Code No: D-3559/CBCS

FACULTY OF ENGINEERING

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

Subject: Surveying-II

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. Name the fundamental lines of a transit
2. What are the temporary adjustments of a theodolite?
3. Write the uses of Gale's Traverse table.
4. How do you adjust the traverse by transit rule
5. Define the degree of a curve by chord definition
6. Write the bisection method of setting out of a simple circular curve
7. What do you understand by a Compound Curve?
8. Illustrate the possible formations of sag-vertical curves based on adjacent grade lines?
9. List out various types of photographs used in Aerial Photogrammetry
10. Illustrate applications of GPS in Surveying?

PART - B

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

11. a) Draw a sketch showing thodolite with its all component parts.
    b) Discuss in detail how Trigonometrical leveling is carried out for inaccessible points

12. a) The following readings were obtained in running a teodolite traverse EFGH. Calculate the length and bearing of EH.

Line	Length	Bearing
EF	48.5	341048'
FG	172.5	160 24'
GH	105.0	1420 06'

    b) In detail write any one method of adjustment or balancing of closed traverse with figure?

13. a) Two straights BA and BC are intersected by a line EF. The angles BEF are 140o and 145o respectively. The radius of the first arc is 600 m and that of the second is 400m. Find the chainages of the tangent points, and the point of compound curvature, given that the chainage of point A is 3415m.
    b) What is meant by elements of transition curve?

14. a) How do you set a simple cure by offsets from long chord?

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b) Determine the RL of Q from the following reciprocal trigonometric observations:
Angle of elevation from P to Q = 01^{o} 41'03"
Signal Height at Q=3.44m
Height of instrument at P=1.65m
Distance between P and Q=17Km
R Sin 1" = 30.96m
RL of P=4251.13m
Coefficient of refraction = 0.07
Assume any missing data suitably

15. a) Calculate the setting out data of a vertical curve based on the following data collected from surveying, Proposed length of the vertical curve (L) = 290 m A descending gradient (-gl) of 3.2% meets another ascending gradient (+g2) of 2.2% Chainage at the vertical point of intersection (I) = 980.00 m RL of vertical point of intersection (I) = 150.00m Peg interval (PI) = 30 m
    b) Write the details of different types of Total Station? Also write the applications of Total Station.

16. a) Explain the components of GIS with a sketch showing its block diagram.
    b) How do you compute for setting out data of summit and sag curve in vertical curves.

17. Write notes on any two of the following
    a) Basic principle of EDM
    b) Effect of Curvature
    c) Elements of Transition curve
    d) Advantages of GIS.

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Code No: D-3566/CBCS

FACULTY OF ENGINEERING

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

SUBJECT: Power Systems – 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. Define Diversity factor, Load factor.
2. What is the function of economizer?
3. Which type of generator is used in Windmills and why?
4. What are the various methods to improve power factor?
5. What is Sag? Why its disadvantageous to have too low or too high sag?
6. Draw the cross section of 3 core belted high voltage cable and name the various parts.
7. What are the advantages of ring main system?
8. List out the problems in operating wind power generator
9. Why AC transmission system is more preferred when compared to DC transmission.
10. What is a nuclear power plant and how does it work?

PART - B

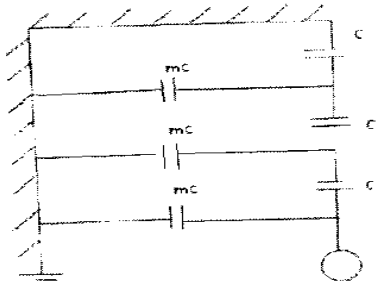
Note: Answer any five questions. **(5 x 10 = 50 Marks)**

11. a) What are various types of steam turbines and give their uses.
    b) List the advantages and disadvantages of hydroelectric plant.

12. a) Explain the capacitance grading of a cable.
    b) A transmission line conductor having a diameter of 19.5mm weight 0.85Kg/m. The span is 275m. The wind pressure is 39Kg/m^2 of projected area with ice coating of 13mm. the ultimate strength of the conductor is 8000Kgs. Calculate the maximum sag if the factor of safety is 2 and ice weighs 910Kg/m^2.

13. Derive an expression for 3 phase unsymmetrical spaced transmission line inductance.

14. a) What are the methods of equalizing the potential distribution over a string of insulators.
    b) A 3-phase overhead transmission line is being supplied by 3-disc insulators. The potential across the top unit and middle unit are 9KV & 11KV respectively. Calculate the ratio of Capacitance between pin and earth to the self-capacitance of each unit and line voltage.



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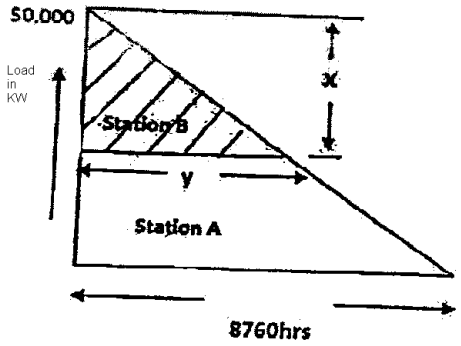
14 The load duration curve of a system for the whole year of 8760 hours as shown in figure below. The system is supplied by 2 stations A & B having the following annual cost.

