FACULTY OF ENGINEERING

B.E. II/IV (EEE/EIE) II - Semester (NON-CBCS) (Backlog) Examination,

March / April 2022

Subject: Electronic Engineering - II

Time: 3 hours   Max. Marks: 75

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all questions.   **(25 Marks)**

1 Give classification of amplifiers?
2 Lower cutoff frequency of one stage is 20 Hz. If three such stages are cascaded what is the overall lower cut-off frequency?
3 What is the effect of voltage shut negative feedback on R1 and R0 of amplifiers
4 What are the characteristics of negative feedback in amplifier?
5 Compare RC and LC oscillators?
6 What is frequency stability of oscillators?
7 Why cross-over distortion occurs in power amplifiers and how it is eliminated?
8 What are the advantages of class B push pull power amplifier?
9 State and prove clamping circuit theorem?
10 Explain how RC High pass circuit works as differentiator?

PART – B

Note: Answer any five questions.   **(5 x 10 = 50 Marks)**

11 Draw a two-stage RC-coupled BJT amplifier and derive expressions for mid band gain & lower cutoff frequency?

12 Draw a voltage shunt negative feedback amplifier circuit. Find R_{msf}, A_{vsf}, Ri if Rf=250KΩ, Rs=1KΩ, Re=1KΩ, Rc=4KΩ, hie=1KΩ hfe=100, hre=hoe=0?

13 Derive expressions for frequency of oscillations and condition of oscillations for a Colpitts oscillator?

14 a) Prove that efficiency of class B power amplifier is 78.6%?
   b) Write about harmonic distortion in power amplifier?

15 Obtain the response of RC low pass circuit for:
      a) Square wave input.
      b) Ramp input. Draw relevant waveforms and derive necessary expressions?

16 a) Explain about step response of high pass RLC circuit
   a) Explain crystal controlled oscillator with neat diagram?

17 Write short note on
      a) Class AB amplifier
      b) Local vs global feedback
       c) Two level clipper.

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FACULTY OF ENGINEERING

B.E. II / IV (ECE) II – Semester (NON-CBCS) (Backlog) Examination,

March / April 2022

Subject: Switching theory & logic design

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

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all questions.   **(25 Marks)**

1. Explain the rules for excess-3 addition. Justify with some example.
2. Prove that the dual of XOR is its complement.
3. Explain prime implicant and essential prime implicant.
4. Realize the Boolean expression XYZ+XZ using only NAND gate.
5. Implement Boolean function $F(x,y,z)=\Sigma m(2,4,6)$ with a multiplexer.
6. Write short notes on hazards.
7. Distinguish between combinational and sequential circuits.
8. Explain set up and hold time.
9. Write short notes on ring counter.
10. Compare asynchronous and synchronous counters.

PART – B

Note: Answer any five questions.   **(5 x 10 = 50 Marks)**

11. a) Encode the decimal numbers 0 to 9 using 6 3 1 -1 code and prove that it is a self-complement BCD code.
    b) Explain Boolean theorems and properties.

12. Minimize the following function using tabular minimization.

    $F(a,b,c,d,e)= \Sigma m(0,1,2,8,9,15,17,2,24,25,27,31)$

13. a) Implement a full-adder using coder and OR gate.
    b) Design a BCE-to-Gray-code converter.

14. a) Convert D flip-flop to JK flip-flop
    b) What is race-around condition explain in detail.

15. Explain universal shift register in detail with near black diagram.

16. a) A receiver tith even parity hamming code has received the date as 1110110. Determine the correct code.
    b) Obtain minimal SOP and POS expression for the

    $f(a,b,c,d)= \Sigma m(0,1,2,3,5,6,8,10,15)$

17. a) Compare and contrast ROM, PLA AND PAL
    b) Write short notes on multiplexer.

