

FACULTY OF ENGINEERING

B. E. 2/4 (EEE&EIE) II– Semester (Backlog) Examination, October/November 2020

Subject: Electronic Engineering - II

Time: 2 hours

Max. Marks: 75

PART – A

Note: Answer any seven questions.

(7x3 = 21 Marks)

1. What are interacting and non-interacting stages?
2. If three identical stages are connected in cascade with gain of each stage is 10dB. What is overall gain?
3. What is the effect of current series negative feedback on R_i and R_o of amplifier?
4. Prove that stability of amplifier gain is improved with negative feedback?
5. What are the advantages of LC oscillations?
6. State Barkhausen criteria for oscillations?
7. Classify amplifiers based on location of Q-point?
8. Compare class B push pull and complimentary symmetry power amplifiers briefly?
9. Draw one level positive clipper and explain briefly?
10. Explain how RC low pass circuit works as integrator?

PART – B

Note: Answer any three questions.

(3x18 = 54 Marks)

11. a) Draw a two-stage RC-coupled FET amplifier and derive expressions for mid band gain & lower cutoff frequency?
12. Draw a current series negative feedback amplifier circuit. Find G_{msf} , A_{vsf} , R_f , I_f $R_s=1K\Omega$, $R_e=1K\Omega$, $R_c=4K\Omega$ $h_{ie}=1K\Omega$, $h_{fe}=100$, $h_{re}=h_{oe}=0$?
13. Derive expressions for frequency of oscillations and condition of oscillations for a wein bridge oscillator?
14. a) For a series fed class A power amplifier, derive expression for its efficiency?
b) Write about cross-over distortion in power amplifier?
15. Obtain the response of RC High pass circuit for:
 - a) Square wave input.
 - b) Ramp input. Draw relevant waveform and derive necessary expressions?
16. a) Explain the effect of cascading of identical stages. Derive necessary expressions for lower and upper cut-off frequencies of cascade amplifier in terms of individual stage cut-off frequencies?
b) Write about frequency stability of oscillators?
17. Write short notes on
 - a) Stability of feedback amplifiers.
 - b) Class D amplifier.
 - c) Clamping circuits.

FACULTY OF ENGINEERING**B.E 2/4 (ECE) II-Semester (Backlog) Examination, October/November 2020****Subject : Switching Theory and Logic Design****Time: 2 Hours****Max. Marks :75****PART –A****Note : Answer any Seven Questions****(7x3 = 21 Marks)**

1. Convert $(52.75)_8$ into Decimal and Binary
2. Draw 3-bit Gray code Table
3. Define Prime Implicant.
4. What is an advantage of Tabular method?
5. Design a function $F = \sum m(1,3,5,6)$ using 74138.
6. Name the types of Static Hazards?
7. Difference between Latch and Flip Flop
8. Write T-Flip Flop Truth table and Excitation table.
9. Differentiate between synchronous and asynchronous
10. Write the applications of shift register?

PART-B**Note : Answer any Three Questions****(3x18= 54 Marks)**

11. (a) Simplify the following functions using Boolean theorems
 (i) $F = (A+B(A+C')) + A' B'+A'C'$ (ii) $F = AB' C+B+BD' + ABD' + A' C$
 (b) Explain the function $BCI + ABDI$ into minterms.
12. Reduce the following function using K-Map method and design using NAND gates $F = \sum m(6, 9, 13, 18, 19, 25, 27, 29, 31) + d(2, 3, 11, 15, 17, 24, 28)$
13. Design BCD to Seven segment convertor circuit using basic gates.
14. (a) Draw and explain the circuit diagram of master slave J-K Flip Flop
 (b) Convert JK Flip Flop into T Flip Flop.
15. Design a Synchronous Counter which counts 0, 2, 5, 3, 4, 1, 2,..... etc using T Flip Flop.
16. (a) State and Prove Demorgan's law.
 (b) With minimum number of NOR gates design XOR gate.
17. (a) Design 3-bit even Parity Generator circuit.
 (b) Draw mod-8 Asynchronous counter and explain its timing diagram.

