FACULTY OF ENGINEERING

BE III-Semester (Civil) (AICTE) (Backlog) Examination, November 2021

Subject: Engineering Geology

Time: 2 Hours   **Max marks: 70**

Missing data, if any, may be suitably assumed

PART - A

Note: **Answer any Five questions**.   **(5x2=10 Marks)**

1. Describe briefly how engineering Geology is useful in civil engineering

2. What are the types of rocks? Give examples of each

3. Define weathering. What are its types?

4. Define aquifers and Aquiclude

5. Define Geomorphology and importance of Engineering Geomorphology in site investigation.

6. What is meant by rock mechanics?

7. Write short note on Decorative stories and Roofing stones

8. What are the different types of dams?

9. Explain the importance of tunnels

10. Write briefly about origin of earthquake

PART - B

Note: Answer any Four questions.   **(4x15=60 Marks)**

11. a) Discuss the plutonic ,hypabyssal volcanic rocks with examples.
    b) Define folds. What are the different types of fold and explain any two.

12. a) What are the different types of Indian soils? Explain each type briefly
    b) Write short notes on groundwater recharge

13. a) Discuss various erosional and depositional Aeolian landforms.
    b) Write short notes on Seismic Refraction method

14. a) What are the geological considerations for the selection of Concrete aggregate?
    b) Write short notes on Highway and Runway Aggregates.

15. a) Define Tunnels. Write short notes on stand up time of rocks
    b) define Landslides and what are its types. How can landslides be prevented?

16. a) What are the problems associated with dam foundations?
    b) Mention the geology of any Indian dam.

17. a) Discuss the formation of soils. What are the engineering use of soils?
    b) Write short notes on Groundwater provinces of India.

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FACULTY OF ENGINEERING

B.E.III – Semester (EE/EIE) (AICTE) (Backlog) Examination, November 2021

Subject: Analog Electronics

Time: 2 Hours   **Max marks: 70**

Missing data, if any, may be suitably assumed

PART – A

Note: **Answer any Five questions**.   **(5x2=10 Marks)**

1. What is P-N junction diode? Draw its characteristics.
2. What is photodiode and write its applications.
3. Compare BJT and JFET.
4. What are the advantages of negative feedback?
5. Distinguish between amplifier and oscillator circuit.
6. What is an oscillator and classify different types of oscillators.
7. What is a Barkhausen criterion for oscillators?
8. What is an Op-amp? Draw block diagram of Op-amp.
9. What are the characteristics of an ideal Op-amp?
10. The parameters of crystal oscillator equivalent circuit are L_s =0.8, C_s =0.08, R_s =100 and C_p =1.0. Determine f_s and f_p.

PART - B

Note: Answer any Four questions.   **(4x15=60 Marks)**

11. a) What is a rectifier? Explain the operation of Centre tapped full wave rectifier with necessary diagrams and waveforms.
    b) Differentiate half wave, full wave and bridge rectifiers.

12. a) What is the need of filter circuits? Explain the construction and working of L filter.
    b) Explain the difference between avalanche breakdown and zener breakdown.

13. a) Explain fixed biasing with meat diagram in detail.
    b) Explain small signal model of BJT.

14. a) Explain RC phase shift oscillator with neat diagram.
    b) Compare class A, class B and class AB power amplifiers.

15. With the help of block diagram explain different types of feedback amplifiers based on sampling and mixing.

16. a) Explain differentiator using Op-amp.
    b) Explain the operation of non-inverting and inverting Op-amp.

17. Write short notes on:

    a) Clipper circuits
    b) Sample and hold circuit
    c) Zero crossing detector

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FACULTY OF ENGINEERING
B.E. (ECE) III-Semester (AICTE) (Backlog) Examination, November 2021

Subject: Probability Theory and stochastic Process

Time: 2 hours   Max. Marks: 70

Note: Missing data, if any, may be suitably assumed.

PART – A

Answer any five questions.   **(5x2 = 10 Marks)**

1 Find the probability of getting 2 diamond if we draw 2 cards at random from a pack of 52 cards.
2 State Bernoulli's Theorem.
3 The pdf of a continuous random variable X is given as $f(x)8/x^3$; $x > 2$. Find its mean?
4 State central limit theorem.
5 The mean and variable of the binomial variable x with parameter n and P are 16 and 8. Find $P(x \geq 1)$ and $P(x > 2)$?
6 State Stochastic process.
7 Write relationship between power spectrum and auto correlation function.
8 Define characteristic function of random variable.
9 Write three properties of Probability Distribution function.
10 State mean Ergodic process.

PART – B

Answer any four questions.   **(4x15 = 60 Marks)**

11 (a) State Total Probability Theorem.
   (b) Two boxes are selected randomly. The first box contain 2 white balls and 3 black balls second box contain 3 white and 4 black balls (i) What is the probability of drawing a white ball (ii) If the selected ball is white then what is the probability that it is from the first box.

12 (a) State probability density function and properties of it.
   (b) If two dices is rolled and x is random variable which denotes sum of the number its faces. Obtain the distribution function and plot the graph.

13 Discuss the characteristic of Rayleigh, Uniform, Gamma, Binomial random variable using relevant expression and sketches of their distribution and density function.