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FACULTY OF ENGINEERING
B.E. II / IV (MECH/PROD/CSE) II - Semester (NON-CBCS) (Backlog)
Examination, March / April 2022

Subject: Electrical Circuits and Machines
Time: 3 hours   **Max. Marks: 75**
(Missing data, if any, may be suitably assumed)

PART – A
**Note: Answer all questions.**   **(25 Marks)**

1 Define average value and rms value.
2 Define active and reactive power.
3 Write the relation between phase and line quantity of voltage and current between 3 phase DELTA connected system.
4 Different losses in DC Machines.
5 Draw the torgue – speed characteristics of DC shunt motor.
6 Define efficiency and regulation of transformer.
7 Different types of DC generators.
8 An 8 pole, 50 Hz, 3 phase induction motor has a rotor emf frequency of 2 Hz. Calculate slip and speed.
9 Why starter is necessity in induction motor?
10 List the various types of single phase induction motor.

PART – B
Note: Answer any five questions.   **(5 x 10 = 50 Marks)**

11 a) Derive the expression for energy stored in inductance.
    b) Find the Current Ix.
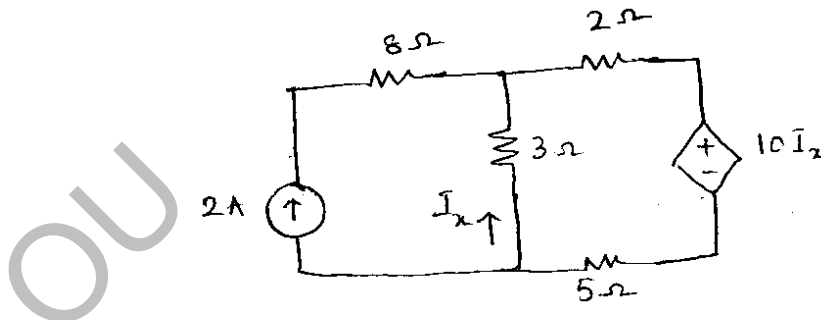
12   Power measurement by two wattmeter method.

13 a) Write a short note on speed control of DC series motor.
    b) The armature of a 6 pole DC generator has a wave winding containing 664 conductors.
        Calculate the generated EMF when flux per pole is 0.06 wb and speed is 250 RPM. At what speed must the armature be driven to generator and EMF of 250V, If the flux per Pole is reduced to 0.058 wb.

14 a) What is Auto transformer?
 b) A 10KVA, 200/400V, 50HZ, single phase transformer the following test result:
    OC Test: 200V, 1.3A, 120W on LV side
    SC Test: 22V, 30A, 200W on HV side
    Calculate i) Magnetizing and Core Loss component at 50HZ and rated voltage.
        ii) Magnetizing Branch Impedance.
        iii) Regulation at full load at 0.8 pf leading.

15 a) Describe Auto Transformer starter of 3 phase induction Motor.
 b) Explain the operation of a Capacitor Start Induction Motor.

16 a) Explain about 3 point Starter in DC Motor.
 b) Explain any two method of speed control of induction motor.

17 a) A 6 pole 50hz, 3 phase induction motor runs at 960 rpm when the torque on the shaft is 200 NM. If the stator losses are 1500W and friction and windage losses are 500W. Find (i) rotor copper losses (ii) Efficiency of the motor.
 b) Derive the EMF equations of DC machines.

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FACULTY OF ENGINEERING
BE (Civil) IV - Semester (AICTE) (Backlog) Examination, March / April 2022
Subject: Fluid Mechanics
Time: 3 Hours   Max. Marks: 70
(Missing data, if any, may be suitably assumed)

PART – A
Note: Answer all questions.   (10 x 2 = 20 Marks)

1. Differentiate between ideal fluids and Real fluids with examples

2. What is the significance of vapour pressure

3. What is the principle involved in manometers?

4. Write the relation between Absolute Pressure, Gauge Pressure and Atmospheric pressure.

5. For incompressible flow mass density is --------

6. Differentiate between free vortex flow and forced vortex flow.

7. Differentiate between momentum equation and moment of momentum equation

8. Define kinetic energy correction factor.

9. Classify the notches and weirs

10. List out the instruments to measure the discharge through pipes.

PART - B
Note: Answer any five questions.   (5 x 10 = 50 Marks)

11. a) Define viscosity and derive the expression for Newton's law of viscosity. Draw the rheological classification of fluids with diagram
   b) Two vertical glass tubes of bore 1mm and 2mm introduced inside a liquid The capillary rise of the liquid in two tubes indicates a difference in height, between the two menisci, of 1.3cm. If the mass density of fluid is 800Kg/m3. Estimate the surface tension of liquid take $\theta = 0°$

12. a) Explain the working principle of Bourdon pressure gauge with neat sketch.
   b) A rectangular plane surface 2m wide 3m deep lies in water in such a way that its plane makes an angle of 30° with the free surface of water. Determine the total pressure and position of centre of pressure when the upper edge is 1.5m below the free surface.