FACULTY OF ENGINEERING

B.E. 2/4 (M/P/CSE) II-Semester (Backlog) Examination, October/November 2020

Subject : Electrical Circuits & Machines

Time : 2 hours

Max. Marks : 75

PART – A

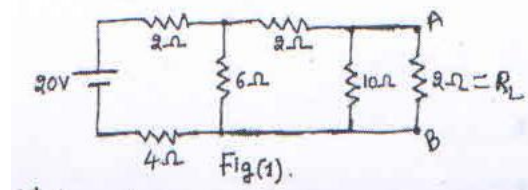
Note: Answer any seven questions.**(7x3 = 21 Marks)**

- 1 Define Kirchoff's law and mutual inductance.
- 2 Define RMS value of a sinusoidal wave.
- 3 Define Regulation of a transformer.
- 4 What is Auto-transformer.
- 5 Mention the applications of DC Motors?
- 6 What is the role of commutator in DC Generator?
- 7 Define (a) slip (b) synchronous speed.
- 8 How many types of three phase induction motors?
- 9 What are the various types of single-phase induction motors?
- 10 Write the basic features of brushless DC motor.

PART – B

Note: Answer any three questions.**(3x18 = 54 Marks)**

- 11 a) Determine current in 2Ω resistor using Thevenin's theorem as shown in below fig (1).



- b) Derive the expression for energy stored in inductance.
- 12 a) Explain two-watt meter method of 3 phase power measurement.
b) Determine the efficiency of 100 KVA transformer, the iron loss is 1Kw & full load copper loss is 1.5Kw. If the load power factor is 0.8 lagging. Find the efficiency at (i) half full load and (ii) full load.
- 13 a) Draw & explain characteristics of DC series motor.
b) Calculate the e.m.f. generated by 4-pole wave-wound generator having 65 slots with 12 conductors per slot when driven at 1200rpm. The flux per pole is 0.02Wb.
- 14 Explain constructional details of three phase induction motor with neat diagrams.
- 15 a) Explain capacitor star motor with the help of neat circuit diagram and mention its applications.
b) Write the applications of BLDC motor.
- 16 a) Explain speed control of DC shunt motor by flux control method.5
b) Explain auto transformer starting method of three phase induction motor.5
- 17 Write short notes on the following
a) Dot convention
b) OC test on single phase transformer.
c) Basic features of stepper motor.

FACULTY OF ENGINEERING
BE 2/4 (AE) II-Semester (Backlog) Examination, October/November 2020

Subject: Automotive Petrol Engines

Time: 2 Hours

Max. Marks: 75

PART – A

Note: Answer any seven questions.

(7x3 = 21 Marks)

- 1 Differentiate between 2 stroke and 4 stroke S.I. Engine.
- 2 Define the term clearance volume and cubic capacity of engine.
- 3 What is stoichiometric air fuel mixture?
- 4 List the draw backs of simple carburetor.
- 5 What is the requirements of petrol injection system in SI engine?
- 6 Draw a neat sketch of battery ignition system.
- 7 Draw a neat sketch of spark plug and indicate the parts.
- 8 Define flame front propagation.
- 9 List the properties to be consider for selection of lubricating oil.
- 10 What are the applications of forced circulation cooling system?

PART – B

Note: Answer any three questions.

(3x18 = 54 Marks)

- 11 (a) Draw a neat sketch of 2 stroke petrol engine and explain its working principle.
(b) List the assumptions made in derivation of air standard Otto cycle.
- 12 (a) With a neat sketch explain the working principle of Solex Carburettor.
(b) Draw a neat sketch of electrical fuel feed pump and explain its working principle.
- 13 (a) With a suitable sketch explain the working principle of vacuum advance mechanism.
(b) Explain electronic fuel injection system.
- 14 (a) What is the effect of compression ratio and speed of the engine on knocking?
(b) Draw a neat sketch of types of combustion chambers.
- 15 (a) Explain why optimum cooling is required in cooling system.
(b) Explain the working of thermosyphon cooling system.
- 16 (a) What are the functions of crank shaft and cam shaft?
(b) Explain the need of MPFI.
- 17 (a) What are the advantages of water-cooling system over air cooling system?
(b) Explain the functions of fins in air cooling system.

