.
2 What is secondary break down in power transistor?
3 Briefly discuss the gate-drive design considerations of the MOSFET.
4 Define the following.
i) Crest factor ii) Displacement factor
5 What are the effects of source inductance on converter performance?
6 Explain the effect of introducing freewheeling diodes in phase controlled converters.
7 Mention applications of cyclo-converters.
8 Draw Cuk regulator circuit diagram.
9 Compare the Voltage source inverter with a Current source inverter.
10 What is sinusoidal pulse width modulation, illustrate with a suitable diagram and its advantages?

PART – B (5 x 10 = 50 Marks)

11 a) Explain the working with neat structure of an n-channel power MOSFET and plot its output characteristics. (5 M)
b) Explain reverse recovery characteristics of a power diode, and derive expression for Q_{RR}. (5 M)

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

13 a) A single-phase fully controlled bridge rectifier is supplied at 230 V rms and at a frequency of 50Hz. The Source inductance L_s = 5 mH and the load current on the DC side is constant at 12 A. Calculate a) firing angle b) overlap angle. (5 M)
b) Distinguish punch through and non-punch through IGBT with neat construction diagrams. (5 M)

14 Explain the operation of 1-¤ half-controlled bridge converter feeding an inductive load with the associated wave forms for continuous conduction. Derive the expression for average load voltage, average load current. (10 M)

15 a) A step-down chopper has a resistive load of R = 10 Ω and input voltage V_{dc} = 200V. When the chopper is turned on, the voltage drop across switch is 2 V, the chopper frequency is 1 kHz. For a duty cycle of 40 %, determine
i) Average output voltage
ii) The RMS output voltage
iii) Efficiency of the chopper. (5 M)
b) Explain the operation of a 1-¤ AC voltage controller with RL-load. (5 M)

16 a) Explain 180^0 conduction mode of 3-phase inverter. (6 M)
b) Brief about Pulse width modulation techniques of Inverters. (4 M)

17 Write short notes on
a) Circulating current mode of single-phase dual converter (5 M)
b) Turn-Off mechanism in IGBT. (5 M)

****

Code No. 2573 / CBCS

FACULTY OF ENGINEERING

B.E. (ECE) IV – Semester (CBCS) (Suppl.) Examination, December 2019

Subject: Analog Electronic Circuits

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 Draw Hybrid Pi model equivalent of transistor (BJT)?
2 Define Beta cut-off frequency and Transition frequency?
3 Calculate gain and bandwidth of a negative feedback amplifier, if the open loop gain and the upper cut-off frequency of an amplifier without feedback are 100 and 200 KHz respectively with a feedback ratio 0.05?
4 Compare positive and negative feedback?
5 Find the operating frequency of a Hartley Oscillator if L_1 = 50 mH, L_2 = 30mH and C = 10 µF.
6 Draw colpitts oscillator circuit diagram.
7 Define Unilaterisation of R.F. amplifier.
8 Explain Synchronous tuning of R.F. amplifier.
9 Explain the similarities and differences between Class B and Class AB power amplifiers?
10 Define Harmonic distortion and Cross over distortion?

PART – B (50 Marks)

11 a) List the advantages and disadvantages of Transformer coupled amplifier? (4)
b) Draw the equivalent of RC coupled amplifier at low and mid frequency. Derive the expression for voltage gain at low and mid frequency? (6)

12 a) How does negative feedback reduces distortion in the amplifier? (4)
b) Derive the expression for input and output resistance of voltage shunt feedback amplifier? (6)

13 a) Explain any two Neutralization techniques with neat circuit diagrams? (7)
b) Differentiate Narrow band and Wide band amplifiers? (3)

14 a) Draw RC phase shift oscillator using BJT and explain its operation? Justify why 3 RC sections are used in the circuit? (5)
b) Explain the operation of Transistor Shunt voltage regulator with neat circuit diagram. (5)

15 a) Draw the circuit diagram of Class A transformer coupled power amplifier and derive the expressions for power dissipation and Efficiency? (7)

b) Define Cross over distortion? How it can be eliminated? (3)

16 a) Gain and bandwidth of an amplifier without feedback is 40dB and 250KHz. 4 such stages are cascaded. Then 10% of output is feedback to the input in a negative feed back, calculate overall Gain and bandwidth? (4)
b) Write the effect of Coupling Capacitor (C_C) on low frequency of single stage RC coupled CE amplifier and derive the expression for cut-off frequency? (6)