13. a)   Describe the following with examples.
        i) Steady and unsteady flow
        ii) Uniform and non uniform flows
        iii) Laminar and Turbulent lows
        iv) Compressible and incompressible fluids.
   b) For a 2D flow the velocity potential function is given by the expression
       $\varnothing = x^2 - y^2$
       i) Show the velocity component satisfy the conditions of flow continuity and irrotationality.
       ii) Determine the stream function and flow rate between stream lines (2,0) and (2,2)

..2

14. a) Derive Bernoulli's equation from fundamentals and write its assumptions and limitations.
   b) The angle of reducing bend is 60º, its initial diameter is 30cm and final diameter is 15cm and fitted in a pipeline carrying a discharge of 0.36cumecs. The pressure at the commencement of the bend is 2.95bar. The friction loss in the pipe bend may be assumed as 10% of kinetic energy at the exit of the bend. Determine the force exerted by the reducing bend.

15. a) What is the difference between pitot-tube and pitot-static tube. How will you determine the velocity at any point with the help of pitot tube.
   b) Find the discharge of water flowing through a pipe of 30cm diameter placed in an inclined position where a venturimeter, is inserted having a throat of 15cm. The difference of pressure between the main and the throat is measured by a liquid of specific gravity 0.6 an inverted U-tube which gives a reading of 30cm. The loss of head between the main and the throat is 0.2 times the kinetic head of the flow.

16. a) What is flow net and write its properties, uses and limitations.
   b) Briefly explain U-tube differential manometer and U-tube inverted differential manometer

17. a) Define co-efficient of contraction, co-efficient of velocity, co-efficient of discharge and co-efficient of resistance.
   b) Derive an expression for discharge over a broad crested weir and prove the condition for maximum discharge.

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FACULTY OF ENGINEERING

B.E. (EEE/EIE) IV - Semester (AICTE) (Backlog) Examination, March / April 2022

Subject: Digital Electronics & Logic Design

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

(Missing data, if any, may be suitably assumed)

PART – A

Note: **Answer all questions**.   **(10 x 2 = 20 Marks)**

1   Perform the following using 2's compliment.
     a) -90+(-20)   b)   125+(-45)
2   What is the representation of logic functions?

3   Using K-Map deduce the minimal function of X=(A+B) (A'+C) (B+C)
4   Realize the basic gates with only NAND gates.
5   Write the excitation table of D Flip Flop.
6   Compare Asynchronous & Synchronous Counters.
7   List A/D Converter ICs.
8   What is encoding?
9   Compare RAM & ROM.
10   Compare PLA & PAL.

PART - B

Note: Answer any five questions.   **(5 x 10 = 50 Marks)**

11   a)   Show that $A \oplus B \oplus A.B = A + B$
     b)   Explain RTL & TTL Family.

12   a)   Find the complement of the function of F = x'yz' + x'y'z by finding the dual of the
          function.
     b)   Implement NOT, AND, OR, NOR, XOR and XNOR using NAND gates.

13   Write short notes on
     a)   Successive approximation A/D converter.
     b)   Sample & Hold Circuit.

14   a)   What is Full Adder? Deduce the Full Adder circuit by using 2 Half adders.
     b)   Design a BCD adder circuit.

15   a)   Compare Combinational & Sequential circuits.
     b)   Design 4-bit ripple down counter using T-flip flops. Give the complete circuit &
          waveforms.

16   Design a synchronous counter with binary sequence 0,1,3,7,6,4 and repeat
     using JK   flip flop. Clearly explain what happens when the counter enters any of
     the illegal states.