FACULTY OF ENGINEERING

B.E. 2/4 (I.T) II – Semester (Backlog) Examination, October/November 2020

Subject: Signals and Systems

Time: 2 Hours

Max. Marks: 75

PART – A

Note: Answer any seven questions.**(7x3 = 21 Marks)**

1. Evaluate the integral

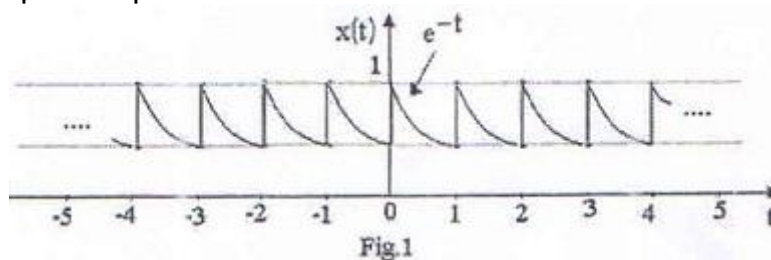
$$x(t) = \int_{-\infty}^{+\infty} (t \cos \pi t) \delta(t-1) dt .$$

2. Write the major classification of signals.
3. Define orthonormality and completeness.
4. Find the convolution of $x(n) * \delta(n-2)$, given $x(n) = \delta(n+2) + 2\delta(n) + 3\delta(n-2)$
5. By using duality property find the Fourier transform $X(\omega)$ of the signal $x(t) = \frac{2}{1+t^2}$
6. What is Region of convergence (ROC)?
7. Write the expression for discrete time fourier series.
8. Determine the Nyquist sampling rate and Nyquist sampling interval for the signal.
 $X(t) = \text{sinc}^2(200\pi t)$
9. State the final value theorem of Z Transform?
10. Find the DTFT of unit step sequence.

PART – B

Note: Answer any three questions.**(3x18 = 54 Marks)**

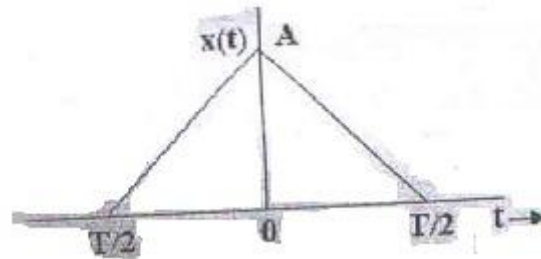
- 11.a) Write about elementary continuous-time signals in detail.
- b) Find the odd and even components of the $x(n) = \{1, 2, 2, 3, 4\}$
12. a) A rectangular function defined by $f(t) = \begin{cases} 1, & 0 < t < \pi \\ -1, & \pi < t < 2\pi \end{cases}$ approximate above rectangular function by a series of sinusoidal function. Show that the mean square error is reduced by increasing the number of terms in the approximation.
- b) Find the Fourier series representation of the signal $x(t)$ shown in fig. 1 Sketch the magnitude and phase spectra.



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13. a) Find the FT of the signal $x(t)$ as shown in fig. 2



b) State and prove the initial and final value theorems in Laplace transform.

14. a) Define sampling and aliasing . For a signal $x(t)$, Calculate Nyquist rate and Nyquist interval.

$$X(t) = 3\cos 50\pi t + 10\sin 300\pi t - \cos 100\pi t$$

b) Consider an LTI system with input $x(n)$ and the unit impulse response $h(n)$ specified as :
 $x(n) = 2n u(-n)$ and $h(n) = u(n)$. Determine $y(n)$.

15. a) Find the inverse Z transform of the following $X(z)$

$$X(z) = \log \left[\frac{1}{1 - aZ^{-1}} \right] \quad |Z| > |a|$$

b) State and prove any two properties of DTFT.