17 a) Determine the following for class B amplifier providing 22V peak signal to 8Ω load and power supply Vcc= 25V. a) Input power ii) output power iii) Circuit efficiency iv) Power dissipation. (4)
b) Briefly explain the classification of amplifiers? (6)

****

Code No : 2577/CBCS

FACULTY OF ENGINEERING

B.E. IV-Semester (CBCS) (M/P) (Suppl.) Examination, December 2019

Subject : Electrical Circuits & Machines

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

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

Part-A (20 Marks)

1 Define the following: (i) Average (ii) RMS values (2)

2 Define the following : (i) Active & passive elements (ii) Capacitance (2)

3 Explain the principle of auto-transformer. (2)

4 Define regulation. (2)

5 Explain the principle of operation of a DC Generator. (2)

6 Explain the necessity for starter in DC motor. (2)

7 Explain why below rated speed is obtained in armature control. (2)

8 Why starter is required in 3-phase Induction motor. (2)

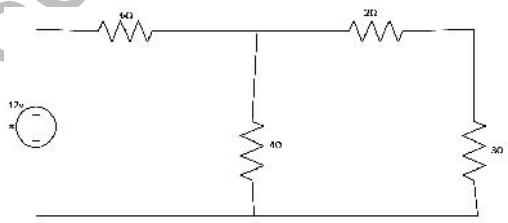
9 Why starting torque of slip-ring Induction Motor is high? (2)

10 Write a short note in voltage regulation on alternator. (2)

Part-B(50 Marks)

11 a) State and prove Thevenin's theorem. (5)

b) Find the current in 3 ohm resistor using thevenin's theorem for the circuit shown below (5)



12 Find the impedance, current, power and power factor of the following series circuits and draw the corresponding phasor diagrams a) R only b) L only c) C only d) R & L e) R & C f) R, L & C g) L & C In each case the applied voltage is 200 V, the frequency is 50 Hz, R = 10 ohms, L = 50 mH and C = 100 µF (10)

13 a) Three 40 ohms non-inductive resistances are connected in delta across 400V, 3-phase line. i) Calculate the power taken from the mains. ii)If the one of the resistance is disconnected what would be the power taken from the mains. (5)

b) Discuss about Ideal Transformer. (5)

14 Explain the construction and working principle of DC generator. (10)

15. a) A 230 V shunt motor takes 5A at no-load. The resistances of the armature and field circuit are 0.25 ohms and 115 ohms respectively. If the motor is loaded so as to carry 40A, determine (i) Iron and friction losses and (ii) Efficiency. (5)

…2

b) Write a short note on power stages in a DC motor. (5)

16. a) Derive an expression for torque equation of a 3-phase induction motor. (5)

b) A 50 Hz, 8-pole Induction motor has full load slip of 4%. The rotor resistance and standstill reactance are 0.01 ohms and 0.1 ohms per phase respectively. Find (i) The speed at which max. torque occurs. (ii) The ratio of max. torque to full load torque. (5)

17. Write short notes on following:

i) Capacitor-start Induction Motor (5)

ii) Universal motor. (5)

****

Code No. 2583/CBCS

FACULTY OF ENGINEERING

BE IV Semester (CBCS) (A.E) (Supplementary) Examination December 2019

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 Define volumetric efficiency.
2 What is meant by TDC and BCS, with a suitable sketch show the two dead centre.
3 What is stoichiometric air fuel mixture?
4 Explain why rich mixture is required for Idling?
5 What is Dwell period?
6 Draw a neat sketch of spark plug.
7 Define abnormal combustion.
8 What is the need of Lubrication System.
9 What are requirements of thermostat in cooling system.
10 What are the merits of thermosyphon cooing system.

PART – B (50 Marks)

11 Derive an expression for thermal efficiency of Otto cycle and write the equation for mean effective pressure.

12 (a) Briefly discuss the air fuel ratio requirements of petrol engine from no load to full load.
(b) Explain the functions of MPFI system with neat sketch.

13 (a) Briefly discuss the various factors which effects the ignition timing.
(b) What are the main functions of Spark plug and explain its various parts.

14 (a) Explain the various factors that influence the flame speed.
(b) Explain the effect of various engine variables on SI engine knock.

15 What are the properties of lubricants which are considered while selecting a particular lubricant for an automotive engine.