17   Write short notes on
     a)   Field Programmable Gate Array
     b)   Content Addressable Memory

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FACULTY OF ENGINEERING
B.E. (ECE) IV - Semester (AICTE) (Backlog) Examination, March / April 2022

Subject: Analog Electronic Circuits

Time: 3 Hours   **Max. Marks: 70**
(Missing data, if any, may be suitably assumed)
PART – A
Note: Answer all questions.   **(10 x 2 = 20 Marks)**

1 Draw high frequency equivalent circuit of BJT and explain.
2 Write about various distortions in amplifiers.
3 What are the different features of negative feedback?
4 Write about the effect of negative current shunt feedback on input and output impedance of amplifier?
5 What are the conditions to be satisfied to sustain oscillations in the circuit?
6 Give applications of LC oscillators.
7 Explain class-D operation.
8 How cross-over distortion occurs in power amplifier? How it is eliminated?
9 What is the effect on bandwidth when single tuned stages are connected in cascade?
10 What is Neutralization in RF tuned voltage amplifiers?

PART – B

Note: Answer any five questions.   **(5 x 10 = 50 Marks)**

11 Derive expressions for low frequency gain and high frequency gain of a single stage RC coupled FET amplifier.

12 (a) Evaluate the effect of negative feedback on bandwidth of amplifier.
   (b) Draw circuit of voltage series negative feedback amplifier and derive expression for it's gain.

13 Explain working of Wien bridge oscillator and derive expressions for frequency of oscillation and condition of oscillation.

14 With a neat circuit explain working of transformer coupled class B push pull power amplifier and find efficiency.

15 For a double tuned RF voltage amplifier obtain expressions for gain at resonance and bandwidth.

16 (a) Evaluate the high frequency response of transformer coupled amplifier.
   (b) Compare local and global feedback.

17 Write short notes on:
   (a) Transistorised voltage regulators
   (b) Crystal oscillator
   (c) Staggered tuned amplifier.

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FACULTY OF ENGINEERING

B.E (MECH/PROD/AE) IV - Semester (AICTE) (Backlog) Examination,

March / April 2022

Subject: Energy Science and Engineering.

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

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all questions.   **(10 x 2 = 20 Marks)**

1   What are primary and secondary energy sources?
2   What are the merits of conventional energy sources?
3   Write a short notes on spillways.
4   Explain the function of moderator in nuclear reactor.
5   Explain wind energy.
6   Write the disadvantages of geothermal energy.
7   What are the benefits of co-generation?
8   What do you understand by the term waste heat?
9   What are the factors that affects economics of generation and distribution of power?
10 List the various pollution standard methods used.

PART - B

Note: Answer any five questions.   **(5 x 10 = 50 Marks)**

11 a) Discuss the merits and demerits of renewable energy sources.
    b) Differentiate between conventional and non-conventional source of energy.

12 a) With a neat sketch explain the working of open cycle gas turbine.
    b) What is the principle of nuclear reactor? Describe about the parts of Reactor core.

13 a) Differentiate wave energy and tidal energy systems.
    b) With a neat sketch, explain the construction and working of KVIC digester.

14 a) Explain about the methods of mechanical energy storage.
    b) What are the benefits of waste heat recovery?

15 a) Describe the various costs associated with the power plant.
    b) Explain the various pollution standard methods used.

16 a) How tidal power plants are classified and what are the limitations of tidal power plant.
    b) With a neat sketch, explain the working of steam turbine.

17 a) What are the advantages of co-generation and tri-generation.
    b) Write short notes on various sources of energy.

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FACULTY OF ENGINEERING
B.E. (CSE) IV - Semester (AICTE) (Backlog) Examination, March / April 2022
Subject: Computer Organization

Time: 3 hours   **Max. Marks: 70**
(Missing data, if any, may be suitably assumed)

PART – A
Note: Answer all questions   **(10 x 2 = 20 Marks)**

1 What are Domain Constraints? List all of them.
2 Define weak entity set? How a weak entity set is represented in E-R Model?
3 Write the Fundamental Relational algebra operations with symbols. And justify how SELECT statement of Relational algebra operation is different from SQL SELECT Statement, with an example?
4 Define natural Join. Explain the natural join using SWL query.
5 Define Joins. What are the conditions of joins used in SWL?
6 What is Authorization? Different types of authorization that database needs to satisfy.
7 Draw the Sparse index using any example?
8 Define Conflict Serializability? Draw the Truth table for it using Read and Write Operations?
9 Explain Recoverability?
10 Explain cascade less schedules?