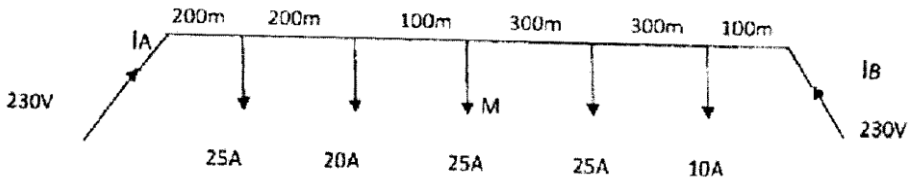
Station A = Rs. (75,000+80*KW+0.02*KWh)

Station B = Rs (50,000+50*KW+0.03*KWh)

Determine the installed capacity required for each station and for how many hours per year. Peak load station should be operated to give the minimum cost per unit generated.



16. A 2 wire distributor is loaded as shown in figure below. The voltage at the 2 ends is 230 volts resp. the distance between the sections are given in meters. Determine the cross section of the conductor for a minimum consumer voltage of 220 Volts.



17. a) A base load station having a capacity of a 18MW and standby station having capacity of 20MW share a common load. Determine (i) Annual load factor (ii) Used factor and capacity factor of the two power stations from the following data:

Annual standby station output is 7.35×10^6 KWh, Annual base station output is 101.35×10^6 KWh, peak load on the standby station is 12MW and hours of use of standby station during the year is 2190 hours.

b) Derive the expression for most economic power factor when demand is constant.

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Code No: D-3569/CBCS

FACULTY OF ENGINEERING

BE (EIE) IV - Semester (CBCS) (Backlog) Examination, March / April 2022

Subject: Transducer 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. Define Random Errors
2. How very minute displacements can be measured? What is the transducer to be used?
3. A Certain transducer exhibiting first order response is subjected to a sudden temperature change of 30oC to 100oC. If it has a time constant of 100seconds what temperature will be indicated by it after 10 seconds.
4. Explain the operation of RTD
5. Discuss the principle of variable inductive transducer
6. Write the types of filled in system thermometers
7. Explain the operation of lionization gauge
8. Briefly explain how temperature compensation is achieved with SGS in a wheat stone bridge.
9. What is magneto resistive effect?
10. Briefly explain the principle of McL eod gauge.

PART - B

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

11. Explain the various Dynamic Characteristics of measuring system

12. Derive the expression for gauge factor for metal wire gauges. Derive the expression for strain in Poisson's Bridge.

13. a) Explain the functioning of an eddy current types of inductive transducer?
    b) How is the thickness of a sheet measured using variable capacitance principle?

14. a) Using a suitable expression and neat sketch explain resistance temperature detectors?
    b) Write a short note on types of filled in system thermometers?

15. Write short notes on
    a) Bourdon tube with a neat diagram
    b) Dead weight gauges and manometer force balance tansducer

16. Find the step response for the first order system given by T(s) Also find steady state error for the response.

17. Write short notes on
    a) Pyrometers
    b) Temperature compensation for SG.

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Code No. D-3575/CBCS

FACULTY OF ENGINEERING

B.E. (ECE) IV - Semester (CBCS) (Backlog) Examination, March / April 2022

Subject: Probability Theory & Stochastic Process

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 probability as a relative frequency.
2 Consider the experiment of tossing a coin three times. What is the probability that head appears at the first two tosses only?
3 Contrast between continuous and discrete random variables.
4 List the various conditions that events A, B and C must satisfy if they are to be statistically independent.
5 State the properties of probability density function.
6 If the density function of a random variable X is $f_X(x) = x/2 \quad 0 \leq x \leq 2$, find $p\{x>1.5/x>1\}$.
7 State Central limit Theorem.
8 If Y = 5X + 10 and X is a uniformly distributed random variable between 0 and 10, find E[Y].
9 Define a random process, when it represents a random variable.
10 Distinguish between White and Coloured Noise processes.

PART – B

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

11 (a) For a certain binary communication channel, the probability that a transmitted '0' is received as a '0' is 0.8 and the probability that a transmitted '1' is received as '1' is 0.9. If the probability that a '0' is transmitted is 0.4, find the probability that a '0' is transmitted is 0.4, find the probability that
(i) a '1' is received (ii) a '1' was transmitted given that a '1' was received.

(b) Three students A, B, C are given a problem. The probabilities of their solving the problem are ¾, 2/3 and ¼ respectively. Find the probability that the problem is solved if all of them try it.

12 A Random Variable 'X' has Rayleigh distribution. Define its density function. Find Cumulative Distribution Function ($F_X(x)$), Mean, Mean square value and Variance.

13 (a) Find the characteristic function of a random variable 'X' distributed exponentially with Parameter 'a'. Find its mean value through characteristic function.

(b) Two random variable X and Y have a joint probability density function.

$$F_{XY}(x,y) = (5/16)x^2y \qquad 0 < y < x < 2$$
$$= 0 \qquad \text{elsewhere}$$

(i) Find the marginal density functions of X and Y.
(ii) Are X and y statistically independent?

