Code No. D-2026/O/AICTE

FACULTY OF ENGINEERING

B.E. (Civil) III - Semester (AICTE) (Main & Backlog) Examinations, March / April 2022

Subject: Engineering Geology

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 mineral and write its classification.
2 Draw a neat sketch of fold with labelling.
3 List out clay minerals.
4 Write the causes of landslides.
5 What is reservoir? List out problems of reservoir.
6 What is mean by payline and over break of tunnel?
7 Write about the geology of any latest Indian tunnel.
8 What is geological hazard?
9 What is Groundwater province?
10 Explain about aerial photographs.

PART – B

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

11 a) Describe the identification characteristics and construction use of following rocks
a) Basalt b) Limestone c) Gneiss d) Marble.

12 What is fault? Explain classification of faults and add a note on mechanism of fault.

13 a) Define weathering? Write its importance in civil engineering.
b) Describe the most dominant soil types in India.

14 a) What is aquifer? Describe its classification with neat sketch.
b) Evaluate the abundance of groundwater availability in different lithological formations

15 a) Describe the field procedures for seismic refraction survey.
b) Describe engineering properties of rocks.

16 Discuss the various problems in tunneling. Suggest the necessary solutions accordingly.

17 Identify the elements at risk, causes, typical effects and main mitigation measures of earthquakes.

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Code No.2029/O/AICTE

FACULTY OF ENGINEERING

B.E. (EEE/EIE) III - Semester (AICTE) (Main & Backlog) Examinations, March / April 2022

Subject: Analog Electronics

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 diffusion and transition capacitances of diode?
2 Discuss the advantages of Bridge rectifier over Full wave rectifier.
3 Write applications of clippers & clamppers?
4 Obtain the relation between α and β of a transistor?
5 Write Advantages of negative feedback amplifiers?
6 An amplifier has mid band gain of 1500 and band width of 4 mHz with feedback, the mid band gain reduced to 150. Determine the value of feedback and band width?
7 Classify different types of Oscillator based on frequency range:
8 What is Barkhasen's Criterion? Explain briefly.
9 Draw the pin diagram of IC 741?
10 Define CMRR and slew rate?

PART – B

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

11 a) With neat diagram explain bridge rectifier circuit and derive formula for ripple factor, efficiency?
b) Explain operation of photo diode.

12 a) Draw and explain output characteristics of CE configuration for NPN transistor?
b) Assume that a silicon transistor with β=50, R_c=5.6KΩ, R_b=3KΩ and R_e=1.5KΩ is used to develop self bias circuit. Find the stability factor?

13 a) Discuss about bias compensation techniques of BJT?
b) Draw the voltage series feedback amplifier block diagram and determine voltage gain Avf, input impedance Rif and outpur impedance Rof.

14 a) Discuss DC and Ac Op-amp characteristics
b) Determine the output voltage of a differential amplifier for input voltage V_1=150 μv and V_2=140 μv. The amplifier has differential gain of 4000 and the value of CMRR is 100.

15 a) Draw & explain the working of class B push pull amplifier and how cross over distortion is eliminated in it?
   b) Draw the circuit of a clamper and explain its working with output waveform.

16 a) Design a RC phase shift oscillator to oscillate at 100 Hz.
   b) Explain the operation of zero crossing detector.

17 Write short notes on:
   a) Small signal model of BJT
   b) Harmonic distortion in power amplifiers
   c) Thermal Runaway.

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Code No. D-2040/O/AICTE

FACULTY OF ENGINEERING

B.E. (ECE) III - Semester (AICTE) (Main & Backlog) Examination,
March / April 2022
Subject: Probability Theory and 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 State conditional probability and mutually exclusive events.
2 If the probability density function is defined as $f(x) = Ae^{6x}$. Where $0 \leq x \leq \infty$. find A.
3 What is a Gaussian random variable?
4 Write the properties of probability distribution function.
5 State central limit theorem.
6 State the Transformation of a random variable.
7 Define characteristic function and two properties.
8 State Bernoulli's Theorem.
9 State Markov process.
10 State WSS.

PART – B

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

11 (a) State Bayes probability Theorem.
(b) In a box containing 15 bulbs, 5 are defective. If 5 bulbs are selected from the box at random, find the probability that
(a) None is defective
(b) Exactly one is defective
(c) At least one is defective.

12 (a) State probability density function and state its properties.
(b) A random variable x has the probability

X	-3	-2	-1	0	1
P(X)	0.2	0.5K	K	0.1	0.3

(i) Find the value of k
(ii) Find the probability distribution and plot it.

13 (a) Find the mean and skew of an uniform random variable $f(x)=1/(b-a)$ where $a \leq x \leq b$.
(b) Write about uniform, poisson, Rayleigh, exponential random variable along with its probability density and distribution and waveform.