16. a) Derive the expression of a Fourier transform of non-periodic signals from Fourier series.

b) Explain the concept of Non-linear phase and Group delay.

17. Write short notes on the following :

a) Signal transmission through LTI systems.

b) Relation between Laplace transform and Z transform.

FACULTY OF ENGINEERING

B.E. (Civil/ECE/AE) IV-Semester (CBCS) (Backlog) Examination,

October/November 2020

Subject : Environmental Science

Time: 2 Hours

Max. Marks :70

PART –A

Note : Answer any Five Questions

(5x2=10 Marks)

- 1 What are the needs for public awareness regarding environment
- 2 What do you understand by Desertification.
- 3 Define the term Ecosystem.
- 4 Distinguish between producers and consumers
- 5 List various types of biodiversities
- 6 What are endangered and endemic species
- 7 State the purpose of water act.
- 8 List the causes of thermal pollution
- 9 Mention the types of disaster with an example.
- 10 Enumerate the causes of Acid rains.

PART-B

Note : Answer any Four Questions

(4 x 15 = 60 Marks)

- 11 a) Discuss in brief about Land degradation. List the causes for the same.
b) Explain various protection measures adopted for floods and drought.
- 12 a) Describe ecological pyramid. Explain different types of ecological pyramid.
b) Discuss Desert Ecosystem.
- 13 a) Explain the different methods of conservation of biodiversity.
b) Write a note on threats to biodiversity
- 14 a) Discuss the causes, effects and control measures of air pollution.
b) Discuss about Wild Life Protection Act.
- 15 a) What is watershed Management? Discuss the various methods of watershed management practices
b) Write a note on Disaster Management cycle with a neat sketch.
- 16 a) Explain briefly the causes, effect and control of global warming
b) Explain the benefits and problems of dam construction
- 17 Write short note on the following
 - a) Solid and liquid waste management
 - b) Ozone layer depletion

FACULTY OF ENGINEERING

B. E. (EEE) (CBCS) IV – Semester (Backlog) Examination, October 2020

Subject: Electrical Machines - I

Time: 2 Hours

Max. Marks :70

PART –A

Note : Answer any Five Questions

(5x2=10 Marks)

1. What is meant by coupling field?
2. The magnetic flux density on the surface of an iron face is 1.6T which is a typical saturation level value for ferromagnetic material. Find the force density on the iron face.
3. Define winding pitch & commutator pitch.
4. A 4 pole generator has a wave wound armature with 800 conductors and it delivers 100A on full load if the brush lead is 10 degrees, calculate the armature dc magnetizing and cross magnetizing ampere turns per pole.
5. Define the critical field resistance for a D.C shunt generator.
6. What the causes for the failure of voltage build-up in D.C generator?
7. Why D.C series motor is called variable speed motor?
8. What is the significance of back emf in D.C motor?
9. What is the condition for maximum efficiency in a D.C machine?
10. What are the advantages and disadvantages of Swinburne's test?

PART-B

Note : Answer any Four Questions

(4 x 15 = 60 Marks)

11. Two coils have self and mutual inductances of $L_{11}=L_{22}=(2/1+2x)$, $L_{12}=(1/1+2x)$, calculate the average force and coil currents at $x = 0.5m$ if both the coils connect in parallel across voltage source of $100\cos 314t$.
12. Explain armature reaction and remedies to compensate it.
13. (a) Explain the parallel operation of DC generators.
(b) A 100KW DC shunt generator driven by a belt from an engine runs at 750rpm and is connected to 230V DC mains. When the belt breaks, it continues to run as motor drawing 9Kw from the mains at what speed would it run? Given armature and field resistances are 0.018Ω and 115Ω .
14. (a) Explain the 4-point starter with neat schematic diagram.
(b) Explain basic speed control methods of DC shunt motor.
15. A retardation test conducted on a separately excited DC machine as a motor the induced voltage falls from 235V to 220V in 25 seconds on opening the armature circuit and 6 seconds on suddenly changing the armature connections from supply to a load resistance taking 12A, find efficiency of the machines when running as a motor & taking a current of 30A on a supply of 240V. If $R_a=0.5\Omega$ and that of field resistance is 240Ω .