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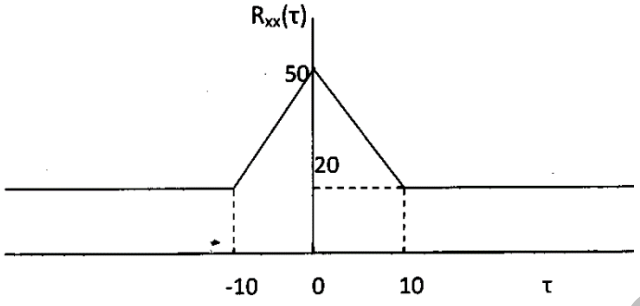
14 For a stationary ergodic process having the autocorrelation function shown in below fig.

Find (i) E[X(t)] (ii) E[X^2(t)] (iii) σ_x^2 .



15 (a) Show that the random process X(t) = A Cos $(\omega_0 t + \theta)$ is Wide Sense Stationary (WSS), if A and ω_0 are constants and θ is uniformly distributed Random variable in the interval $(0, 2\pi)$.

(b) State the properties of Cross power density spectrum.

16 (a) Find the autocorrelation function corresponding to the power spectrum $\psi_{XX}(\omega) = 8/(9+\omega^2)^2$.

(b) Find the power density spectrum of the random process for which $R_{xx}(\tau) = p\cos^4(\omega_0\tau)$

if P and ω_0 are constants. Determine the average power.

17 Prove that the PSD and time average of auto correlation function form a Fourier transform pair.

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Code No. D-3579/CBCS

FACULTY OF ENGINEERING

B.E. (MECH) IV - Semester (CBCS) (Backlog) Examination, March / April 2022

Subject: Applied Thermodynamics

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 is intercooling in air compressors?
2 Sketch P-V diagram or reciprocating air compressor with clearance volume.
3 Sketch and label the parts of simple carburetor.
4 Define (a) Indicated power (b) Brake thermal efficiency.
5 Define Octane number rating.
6 What are the effects of knocking in CI engine?
7 Differentiate between jet and surface condensers.
8 What are boiler mountings? Give some examples.
9 Sketch P-V diagram of Rankine cycle.
10 Define the process of regeneration in Rankine cycle.

PART – B

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

11 (a) Give the applications of compressed air.

(b) An air compressor takes in air at 1 bar and 20˚C and compresses it according to law $PV^{1.2}$=constant. It is then delivered to a receiver at a constant pressure of 10 bar. R=0.287kJ/kg K. Determine: (i) Temperature at the end of compression. (ii) Work done and heat transferred during compression per kg of air.

12 (a) Enumerate the reason for deviation of actual cycles from air standard cycles.
(b) The following results refer to a test on a petrol engine:
Indicated power = 30kW;
Brake power = 26kW;
Engine speed = 1000 r.p.m.;
Fuel per brake-power hour = 0.35kg;
Calorific value of the fuel used = 43,900 kJ/kg. Calculate:
(i) The indicated thermal efficiency,
(ii) The brake thermal efficiency and
(iii) The mechanical efficiency.

13 (a) Explain the stages of combustion in case of CI engine with the help of pressure Vs crane angle diagram.
(b) Explain the phenomenon of knocking in SI engine.

14 Explain any one type of fire tube boiler with the help of neat sketch.

15 (a) What is critical pressure ratio in nozzles?

(b) Stream is expanded in a set of nozzles from 10 bar and 200˚C to 5 bar. What type of nozzle is it? Neglecting the initial velocity find minimum area of the nozzle required to allow a flow of 3 kg/s under the given conditions. Assume that expansion of steam to be isentropic.

16 (a) Explain the function of economizer used in boiler.
(b) What are the methods of improving efficiency of Rankine cycle?

17 (a) Explain the working of battery ignition system.
(b) What is abnormal combustion in engine?

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Code No.D-3582/CBCS

FACULTY OF ENGINEERING

B.E. (PROD) IV - Semester (CBCS) (Backlog) Examination, March / April 2022

Subject: Applied Thermodynamics and Heat Transfer

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 In reciprocating air compressor, what is meant by perfect inter cooling?
2 What is the effect of clearance volume on performance of reciprocating air compressor?
3 For same power output, why a diesel engine is heavier than petrol engine?
4 Define mechanical efficiency of IC engine. What does it indicate?
5 Name different good heat conducting materials and good heat insulating materials.
6 What is overall heat transfer co efficient?
7 Define Reynolds number what is its use?
8 Write Kirchhoff's law of radiation.
9 Compare air cooling with water cooling for IC engines.
10 Graphically show the temperature distribution in a counter flow heat exchanger and write expression for LMTD for it.

PART – B

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

11 For a 2 stage reciprocating air compressor, without clearance and with inter cooling derive relation between intermediate pressure, suction pressure and delivery pressure for minimum work input. Draw indicator diagram.

12 A single stage reciprocating air compressor sucks in air at 1 bar, 30°C and delivers at 4 bar. The suction capacity of compressor is 1.2/min. Determine the mass flow air delivered by compressor per min. Find the power required to drive the compressor isothermally and isothermal efficiency.

13 With neat sketch, explain working of 2 stroke engine.

14 What is the function of carburetor in SI engines? Name different types of Carburetors. With a neat sketch explain working of simple carburetor.