PART – B
Note: Answer any five questions   **(5 x 10 = 50 Marks)**

11 a) List the various applications of databases.
   b) Explain different architectures of database applications?

12 a) Explain extended relational algebra operations?
   b) Explain the three different modes of data transfer.

13 a) Explain the direct mapping process of cache memory of size 512*12 bits with a main memory of 32k*12 bits. Give relevant details.
   b) Explain the functioning of auxiliary memory.

14 Draw the pin diagram of 8086 and explain all the pins.

15 Explain Data transfer and Logical instructions of 8086 in detail with examples.

16 a) Explain Asynchronous data transfer with neat block and timing diagrams.
   b) Explain types of interrupts in detail. Draw interrupts cycle.

17 Write short notes on:
   a) Virtual Memory
   b) Stack pointer and Program counter
   c) Memory Segmentation of 8086.

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FACULTY OF ENGINEERING
B.E. (CME/IT) IV - Semester (AICTE) (Backlog) Examination, March / April 2022

Subject: Computer Organization & Microprocessor

Time: 3 hours   Max. Marks: 70

(Missing data, if any, may be suitably assumed)
PART – A
Note: Answer all questions.   **(10 x 2 = 20 Marks)**

1 Explain about Functions of CPU.
2 Explain about Interrupts.
3 Define memory mapped I/O.
4 What is Strobe Control? Explain.
5 Define Virtual Memory.
6 Differentiate between Minimum mode and Maximum mode in 8086 pin diagram.
7 Write an Assembly language program to find the Sum of two 8bit numbers.
8 Differentiate between write back and write through mechanism of writing data into cache memory.
9 List the advantages of memory Segmentation of 8086.
10 The value of Code segment (CS) register is 4042H and the value of different offset is follows
    BX: 2025H   IP: 0580H   DI: 4247H calculate the effective address of the memory location pointed by the CS.

PART – B

Note: Answer any five questions.   **(5 x 10 = 50 Marks)**

11 a) Explain about 8086 Flag Register.
    b) Explain about RAM and ROM Chips.

12 What do you understand by the term Addressing Mode? Explain the addressing modes of 8086 microprocessor with suitable examples.

13 a) Explain about Auxiliary memory.
    b) What is the Program Control? Explain in detail.

14 a) Explain about Asynchronous data Transfer
    b) What is PSW? What flags will be effect by the following mnemonics Let AX=1010H, CX=1111H and CY=1?
        (i) RCL AX, 01H   (ii) XOR CX, CX   (iii) ADD AX, CX.

15 a) Explain in detail about DMA Transfer
    b) Distinguish between isolated I/O and memory mapped I/O with an example.

16 a) Write an Assembly language program to demonstrate the numbers in Ascending Order.
    b) What is the significance of virtual memory? Explain.

17 Write short notes on :
a) Associative memory   b) Cache memory   c) Main memory.
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FACULTY OF ENGINEERING

BE (Civil/ECE/AE) IV - Semester (CBCS) (Backlog) Examination, March / April 2022

Subject: Environmental Sciences

Time: 3 Hours   Max. Marks: 70

(Missing data, if any may be suitably assumed)

PART – A

Note: **Answer all questions**.   **(10 x 2 = 20 Marks)**

1. List various causes for water logging and salinity.

2. Discuss the role of public awareness in the protection of environment.

3. Differentiate between grazing and detritus food chain with examples

4. Identify what are the main causes for ecological imbalance in an ecosystem

5. What are the endangered and endemic species of India

6. Discuss about species diversity with suitable examples

7. Define noise pollution. Discuss the ill effects of noise pollution on human

8. Explain the ill effects of population explosion

9. Describe the need for environmental ethics among human.

10. List the harmful effects of emission of green house gases in the atmosphere?

PART - B

Note: Answers any five questions.   **(5 x 10 = 50 Marks)**

11. a. Define drought? What are the different types of drought? Discuss the impact of drought on the economy and society. Suggest some control measures.
    b. Describe in detail the positive and negative environmental impacts of dams.