16. (a) Discuss the various methods of improving commutation in DC machines.
(b) What is the significance of critical field resistance and critical field in DC machines?
17. (a) Explain the various methods of speed control of a D.C series motor.
(b) Explain the O.C.C and load characteristics of D.C series generator.

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FACULTY OF ENGINEERING

B.E. (Inst.) IV-Semester (CBCS) (Backlog) Examination, October 2020

Subject : Signals and Systems

Time : 2 hours

Max. Marks :70

PART –A

Note : Answer any Five Questions (5x2=10 Marks)

- 1 How many Types of SCALING operation are there? Give an example.
- 2 Classify signals and determine the periodicity or other wise of $x(t) = e^{-t}$ and sketch it.
- 3 Define Power of a signal and determine the same for $x(t) = e^{-8t} u(t)$, for all " t".
- 4 Determine whether the following signals are, linear or non linear
a) $y(t) = x(t)^{-1/2}$ and b) $y(t) = \text{Cos}(t) x(t)$
- 5 What is a Fourier Transform ? Give an example.
- 6 Find the Fourier Transform of $x(t) = e^{-8t} u(t)$ and plot Magnitude spectra
- 7 Define a LAPLACE Transform?
- 8 How many types of scaling operations can be performed on a Discrete Time Signal?
- 9 What do you understand by a Dynamic Discrete Time System?
- 10 What are the characteristics of a Non Linear system?

PART-B

Note : Answer any Four Questions (4 x 15 = 60 Marks)

11. a) What is the difference between a Stable signal and a Causal signal? Give example, and sketch.
b) Differentiate between a STABLE and an UNSTABLE system with an example.
12. a) Find the Trigonometric Fourier series of a Triangular signal , which starts from $t = 0$ with an amplitude A and reaches zero when $t = T/2$ and raises to A when $t = T$, and continues. Sketch the signal.
b) Find the Fourier series of a SAW tooth wave with amplitude zero at $t = 0$ and amplitude 40 at $t = 2\pi$, falls to zero at $t = 2\pi$ and raises to 40 at $t = 4\pi$ and continues.
13. a) What is a Fourier transform ? Write all the properties of it .
b) Write the frequency Convolution Theorem with proof .
14. a) Classify Discrete Time systems. Give example for each.
b) Why is "Sampling" is done? A signal with frequency 100 Hz is sampled by A with a frequency 30 and by B with a frequency 200, who can recover the original signal?

15. a) Define a Discrete Time Fourier series and Discrete Fourier Transform.
b) What is Circular Convolution and Circular Frequency shift?
16. a) What is the process of computing convolution between two signals ?
b) What is Region of Convergence (ROC)? Explain all of its type.
- 17) Write short notes on any two:
(i) Orthogonality in signals
(ii) Causal and Non Causal systems
(iii) Z-Transform
(iv) Energy and Power of a signal

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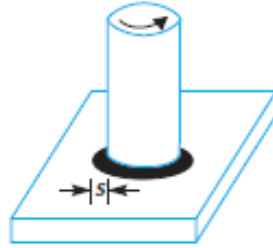
FACULTY OF ENGINEERING**B.E. IV-Semester (CBCS) (M/P) (Backlog) Examination, October 2020****Subject : DESIGN OF MACHINE ELEMENTS****Time: 2 Hours****Max. Marks :70****PART –A****Note : Answer any Five Questions****(5x2 = 10 Marks)**

1. Briefly explain about Rankine's theory.
2. Explain and draw the Goodman method for combination of stresses
3. Enumerate the type of stresses induced in axle and shaft.
4. Distinguish between Marine type of coupling and protected type of coupling.
5. Explain briefly strength of transverse fillet weld with a neat sketch.
6. What are the general considerations in Machine design?.
7. Define the following terms i) allowable stress
ii) Fatigue stress concentration factor.
8. In what ways shaft couplings are differed from clutches
9. What is a cotter? Explain with help of a neat sketch.
10. What is function of Rivets?