15 Explain free convention heat transfer with example. Write Buckingham pi theorem. Define grashof number, nusselt number and prandntl number.

16 Define heat exchanger, classify the heat exchangers. Drive an expression for LMTD for a parallel flow heat exchanger.

17 A cylinder is made of an insulating material (thermal conductivity 0.2W/M°c) the inner and outer diameter of cylinder are 20mm and 40mm respectively. Determine the rate of heat leakage through the insulation. Inner and outer surface temperatures of cylinder are 200°c and 40°c respectively.

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Code No. D-3585/CBCS

FACULTY OF ENGINEERING

B.E. (AE) IV - Semester (CBCS) (Backlog) Examination, March / April 2022

Subject: Metallurgy and Material Testing

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 various defects in crystals.
2 Differentiate between cold working and hot working.
3 What do you understand by Fatigue strength? Explain briefly.
4 State Fick's law of diffusion.
5 Briefly explain about Eutectoid reaction.
6 Give a brief classification of Cast Irons.
7 What is the significance of Heat treatment?
8 How normalizing is different from Annealing? Explain.
9 Explain the principle of impact testing.
10 Differentiate between Brinell and Vickers hardness testing.

PART – B

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

11 (a) Discuss the effect of slip and twinning on plastic deformation.
(b) Explain the effect grain growth on mechanical properties of metals.

12 (a) Explain Griffith theory of brittle fracture.
(b) Discuss various protective methods to enhance the fatigue life of a component.

13 (a) Explain RR-Moore Test with the help of a neat diagram.
(b) Sketch and explain different stages of creep curve.

14 (a) Explain Iron-Iron carbide equilibrium diagram with a neat sketch.
(b) Discuss various types of plain carbon steels and their applications.

15 (a) Discuss various stages of heat treatment.
(b) Explain the process of Induction hardening with a diagram.

16 (a) Suggest suitable material for the piston of automobile engine. Justify your answer.
(b) Describe the Tensile test on Universal Testing Machine with a neat diagram.

17 (a) Write a short note on following:
(a) Bauschinger effect.
(b) Carbo-Nitriding.
(c) Eddy current Testing.

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Code No. D-3589/CBCS

FACULTY OF ENGINEERING

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

Subject: OBJECT ORIENTED PROGRAMMING USING JAVA

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 the features and benefits of Object Oriented Development.
2 What is the significance of each word in public static void main (string args[])?
3 What is difference between overloading and overriding?
4 What is the use of String Tokenzier?
5 Explain the delegation even model.
6 List the different AWT controls.
7 What is Serialization? Which type of variables cannot be serialized?
8 What is use of Data input stream and Push back input stream?
9 Write a stack program using user-defined exception.
10 Write a program to copy one file content into another file.

PART – B

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

11 Explain the dynamic method dispatch with example.

12 Explain creation of a package and importing a package.

13 What is a thread? Illustrate with an example the role of multi-threading.

14 Write a program to create and use user define Exception.

15 Explain the different iterators used for accessing the elements with example.

16 Explain with example
(a) This keyword
(b) Super keyword.

17 (a) Differentiate abstract class and interface.
(b) Explain the steps involved in creation and handling of Menus.

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Code No. D-3595/CBCS

FACULTY OF ENGINEERING

B.E. (IT) IV - Semester (CBCS) (Backlog) Examination, March / April 2022

Subject: OOPS Using JAVA

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 is an array?
2 What is string tokenizer?
3 What is the difference between throw and throws?
4 What is multithreading? What are two different ways to create multithread program?
5 What is the difference between Array List and vector?
6 What is the difference between Iterator and List Iterator?
7 Write short notes on packages.
8 Give the difference between exception and error.
9 List the type of Layouts.
10 What is the difference between string and string Buffer classes and give example code snippets?

PART – B

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

11 What is polymorphism? Differentiate between compile time and runtime polymorphism with the help of complete program.

12 Write short notes on the following:
(a) Legacy classes
(b) Iterators.

13 What are the methods supported by Mouse listener interface?

14 Explain about delegation even model.

15 What are the Java I/O's? Explain about each with an example program.

16 Write short notes on the following:
(a) String Tokenizer
(b) Applet
(c) Checkbox Group.

17 (a) What is AWT? Write AWT classes with suitable examples.
(b) What is event delegation model? Explain with suitable example.

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Code No. D-2060/CBCS

FACULTY OF ENGINEERING

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

Subject: Elements of Mechanical 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 Distinguish between SI and CI engine.
2 Define SFC and write it units.
3 What are applications of heat exchangers?
4 Explain Newton's law of cooling.
5 What are limitations of centrifugal pump?
6 Define slip and creep.
7 Write classification of gears.
8 Name the different parts of Lathe machine.
9 What is 3D printing?
10 Draw neat sketch of Arc welding setup.

PART – B

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

11 a) A 4-cylinger petrol engine works on a mean effective pressure of 5 bar and engine speed of 1250 r.p.m. Find indicated power developed by the engine if the bore is 100mm and stroke 150mm.
b) Explain closed cycle gas turbine.