14 Find the conditional probability of two random variable x and y have a joint probability density function of the form $f(x,y) = 4xy\ u(x)u(y) : 0 \leq x \leq \infty 0$ & $0 \leq y \leq \infty$.

15 (a) Find the marginal density function of joint density function $F_{xy}(x,y) = Axy$ where $0 \leq x\ 1\ 0 \leq y \leq 1$ and find A and also check whether they are statistically independent.
(b) Write about joint probability density function and its properties.

16 (a) State a random process and write its classification in detail.
(b) If X and y are random variable with jpdf f_{xy} (x,y) = x+y, where the 0≤x1 0≤y≤1. Find correlation coefficient.

17 (a) Consider a random process x(t) =A cos(wt+ϕ) where A and ϕ are statistical independent and ϕ is uniform in the interval of (0,2π). Is the process WSS or not?
(b) State autocorrelation and cross correlation and its properties.

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Code No. D-2043/O/AICTE

FACULTY OF ENGINEERING

B.E. (MECH/PROD) III - Semester (AICTE) (Main & Backlog) Examination,
March / April 2022
Subject: 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 Define extensive property?
2 Define system, surroundings and property?
3 Give the mathematical expression for the first law of thermodynamics?
4 What are the limitations of first law of thermodynamics?
5 State Kelvin max plank statement.
6 Explain the term available energy?
7 Explain the concept of phase change?
8 What is a pure substance?
9 Give the expression for Rankine cycle?
10 Give the expression for air standard efficiency of dual combustion cycle.

PART – B

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

11 (a) Describe about ideal gas temperature scale.
(b) Explain zeroth law of thermodynamics.

12 (a) Explain the corollories of the first law of thermodynamics.
(b) Prove that energy is a property of the system.

13 (a) Explain equivalence of Kelvin planck and clausius statement.
(b) Derive Helmholtz function?

14 (a) Volume of a given mass of dry saturated steam at 12 bar abs is found to be $2m^3$. Determine the enthalpy of this steam if it is at a temperature of 300 C.
(b) Compute the specific entropy of steam in the following states
(i) dry and saturated at 10 bar abs
(ii) saturated at 8 bar 0.9 dry
(iii) superheated at 12 bar abs and 300 C. Take Cp=2.09

15 (a) Derive the expression for air standard efficiency of Diesel cycle.
(b) Explain about mole fraction and mass fraction

16 (a) Explain clausius inequality.
(b) Explain macroscopic approach of thermodynamics system.

17 (a) Write down Maxwell relations.
(b) Explain about the terms enthalpy and internal energy.

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Code No. D-2045/O/AICTE

FACULTY OF ENGINEERING

B.E. (AE) III - Semester (AICTE) (Main & Backlog) Examination, March / April 2022

Subject: Thermal 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 thermodynamic equilibrium.
2 Define Perpetual motion machine - I (PMM-I).
3 Define (i) Heat pump (ii) Refrigerator.
4 State Carnot's theorem.
5 Explain how reheating improve the performance of Gas turbine.
6 Classify Nozzles.
7 Define (i) Dryness fraction (ii) Latent Heat.
8 Sketch P-H diagram of simple vapour compression refrigeration system.
9 What are the advantages of multi stage compression?
10 What are the advantages of Hybrid vehicles?

PART – B

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

11 (a) Define first law of thermodynamics.
(b) A mass of 2.4 kg of air at 150 kPa and 12^{o}C is contained in a gas tight friction less piston cylinder device. The air now compressed to a final pressure of 600kPa. During the process, heat is transferred from the air such that temperature inside the cylinder remains constant. Calculate the work input during the process.

12 (a) Derive Clausius inequality and state its significance.
(b) A refrigerator having a COP of 4.5 is run by an engine of 25 percent thermal efficiency. Determine the heat input into the engine for each kJ of heat removed from the refrigerated space.

13 A gas turbine plant operates on Brayton cycle between the temperature limits of 27^{o}C and 600^{o}C.
(a) Determine the pressure ratio at which the cycle efficiency approaches Carnot cycle efficiency.
(b) Determine efficiency at a pressure ratio of 9.5 and compare it with Carnot efficiency for the given temperatures.

14 (a) Define a pure substance, mention few properties.
(b) Explain the working of simple vapour absorption system.

15 (a) What is the effect of clearance volume on performance of reciprocating air compressor?
(b) What are advantages and disadvantages of Hydrogen fuel?

16 (a) Define volumetric and Isothermal efficiency of a reciprocating air compressor.
(b) Explain the working of reversed Carnot cycle for refrigeration system.