16 (a) With a neat sketch explain thermosyphon & pump circulation cooling system.
(b) Explain the advantages of water cooling system over air cooling system.

17 Write short notes on the following:
(a) Deviation of Actual cycles with air standard cycles.
(b) Types of carburetors.
(c) Types of combustion chambers.

***

Code No. 2587 / CBCS

FACULTY OF ENGINEERING

B.E. (CSE) IV – Semester (CBCS) (Suppl.) Examination, December 2019

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 List the properties of impulse function. 2M

2 State the condition for orthogonality of two complex functions. 2M

3 State the conditions for the existence of Fourier transform of a signal. 2M

4 Find the Fourier Transform of x(t-4) + x(t+4) 2M

5 Define ROC in Laplace transform. 2M

6 Explain how Impulse Response and Transfer Function of a LTI system are related. 2M

7 Define auto correlation and state its properties. 2M

8 Show that $R(\tau)$ and ESD form Fourier transform pair. 2M

9 Determine the initial and final value of x(n),for given 2M

$$X(z) = \frac{z}{2z^2 - 3z + 1}$$

10 What are the properties of ROC of Z- transform. 2M

PART – B (50 Marks)

11 a) Derive the expression for Mean Square Error. 4M

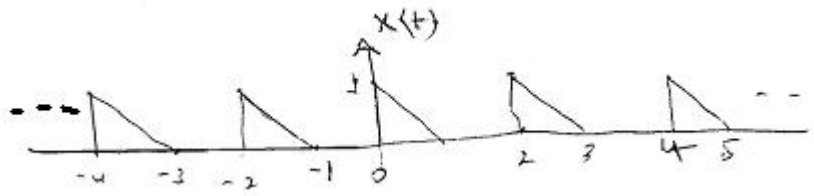
b) Define orthogonal signal space and bring out clearly its application in representing a signal. 6M

12 Determine the Fourier Transform of

$x(t) = 1-t^2 \quad |t|<1$

$= 0, \quad |t|>1$ 10M

13 a) Find the exponential fourier series for the signal shown below. 6M



b) Classify discrete time signals. 4M

..2

14 a) Find the convolution of the following signals using graphical analysis:

$x(t) = e^{-t}u(t)$ and $h(t) = e^{-at}[u(t) - u(t-2)]$ 6M

b) Verify Parseval's theorem for the energy signal x(t) = $e^{-at}u(t)$ 4M

15 a) Distinguish between Fourier, Laplace and Z-transforms. 4M

b) Using Partial Fraction expansion find the Inverse Z- transform of

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

16 a) A LTI system is described by the differential equation 6M

$$y(n) - 3.5y(n-1) + 1.5y(n-2) = 3x(n) - 4x(n-1)$$

Specify ROC of H(z) and determine h(n) for the following conditions

i) The system is stable

ii) The system is causal.

b) State and prove the following properties
   i) Differentiate in z- domain Property
   ii) Time shifting Property. 4M

17 Write short notes on:

a) Properties of discrete time systems. 5M

b) Mapping between S-plane and Z-plane. 5M

****

Code No. 2593/CBCS

FACULTY OF ENGINEERING

BE IV-Semester (CBCS)(I.T) (Suppl.) Examination, December 2019

Subject : 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 Explain briefly about PC, IR, MAR, MDR Registers.

2 Differentiate between SRAM and DRAM.

3 Define Hit Ratio.

4 Write the functions of Handshake signals.

5 Write the features of DMA.

6 Write an ALP to subtract two 8-Bit numbers.

7 List the addressing modes of 8085 with examples.

8 What is an Interrupt. List the interrupts used in 8085.

9 What is meant by Subroutine? Explain.

10 Explain about A/D and D/A conversion.

Part - B (5x10 = 50 Marks)

11 a. Explain briefly about the generations of computers. (5)
b. Explain about Input-Output organization with a suitable block diagram (5)

12 a. Explain about various Memory Systems. (5)
b. Write the features of Flash Memory. (5)

13 Explain the Pin diagram of 8085 with a neat sketch. (10)

14 Write in detail about 8255 in I/O mode. (10)

15 a. Write about the various data transfer instructions in 8085. (5)
b. Write an ALP to subtract two 16-Bit numbers. (5)

16 Explain about 8253 with a neat sketch. (10)

17 Write short notes on any two of the following (10)
a. Virtual Memory.
b. Secondary Storage.
c. The RS 232C Standard.

****