12 a) Derive an expression for LMTD of counter flow heat exchanger.
b) Explain Fourier's law.

13 a) Explain working principle of Reciprocating pump.
b) Explain Pelton wheel with neat sketch.

14 a) Derive an expression for length of cross belt drive.
b) Explain with neat sketch reverted gear trains.

15 a) Differentiate between welding, brazing and soldering.
b) Explain up milling and down milling.

16 a) Draw valve timing diagram for four stroke petrol and diesel engines.
b) Write a note on additive manufacturing.

17 Write short note on additive manufacturing.
a) Critical radius of insulation.
b) Manufacturing processes using lathe machine.
c) Different types of heat exchangers.

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FACULTY OF ENGINEERING

B.E. (ECE/CSE/IT) IV-Semester (AICTE) (Old) (Backlog) Examination,
March / April 2022
Subject: Signal 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 State Sampling theorem.

2 What is the condition for DT sinusoidal sequence to be periodic?

3 Distinguish between Time invariant and Time varying system.

4 Define System function.

5 Define ROC and mention ROC for causal signal in s-plane.

6 Distinguish between Fourier Transform and Laplace transform.

7 What are the differences between the Fourier series and Fourier Transform?

8 State the properties of Fourier Transform.

9 What is the relation between discrete-time Fourier transform and Z-transform?

10 Differentiate between DTFT and DFT.

PART – B

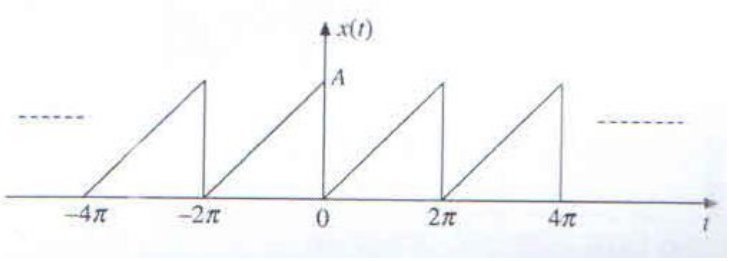
Note: Answer any five questions. **(5 x 10 = 50 Marks)**

11 (a) Determine whether the following signals are periodic or not. If periodic, determine fundamental period. (i) Cos (0.02πn) (ii) Cos(20πt) + Sin(10πt)
(b) Explain aliasing effect.

12 Check whether the following systems are
(i) Linear or non-linear (ii) Causal or non-causal (iii) Time variant or Time invariant
(a) $y(t) = at^2 x(t) + btx(t-4)$
(b) $y(n) = x^2(n) + \frac{1}{x(n-1)}$.

13 Solve the following difference equation using unilateral z-transform.
$y(n) - \frac{7}{12} y(n-1) + \frac{1}{12} y(n-2) = x(n)$ *for* $n \geq 0$ with initial conditions
$y(-1) = 2, y(-2) = 4$ and $x(n) = \left(\frac{1}{5}\right)^n u(n)$.

14 Find Fourier series of the following signal.



15 Find DTFT of following:

(a) X(n) = {1, -2, 2, 3}

(b) $x(n)=\left(\frac{1}{2}\right)^{n-2} u(n-2)$.

16 Plot the pole-zero pattern and determine whether the following system is stable or not. $y(n)=y(n-1)-0.8y(n-2)+x(n)+x(n-2)$.

17 (a) Find DFT of the sequence x(n) = {1, 2, 3, 4}.

(b) What are the properties of ROC?

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Code No. 2074/N/AICTE

FACULTY OF ENGINEERING

B.E. (ECE/CSE/IT) IV-Semester (AICTE) (New) (Backlog) Examination, March / April 2022

Subject: Signal and Systems

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

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

PART – A

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

1 What is different between analog and digital systems?
2 Check whether the following signal is periodic or not. If periodic find the period. x(t) = 3 Sin 200πt + 4 Cos 100πt.
3 Write the conditions for existence of Fourier series.
4 How do you obtain Exponential Fourier series coefficients from Trigonometric Fourier series coefficients?
5 Find the Fourier Transform of $X(t) = e^{-2t}$. u(t).
6 State the frequency shifting and time shifting property of Laplace transform.
7 Define Singularity of functions.
8 List the properties of Discrete Time Fourier Series.
9 What is Region of convergence with respect of Z-transform?
10 List few properties of DTFT.

PART – B

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

11 (a) Find whether the given x(t) is energy signal or power signal and also find the energy and power of the signal.

$$x(t) = t - 2 \quad ; \quad -2 \le t \le 0$$
$$= 2 - t \; ; \quad 0 \le t \le 2$$
$$= 0 \quad ; \quad otherwise$$

(b) Explain the basic operations can be performed on a continuous time signal.

12 An LTI system has the impulse response (n) = u(n) - u(n – 3). Find the output of the system to the input $x(n) = (1/3)^n u(n)$.

13 (a) State and prove any four properties of Laplace transform.

(b) Find the Inverse Laplace Transform of $X(S) = \frac{1}{(s+1)(s+4)(s+6)}$.