17 (a) Define Zeroth law of thermodynamics and mention its applications.
(b) What are the limitations of first law of thermodynamics?

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Code No: D-2049/O/AICTE

FACULTY OF MANAGEMENT

BE (CSE) III - Semester (AICTE) (Main & Backlog) Examination, March / April 2022

Subject: Programming Languages

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. Write the differences between Compilation and Interpretation.
2. What is enumerated data type?
3. What are rectangular and jagged arrays?
4. Differentiate Static and Dynamic Binding.
5. What is scope and lifetime of a variable. Give an example.
6. What is an activation record?
7. Write about functions in python.
8. Explain parse tree breafly
9. What is short circuit evaluation?
10. What are the basic elements of prolog.

PART – B

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

11. a) Explain BNF and EBNF.

    b) What are the various influences on language design.

12. a) Distinguish between record and array.
    b) What is union. Explain in detail Ada union types and union in F#.

13. a) Define binding, binding time. Explain possible binding times by using suitable examples.
    b) What is call-by-value and call-by-reference? Give suitable example.

14. a) Explain in detail about Exception handling in C++ and Java
    b) Describe the process of Unification and Resolution in prolog.

15. a) Explain the various approaches for expression evaluation in Functional programming language.
    b) Write about LISP, applications of functional programming languages.

16. a) Discuss in detail semaphores, monitor, message passing as methods for providing synchronization.
    b) Write short notes on: Context free grammarsand Polymorphism.

17 Write short notes on the following

a) Control structures b) Scripting languages c) Con currency

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Code No.D-2054/O/AICTE

FACULTY OF ENGINEERING

B.E. (CME/IT) III-Semester (AICTE) (Main & Backlog) Examinations, March / April 2022

Subject: Mathematics III
(Probability & Statistics)

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 mutually Exclusive events with example.
2 Define Theorem of total Probability.
3 Derive mean of Binomial Distribution.
4 If var (x)=4, find var (4x+5), x is a random variable.
5 Define Uniform Distribution.
6 Define Standard Normal variate.
7 Write the normal equations of straight line.
8 Write the angle between Regression lines.
9 Define Chi-square test.
10 Define Null Hypothesis.

PART – B

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

11 a) State and Prove Baye's Theorem.
b) A random variable x has the p.d.f of f(x) given by f(x)=$\begin{cases} cxe^{-x} & if\ x > 0 \\ 0 & if\ x \leq 0 \end{cases}$ Find the value of c.

12 a) For a Binomial Distribution of mean 4 and variance 2. Find the Probability of Getting (i) At leat 2 successes (ii) At most 2 successes (iii) Find P(5≤x≤7).
b) Find mean and variance of continuous random variable x, if it has the density function $f(x) = \begin{cases} 2(x-1), & 1<x<2 \\ 0 & , \quad otherwise \end{cases}$.

13 a) Derive mean and variance of Uniform distribution.
b) Suppose the height of men of a certain country are normally distributed with average 68 and S.D=2.5, find the percentage of men who are
i) Between a = 66 and b = 71 inches in height
ii) Approximately 6 feet tall.

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14 a) Fit a least square quadratic curve to the following data

X	1	2	3	4
Y	1.7	1.8	2.3	3.2

Estimate y (2.4).

b) The following are the regression equations. Find the regression line X on Y, Y on X and also find.

i) $\bar{x}$ and $\bar{y}$ ii) The regression co-efficients

8x-10y+66=0

40x-18y=214.

15 a) Assume that air ticket reservation from Delhi to Gulf is uniformly distributed during all days in winter season. To determine whether it is uniform we selected a random sample reservation lists for 10 days. The following information is drawn from the list.

S. No.	1	2	3	4	5	6	7	8	9	10
No. of Reservations	65	80	100	98	75	80	82	70	60	90

Test the validity of assumptions using Chi–square test.

b) Ten cartons are taken at random from an automatic filling machine. The mean net weight of carton is 11.8 and the S.D is 0.15. does the sample differ significantly for the intended weight of 12

16 a) An urn contains 5 balls. Two balls are drawn and found to be white. What is the probability of all the balls being white?

b) If x has p.d.f, $f(x)=\begin{cases}\frac{x+1}{2}, & -1\le x\le 1\\ 0, & \text{otherwise}\end{cases}$ find the first four central moments.

17 a) If x is a Poisson random variable such that P(x=1) = $\frac{3}{10}$, P(x=2) = $\frac{1}{5}$ find P(x=0) and P(x=3).

b) Calculate Karl – pearson co-efficient correlation for the following data

X	9	8	7	6	5	4	3	2	1
Y	15	16	14	13	11	12	10	8	9

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