12. a. What is a food chain? Describe its two basic types with suitable examples
    b. With the help of neat sketch explain how the energy flows through the ecosystem.

13. a. Explain the significance of conservation of biodiversity. Discuss about various methods adopted for achieving conservation of biodiversity
    b. India is a mega diversity nation. Justify

14. a. Discuss about the various sources, its effects and control measures of water pollution
    b. Define solid waste. Discuss their types, effects and name the various methods used to dispose solid waste. Explain the merits and demerits any one of them

15. a. List out various water conservation methods and describe any one of them in detail.
    b. Discuss about the dreaded effects of Ozone layer depletion on biotic as well as abiotic world

16. a. Discuss about the statement "Man cannot command nature except by obeying it"
    b. Discuss the major causes for soil pollution and their impact. Suggest some remedial measures to control soil pollution.

17. a. Discuss the role of an individual to conserve the existing natural resources for our future generations so as to meet the sustainable development goals.
    b. Explain how is modern agriculture different from that of conventional agriculture? Discuss the ill effects of modern agriculture on the environment

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FACULTY OF ENGINEERING

B.E. (EEE) IV – Semester (CBCS) (Backlog) Examination, March / April 2022

Subject: Electrical Machines - I

Time: 3 Hours   Max marks: 70

(Missing data, if any may be suitably assumed)

PART – A

Note: **Answer all questions**.   **(10 x 2 = 20 Marks)**

1. Give an example for single & multiple excitation systems.

2. Write applications of DC compound generator

3. Mention various methods of speed control of DC Series Motor.

4. State the advantages and disadvantages of flux control method.

5. Define Speed regulation.

6. Define Critical field resistance.

7. Define Lenz's law.

8. Write difference between Lap and Wave winding

9. What is the importance of back Emf in DC Motor

10. Draw B-H curve for magnetic material.

PART - B

Note: Answers any five questions.   **(5 x 10 = 50 Marks)**

11. a) Describe the basic concepts of magnetically induced EMF and force.
    b) Explain the flow of energy in electro mechanical devices.

12. Define and explain the terms i) pole pitch   ii) coil pitch   iii) back pitch
    iv) front pitch   v) Commutator pitch.

13. A DC shunt motor runs at 1200rpm on no load drawing 5 amps from 220 Volts
    mains. Its Ra = 0.25Ω & Rsh=110Ω. When loaded at motor shaft draws a current of
    62 Amps from mains. What would be its speed? Assume that the armature reaction
    demagnetizes the field to the extent of 5%. Also calculate the internal torque
    developed at No-load & ON-load. What is motor shaft torque at load?

14. a) Explain in detail about Field test.
    b) Explain different losses in DC Machines.

15. a) Derive efficiency equation of DC motor.
    b) With a neat diagram explain 4-point starter.

16. a) Explain different methods of improving commutation.
    b) Explain in detail about parallel operation of any DC generator.

17. a) Derive EMF equation of DC generator.
    b) Explain in detail about armature reaction and how to overcome it with neat
       diagrams.

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FACULTY OF ENGINEERING
B.E. (EIE) IV - Semester (CBCS) (Backlog) Examination, March / April 2022
Subject: Signals and Systems

Time: 3 hours   **Max. Marks: 70**
(Missing data, if any, may be suitably assumed)
PART – A

Note: Answer all questions.   **(10 x 2 = 20 Marks)**

1. Define even and odd signals with an example.
2. What are the properties of LTI system?
3. What is half wave symmetry? What are its effects?
4. Explain analogy between vectors and signals.
5. What is frequency spectrum?
6. State and prove modulation and conjugation properties of Fourier Transform.
7. State and prove Initial value theorem.
8. Find inverse Laplace transform of $X(s) = \dfrac{e^{-as}}{s+a}$.
9. What is the condition for Z-transform to exist?
10. State Sampling theorem.

PART – B
Note: Answer any five questions.   **(5 x 10 = 50 Marks)**

11. (a) Find convolution sum of following sequences x(n) = {1, 2, 3, 4} and h(n) = {1, 2, 3}.
    (b) Check whether the following system are Linear and Time invariant.
        (i) Y(t) = pt² x(t) + qtx(t - 3)   (ii) y(n)=aⁿu(n).