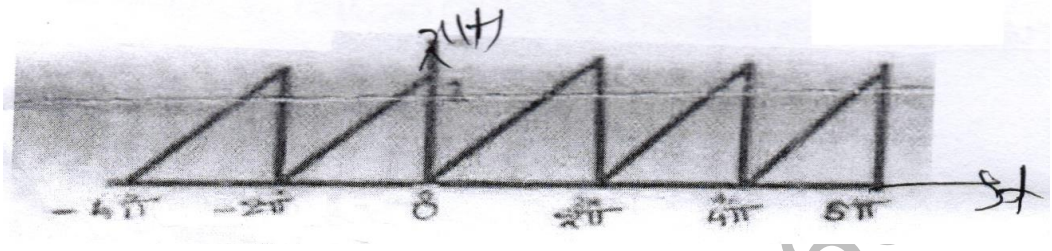
14 Determine the Fourier series representation of the following discrete time signal and sketch the frequency spectrum.

X(n) = {…., 1, 2, -1, 2, -1, 1, 2, -1 , …..}.

15 Determine the Z-transform of function with R.O.C.

(a) X(n) = u(n) (b) $x(n) = -b^n u(- n – 1)$.

16 (a) Obtain the exponential Fourier series of for the below waveform x(t).



(b) Determine the response of the LTI system whose input x(n) and impulse response h(n) are given by, x(n) = {0, 2, -3, -1} and h(n) = {2, -1, -1, 4}.

17 (a) Inverse z transform.

(b) Write about Linear and Time-invariant systems.

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Code No: D-2082/AICTE

FACULTY OF ENGINEERING

B.E. (MECH/PROD) IV - Semester (AICTE) (Backlog) Examination,
March / April 2022
Subject: Manufacturing Processes

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. Discuss pattern allowances?
2. Explain the properties of molding sand?
3. Define casting yield? Why casting yield is 100% in centrifugal castings
4. Explain chills and chaplets.
5. Differentiate different gas flames used in welding.
6. Describe the role of Inert gases in welding process?
7. Differentiate between welding, brazing and soldering.
8. Explain strain hardening?
9. Differentiate between cold forging and hot forging?
10. Explain the fundamentals of rolling process.

(BT2,CO2)

PART - B

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

11. a) State and explain the types of patterns used in moulding.
    b) Explain about types flames in gas welding with the help of sketches, elative merits and demerits of each.

12. a) Explain shell moulding process with a neat sketch.
    b) Discuss the causes and remedies of following casting defects
    i) Pin holes ii) hot tears iii) misrun iv) rat tail

13. a) Explain GTAW with neat sketch and state its advantages, limitations and applications.
    b) Explain the terms of DCSP and DCRP.

14. a) Explain about electro slag welding process with neat sketch.
    b) Describe the parameters that control the weld quality in SMAW.

15. a) Distinguish between forward extrusion and backward extrusion.
    b) Explain with a neat sketch of smith forging and drop forging.

16. a) Explain the powder metallurgy process with a block diagram.
    b) Explain the extrusion process for thermoplastic materials.

17. a) Explain electromagnetic forming process.
    b) Explain the following terms.
    i) Core sands ii) Weldability iii) spring back effect

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Code No: D-2087/AICTE

FACULTY OF ENGINEERING

B.E. (AE) IV - Semester (AICTE) (Backlog) Examination,
March / April 2022
Subject: Metallurgy and Material Testing

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 is strain hardening?
2. What are the different modes of fracture?
3. Draw the structure of a fatigue surface and explain the fracture zones.
4. State and explain FICK'S 1st LAW of diffusion.
5. List out the methods of construction of equilibrium diagrams.
6. Draw and explain the cooling curves for pure metal and solid solution alloys.
7. What is full annealing?
8. Differentiate between austempering and martempering.
9. State the differences between destructive and non-destructive tests.
10. What is hardenability?

PART - B

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

11. (a) Distinguish between cold working and hot working. What are the advantages of cold working compare to hot working?
    (b) What is critical resolved shear stress? Explain.

12. (a) Explain the fatigue behavior with a neat sketch by R-R-Moore test.
    (b) Write the applications of diffusion theory in mechanical engineering.

13. (a) Draw Iron-Iron carbide equilibrium diagram and label all points, lines and areas of significance.
    (b) Discuss the invariant reactions in Fe-C system.

14. (a) What is surface hardening? Explain flame hardening process.
    (b) Explain the method of construction of a TTT diagram for Eutectoid steel.

15. (a) Mention different hardness tests. Describe Rockwell hardness test with suitable sketch.
    (b) Explain ultrasonic testing of materials for detecting the flaws.

16. (a) Explain the different test conducted on Universal testing machine.
    (b) Explain Charpy and Izod Imapct test.

17. (a) Deduce Griffith's equation of brittle fracture.
    (b) Write a short note on:
        (i) Thermal/infrared testing
        (ii) Eddy current Testing.

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Code No. D-3047/NON-CBCS

FACULTY OF ENGINEERING

B.E. II / IV (Civil) II-Semester (NON-CBCS) (Backlog) Examination, March / April 2022

Subject: Fluid Mechanics

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

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

PART – A

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

1 Distinguish between path line and streak line.
2 Define connective acceleration.
3 Write the principle involved in venturimeter for measuring discharge.
4 Define Adiabatic process.
5 Write the significance of Reynolds experiment.
6 Distinguish between Absolute pressure and gauge pressure.
7 Mention the applications of Bernoulli's equation.
8 Write the advantages of V-notch over rectangular notch.
9 Write the Bernoulli's equation for adiabatic process.
10 Show that f = 6u / Re for turbulent flow.