PART-B**Note : Answer any Four Questions****(4x15= 60 Marks)**

11. A mild steel shaft of 50 mm diameter is subjected to a bending moment of 2000 N-m and a torque T. If the yield point of the steel in tension is 200 MPa, find the maximum value of this torque without causing yielding of the shaft according to 1. The maximum principal stress; 2. The maximum shear stress; and 3. the maximum distortion strain energy theory of yielding.
12. A machine component is subjected to a flexural stress which fluctuates between + 300 MN/m² and -150 MN/m². Determine the value of minimum ultimate strength according to Goodman relation and Soderberg relation. Take yield strength = 0.55 Ultimate strength; Endurance strength = 0.5 Ultimate strength; and factor of safety=2
- 13.a. Design and make a neat dimension sketch of a muff coupling which is used to connect two steel shafts transmitting 40 kW at 350 R.p.m. The material for the shafts and key is plain carbon steel for which allowable shear and crushing stresses may be taken as 40 MPa and 80 MPa respectively. The material for the muff is cast iron for which the allowable shear stress may be assumed as 15 MPa.
b. Design the rectangular key for a shaft of 50 mm diameter. The shearing and crushing stresses for the key material are 42 MPa and 70 MPa.
14. Design a Socket and Spigot cotter joint to transmit a Load of 140kN. The design stresses may be taken as 80MPa in tension, 60MPa in shear and 140MPa in compression.
- 15.a A 50 mm diameter solid shaft is welded to a flat plate by 10 mm fillet weld as shown in figure. Find the maximum torque that the welded joint can sustain if the maximum shear stress intensity in the weld material is not to exceed 80 MPa.

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b. A double riveted double cover butt joint in plates 20 mm thick is made with 25 mm diameter rivets at 100 mm pitch. The permissible stresses are : $\sigma_t = 120$ MPa; $\tau = 100$ MPa; $\sigma_c = 150$ MPa Find the efficiency of joint, taking the strength of the rivet in double shear as twice than that of single shear.

16. Shaft made of mild steel is required to transmit 100 kW at 300 R.p.m. The supported length of the shaft is 3 meters. It carries two pulleys each weighing 1500 N supported at a distance of 1 meter from the ends respectively. Assuming the safe value of stress, determine the diameter of the shaft.

17. Write short notes on

- a. Variable loading.
- b. Cumulative Fatigue.
- c. Woodruff Keys.
- d. Gasket joints.
- e. Compound screws.

FACULTY OF ENGINEERING

BE IV-Semester (CBCS)(CSE) (Backlog) Examination, October 2020

Subject : Microprocessors and Interfacing

Time: 2 Hours

Max. Marks :70

PART –A

Note : Answer any Five Questions

(5x2=10 Marks)

- 1 Define PROM and EEPROM
- 2 Write a program to display digit 5 on7-segment LED using common anode.
- 3 Describe the LDA and LXI instructions.
- 4 Write an ALP to find the smaller of two numbers using 8085.
- 5 Write the differences between peripheral mapped I/O and memory mapped I/O.
- 6 Define DMA
- 7 Draw the BSR command word of 8255A.
- 8 List and describe the addressing modes of 8086.
- 9 What is modular programming?
- 10 State the hardware interrupts in 8086 microprocessor.

PART-B

Note : Answer any Four Questions

(4 x 15 = 60 Marks)

- 11 Draw the architecture of 8085 microprocessor and explain.
- 12 a) Explain the A/D converter using 8085 microprocessor.
b) Define stack and write about the stack instructions with examples.
- 13 Draw and explain the functional block diagram of Programmable Communication Interface (8251A).
- 14 Explain the 8253 with a neat diagram.
- 15 Draw and explain the Pin Diagram of 8086 microprocessor.
- 16 Illustrate the instruction set of 8086 microprocessor.
- 17 Write a short note on the following
 - a) Explain the I/O modes of 8255A.
 - b) Macros in 8086.