12. (a) Prove that complex exponential are orthogonal functions.
    (b) Find the complex componential Fourier series representation of x(t)=cos²(t).

13. Find Fourier transform of (a) cos $(w_0 t)$ (b) te⁻ᵃᵗu(t).

14. Find inverse Laplace transform of

    (a) $\dfrac{s+2}{s^2+2s+2}$ (b) $\dfrac{s+3}{s(s^2+4)(s+2)(s+1)}$.

15. Find step response and impulse response of $H(s) = \dfrac{s}{(s^2+2s+2)}$.

16. (a) Explain natural sampling method.
    (b) What is zero order hold? Obtain transfer function of zero order hold.

17. (a) Find z-transform of the given difference equation y(n) = x(n – 2) u(n).
    (b) Find the z-transform and ROC of x(n) = aⁿu(- n).

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FACULTY OF ENGINEERING
B.E. (MECH/PROD) IV – Semester (CBCS) (Backlog) Examination, March / April 2022
Subject: Design of Machine Elements

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

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all questions.   **(10 x 2 = 20 Marks)**

1   What are preferred numbers?
2   Define the terms: (a) CODES   (b) STANDARDS used in design.
3   Define the terms: (i) Notch sensitivity and (ii) stress concentration factor.
4   What is S – N curve?
5   State difference between axle, shaft and rod.
6   Mention the applications of muff and split muff coupling.
7   Why Gib head is provided at joints?
8   Why gaskets are provided at joints?
9   Sketch differential and compound screw.
10 State the assumptions made in the design of welded joints.

PART – B

Note: Answer any five questions.   **(5 x 10 = 50 Marks)**

11 A cylindrical shaft made of steel of yield strength 700MPa is subjected to static loads consisting of bending moment of 10kN-m. Determine the diameter of the shaft using two theories of failures, and assuming a factor of safety of 1.5. Take E = 210GPa and Poisson's ratio = 0.25.

12 A circular bar of 400mm length is supported freely at its ends. It is acted upon by a central concentrated cyclic load having a minimum value of 22kN and a maximum value of 48kN. Determine the diameter of bar by taking a factor of safety. f 1.5, size effect of 0.84, surface finish factor of 0.88. The material properties of bar are given as: Ultimate tensile strength of 650MPa, yield strength of 500MPa and endurance strength of 350MPa.

13 Design and draw a cast iron flange coupling for a mild steel shaft transmitting 90kW at 250rpm. The allowable shear stress in the shaft is 40MPa and the angle of twist is not exceed 1° in a length of 20 diameters. The allowable shear stress in the coupling bolts is 30MPa.

14 Design a cotter joint of socket and spigot type, which may be subjected to a pull or push of 30kN. All the parts of joints are made of same material with the permissible stresses 55MPa in tension, 70MPa in compression and 40MPa in shear.

15 Determine the size of rivets required for the bracket shown in figure. Take permissible shear stress for the rivet material as 100MPa.
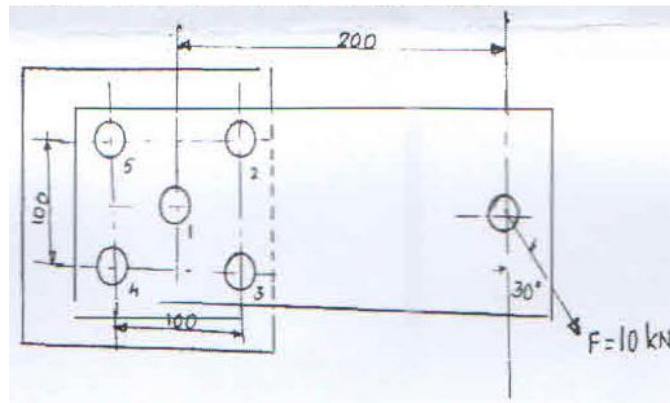
16 Design a screw jack to lift a load of 50 KN.