PART – B

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

11 (a) Derive continuity equation in 3-Dimensions.
(b) Two horizontal plates are placed 1.5cm apart, the space between them being filled with oil of viscosity 12 poises. Calculate move with velocity of 3m/s.

12 (a) Derive an expression for depth of paraboloid formed by the surface of a liquid contained in a cylindrical tank which is rotated at a constant angular velocity about its vertical axis.
(b) A pipe of diameter 400mm carries water at a velocity of 25 m/s. The pressures at points A & B are given as 29 N/cm^2 and 22N/cm^2 respectively. While the data m lead at A & B are 27m and 29m. Determine the loss of lead between A > B.

13 (a) Explain Bourdan pressure gauge.
(b) A horizontal venturimeter with inlet and throat diameter 30cm and 15cm respectively is used to measure the flow of oil of specific gravity 0.8 differential manometer reading is 20cm of mercury. Determine the rate of flow. Take Cd as 0.98.

14 (a) Derive continuity equation in differential form for compressible flow.
(b) Calculate the mach number at a point on a Jet propelled air craft which is flying at 1200 kmph at sea level where air temperature is 20^oC. Take k = 1.4 and R = 287 J/kg ^oK.

15 (a) Derive Hagen's Poiseullis equation with usual notation. State the assumptions made in the equation.
(b) Explain the significance of Mady's diagram for applied to pipe flow. Draw the sketch and explain how it is adopted.

16 (a) With the help of neat sketch explain functioning of micro manometer. How it is advantageous when compared with conventional manometer.
(b) Derive Darcy's Werst-back expression with usual notation. State the assumptions made.

17 Write short notes on any two of the following:
(a) Newton's laws of viscosity
(b) Hydraulic gradient
(c) Partial flume.

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Code No: 3053/NON-CBCS

FACULTY OF ENGINEERING

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

Subject: Electromagnetic Fields

Time: 3 Hours **Max marks: 75**

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

PART – A

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

1. What is meant by electric flux density?
2. State Gauss's Law
3. What is meant by boundary conditions?
4. When does a material be called a perfect dielectric material?
5. How is force on a moving charge expressed?
6. Define Magnetic Vector potential
7. Express three analogies of Magnetic and electric fields.
8. Write the expressions for energy stored in a magnetic and electric fields.
9. Write Laplace equations for wave propagation
10. What is method of moments?

PART – B

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

11. Three charges of + 1.5C, + 3.0 C and + 2.0 C are placed on the three corners of a square of size 10 units. Derive the expression for Electric field due to these charges at the 4^{th} corner.

12. State Divergence Theorem, potential gradient and give an example each of their applications.

13 Derive the self inductance of a coil having N turns, of radius R and carrying a current I. Assume any relevant unknown values.

14 Describe a magnetic series circuit and draw the analogy with relevant electric circuit.

15 Describe the Maxwell's equations in Integral and Differential Forms.

16 What is a sinusoidally time varying uniform plane wave? What are its characteristics?

17 Write short notes on : 1) Coulomb's Law, 2) Dielectric in a Capacitance 3) Biot - savart's Law, 4) Reflection of uniform plane waves.

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Code. No. 3061/NON-CBCS

FACULTY OF ENGINEERING

B.E. II / IV (ECE) II - Semester (NON-CBCS) (Backlog) Examination,
March / April 2022
Subject: Networks and Transmission Lines

Time: 3 Hours **Max marks: 75**

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

PART – A

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

1. Define image transfer constant and iterative constant of an asymmetrical network
2. Calculate the image impedance of a 'T' network with series impedances Z_1=30+j7.5; Z_2=50+j10 and shunt impedance Z_3=-j3229.
3. Design a constant k low pass filter with a cutoff frequency of 3KHz and a nominal impedance of 600Ω.
4. What is notch filter? Where it is used.
5. Test whether the polynomial P(s) = $S^4+S^3+3S^2+2s+12$ is Hurwitz.
6. Design a symmetrical πAttenuator having an attenuation of 60dB and a nominal impedance of 600Ω.
7. Define phase and group velocity
8. What are the Special features of telephone cable?
9. List the applications and properties of Smith chart?
10. Define reflection Coefficient & VSWR.

PART – B

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

11. a) Obtain the expression for image impedance of asymmetrical L – network.
    b) An L-network has a series arm of 300Ω and shunt arm of 600Ω. Determine its iterative impedance.

12. Design a m-derived High pass filter with a cutoff frequency of 5KHZ and a nominal impedance of 600Ω and frequency of infinite attenuation is 5.5KHZ. Derive the formulae you use.

13 a) The Driving point impedance of RL Network is given by Z(s) =6 (S+1) (S+7) / (S+8) (S+3) Synthesize using Foster form – I
    b) Design a symmetrical T – Attenuator having an attenuation of 40dB and to work into a line of 600Ω impedance.