17 Write short notes on :
   (a) S – N Diagram
   (b) Bolts of Uniform strength
   (c) Looking devices for nuts.

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FACULTY OF ENGINEERING
B.E. (CSE) IV - Semester (CBCS) (Backlog) Examination, March/April 2022

Subject: Microprocessors and Interfacing

Time: 3 hours   Max. Marks: 70

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all questions.   (10 x 2 = 20 Marks)

1 Enlist differences between 8085 and 8086 Microprocessor instruction set.
2 Draw the flag register of 8085 microprocessor.
3 Show the Rotate instructions of 8085.
4 What are the registers used in 8259A?
5 What are Assembler directives?
6 Define BSR mode in 8255A (PPI).
7 Generate the control word to set PORT-C7 bits of 8255.
8 What is linking?
9 Differentiate between Macros and procedures.
10 Differentiate between 8085 and 8086 microprocessor.

PART – B

Note: Answer any five questions.   (5 x 10 = 50 Marks)

11 Explain the interfacing of a stepper motor to 8085 microprocessor with necessary circuit diagram. Write an ALP to rotate the stepper motor in clockwise direction.

12 Describe the 8257 DMA controller with neat diagram.

13 With the help of block diagram explain the internal architecture of IC 8255 and describe its working in IO mode.

14 Explain the addressing mode of 8086 microprocessor with an example.

15 Determine the physical address resulting from the following instructions:
   (a) MOV DL, [BP+SI]
   (b) MOV DI, [BX+100h]
   (c) SUB BX, AX
   (d) MOV[BP+DI+5], AH
   (e) MOV AL, [5036h]
      Where BP = 7000h, SI = 0350h, SS=8000h, BX=4FFFh, DS=2000h, DI=6A00h.

16 (a) Explain the register structure of 8086 microprocessor.
   (b) Explain 8086 assembler directives with an example.

17 Write notes on:
   (a) Peripheral mapped I/O and memory mapped I/O.
   (b) Data transfer using DMA.

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FACULTY OF ENGINEERING

B.E II / IV (IT) II Semester (NON-CBCS) (Backlog) Examination, March / April 2022
SUBJECT: Signal and Systems

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

(Missing data, if any, may be suitably assumed)

PART - A

Note: Answer all questions.   **(25 Marks)**

1. Write the major classification of signals.
2. When a system is said be causal and non causal?
3. Define orthonormality and completeness.
4. Write the expression of Exponential Fourier series coefficients.
5. What is the relationship between Fourier Transform and Laplace Transform?
6. Find the Laplace transform of $f(t) = e^{-5t} u(t)$.
7. Define aliasing.
8. Find DTFT of $(0.3)^n \cdot u(n)$
9. Find the Z-transform of $x(n)=\{-2,4,5,7\}$.
10. List few properties of Z- transform.

PART - B

Note: Answer any five questions.   **(5 x 10 = 50 Marks)**

11. a) With the help of an example, explain Time shifting, Time scaling & Time inversion.
    b) Check whether $\cos(t)$ is an energy signal or power signal.

12. a) Obtain the Trigonometric Fourier series for the saw tooth wave .
    $F(t) = At ; 0 < t < 1$
    b) Explain the analogy between vectors and signals.

13. a) Find the Fourier series of a SAW tooth wave with amplitude zero at t=0 and amplitude 40 at t= 2π , falls to zero at t= 2π and raises to 40 at t=4π and continues.
    b) Differentiate Laplace transform and Z transform.

14. a) Explain any three properties of Fourier Transform with suitable examples.
    b) Find the Laplace Transform of $X(S) = \dfrac{(2s+3)}{s(s^2+2s+5)}$

15. a) For the given $x(n)=\{2,1,4,3,5\}$ .Find $x(-n)$, $x(n-2)$, $x(n+3)$,$-x(n)$ and $x(-n-1)$.
    b) Explain sampling operation in detail.

16. a) Find the Z – Transform of $x(n) = n^2 \cdot u(n)$.
    b) Find the inverse Z –transform for
    $X(Z) = (1+5Z^{-1}) / (1 - 8Z^{-1} - 48Z^{-2})$, if ROC $|z| > 12$.

17. Write notes on the following:
    a) Signal transmission through LTI systems.
    b) With example explain linear and non linear system.

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