14. a) The characteristics impedance of a uniform transmission line is 2039.5Ω at a frequency of 800 hz. At this frequency the propagation constant was found to be 0.05 L 87.9^o Determine the values of line constants R, L, C, G.
    b) Derive the Input impedance of a loss less transmission line.

…2

15. a) The terminating load of UHF transmission line with Zo=50LO^{o} ohms Working at 300 MHz is 50+j50 ohms. Calculate VSWR and the position of the voltage minimum nearest to load.

    b) A low – loss line with Z_o=70 ohm terminated with an impedance of Z_r=115-j80 ohm the Wavelength of transmission is 2.5 meters using the given Smith chart. Find the following I) Reflection. II) Standing wave ratio

16. a) Find the characteristic impedance of a symmetrical T-section whose total series arm impedance is (50+j125) Ω and shunt arm impedance is (200-j100) Ω.

    b) Design a band pass filter with Cut off frequencies of 10KHz, 12KHz and a nominal impedance of 600 Ω.

17. Write short notes on the following :

    a) List the properties of Hurwitz Polynomial

    b) Campbell formula?

    c) Single stub matching

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Code No. D-3067/**Non-CBCS**

FACULTY OF ENGINEERING

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

Subject: Basic Electronics

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

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

PART – A

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

1 Define Diffusion current.
2 What are ripples in rectifiers? How do we rectify the ripples?
3 What is pinch off voltage of JFET?
4 What are the Advantages of JFET over BJT?
5 What is an Oscillator circuit? Give an example of usage of Oscillator in our daily life.
6 What are the advantages and disadvantages negative feedback.
7 What are universal gates? Write their truth tables.
8 Draw the equivalent circuit of OP-AMP.
9 What is a photo diode? Can we use the photo diodes for solar panel construction?
10 What is Force Transducer?

PART – B

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

11 a) What is Hall Effect? Derive an equation for Hall Voltage.
b) Explain the working of Zener diode as regulator.

12 a) Explain about Intrinsic and Extrinsic semiconductor.
b) List the applications of semiconductors.

13 a) Draw the circuit of a simple CC amplifier and derive the output for it?
b) Draw the symbol of JFET and explain the purpose of Gate Drain and Source.

14 Draw a neat circuit diagram of the Hartley oscillator and derive the frequency of oscillations and conditions and condition for oscillations.

15 a) Draw the Op-Amp as Differentiator and derive the equation for output.
b) Implement half adder and half subractor using suitable logic gates.

16 a) Explain the construction and working of C R O.
b) Explain about transistor.

17 Explain the following:
a) LVDT
b) SCR
c) Non-inverting Amplifier.

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Code No. D-3074/NON-CBCS

FACULTY OF ENGINEERING

B.E. II/IV (CSE) II - Semester (NON-CBCS) (Backlog) Examination, March / April 2022

Subject: Microprocessors and Interfacing

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

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

PART – A

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

1 What is an instruction set explain?
2 What is timing and control unit?
3 What is stack and subroutine?
4 What is IO interfacing?
5 What is asynchronous data transmission?
6 Compare between RS232C and IEEE 488.
7 Compare between Microprocessor & Microcontroller?
8 List and explain different Timer Models of Operation of 8051.
9 List and explain different data transfer instruction set in 8086.
10 Explain about rotate and branch instruction set in 8086.

PART – B

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

11 Draw and Explain pin diagram of 8085.

12 Explain Programmable Interrupt Controller 8259A.

13 a) Explain different Operation Modes of 8255A.
b) Compare between asynchronous and synchronous data transmission.

14 List and explain arithmetic and Byte manipulation instruction sets in 8051.

15 List and explain different addressing modes of 8086.

16 a) Write about Data transfer (copy) instruction of 8086.
b) Explain Arithmetic instruction set of 8086.

17 Write short notes on:
a) Maskable and non maskable interrupts.
b) Vectored and non vectored interrupts.

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Code No: D-3079/NON-CBCS

FACULTY OF ENGINEERING

B.E II/IV (IT) II – Semester (NON-CBCS) (Backlog) Examination, March / April 2022
Subject: Computer Organization and Microprocessors

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

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

PART – A

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

1. What is a microprocessor?
2. What is an interrupt?
3. Differentiate RAM and cache memory.
4. What is Secondary storage?
5. What is an instruction set explain?
6. What is timing and control unit?
7. What is stack and subroutine?
8. What is IO interfacing?
9. What is asynchronous data transmission?
10. Compare between RS232C and IEEE 488.

PART – B

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

11. (a) Differentiate between RISC and CISC Instruction sets.
    (b) What is DMA? Explain in detail.
12. (a) What are Read Only Memories? Explain different types of ROMs.
    (b) Write in detail and about virtual memories.
13. Draw and explain pin diagram of 8085.
14. Explain Programmable Interrupt Controller 8259A.
15. (a) Explain different Operation Modes of 8255A.
    (b) Compare between asynchronous and synchronous data transmission.
16. (a) Write about data transfer(copy) instruction.
    (b) Write about Arithmetic instruction set.
17. (a) Differentiate maskable and non maskable interrupts.
    (b) Explain in detail vectored and non vectored interrupts.

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