14 (a) Let X be a continuous random variable with density function
        $f(x)=x/6+k$; $0 \leq x \leq 3 = 0$ Elsewhere
        (i) find the value of k   (ii) Find $P(1 \leq x \leq 2)$.
   (b) Obtain the characteristic function of Poisson random variable.

15 Find the conditional density function of joint density function.
                $Fxy(x, y)=4xye^{-(x2+y2)}$ where $0 \leq x \leq \infty$ $0 \leq y \leq \infty$

16 (a) State joint characteristic function and properties.
   (b) The auto correlation function is given as $R_{xx}(\zeta) = 36 + 4/1+5\zeta^2$. Find the mean and variance of process of x(t).

17 (a) Consider a random process X(t)=A sin(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 cross correlation function and state its 3 properties.

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Code No.15041/AICTE/BL

FACULTY OF ENGINEERING

B.E. (AICTE) (M/P) III–Semester (Backlog) Examination, November 2021

Subject: Thermodynamics

Time: 2 hours   Max. Marks: 70

Note: Missing data, if any, may be suitably assumed.

PART – A

Answer any five questions.   **(5x2 = 10 Marks)**

1. What are the types of thermodynamic systems give examples.
2. Differentiate between intensive and extensive properties with examples.
3. Define Dalton's Law of partial pressures.
4. Define Perpetual Motion Machine – I & II (PMM-I & PMM-II).
5. Define thermal efficiency of a heat engine.
6. State Kelvin Planck statement and Clausius statement for second law of thermodynamics.
7. Define pure substance.
8. Define saturated water, saturated steam, wet steam and superheated steam.
9. Draw the P-V and T-S diagram for a dual cycle.
10. What are the components of a Rankine cycle?

PART – B

Answer any four questions.   **(4x15 = 60 Marks)**

11. (a) Define and explain the concept of thermodynamics equillibrium.
    (b) Explain the Zeroth law of thermodynamics. What is its Significance?

12. (a) Explain the various temperature scales.
    (b) A mass of 8 kg gas expands within a flexible container so that the p-v relation is of the form $pv^{1.2}$ = constant. The initial pressure is 1000 kPa and the initial volume is 1 m^3. The final pressure is 5 kPa. If the specific internal energy of the gas decreases by 40 kJ/kg, find **(i)** The final volume; **(ii)** Magnitude and direction of Work transfer; **(iii)** Magnitude and direction of Heat transfer. **(iv)** Sketch the process on a p-v diagram.

13. (a) Derive the Steady Flow Energy Equation (SFEE).
    (b) A turbine operates under steady flow conditions, receiving steam at the following state: pressure 1.2 MPa, temperature 188^0C, enthalpy 2785 kJ/kg, velocity 33.3 m/s and elevation 3 m. The steam leaves the turbine at the following state: pressure 20 kPa, enthalpy 2512 kJ/kg, velocity 100 m/s and elevation 0 m. Heat is lost to the surroundings at the rate of 0.29 kJ/s. If the rate of steam flow through the turbine is 0.42 kg/s, what will be the power output of the turbine in kW?

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14. (a) Explain the Carnot heat engine cycle for a stationary (closed) system.
    (b) State and explain the Clausius Inequality.

15. (a) Derive the Maxwell's relations.
    (b) Steam initially at 1.5 MPa, 300^0C expands reversibly and adiabatically in a steam turbine to 40^0C. Determine the ideal work output of the turbine per kg of steam.

16. (a) Explain the Air standard Diesel cycle.
    (b) Explain the Brayton cycle.

17. Write short notes on the following:
    (a) Macroscopic and Microscopic Approach.
    (b) Internal Energy, Enthalpy and Entropy.
    (c) Anomalous expansion of water

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FACULTY OF ENGINEERING
B.E. (AE) III-Semester (AICTE) (Backlog) Examination, November 2021

Subject: Thermal Engineering

Time: 2 hours   Max. Marks: 70

Note: Missing data, if any, may be suitably assumed.

PART – A

Answer any five questions.   **(5x2 = 10 Marks)**
1 Define zeroth law of thermodynamics.
2 What is thermodynamics system? State types of system.
3 Define Clausius and Kelvin plank statement of second law of thermodynamics.
4 Sketch P-V and T-S diagram of Carnot cycle.
5 What are the methods of improving efficiencies of gas turbines?
6 Explain the concept of reheating in gas turbine cycle.
7 Explain the formation of steam with the help of temperature - enthalpy diagram.
8 Define COP and unit of refrigeration.
9 Define Hybrid vehicle.
10 Classify reciprocating air compressors.

PART – B

Answer any four questions.   **(4x15 = 60 Marks)**
11 (a) What is thermodynamic equilibrium?
   (b) Derive steady flow energy equation for one inlet and one outlet.

12 (a) What are limitations of first law of thermodynamics?
   (b) Derive Clausius inequality. State its significance.

13 Explain the process of regeneration to improve the efficiency of Brayton cycle
    with the help of suitable sketch.

14 Explain the working of simple vapour compression refrigeration system with help
    of layout diagram and P – H graph.

15 Discuss the current status, future developments and prospects of hybrid
    vehicles.

16 (a) What are the advantages and disadvantages of hydrogen as a fuel?
   (b) Explain the working principle of vapour absorption refrigeration system.

17 (a) Compare refrigerator, heat engine and heat pump.
   (b) What are applications of steady flow energy equation?

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FACULTY OF ENGINEERING
BE III - Semester (AICTE) (CME/IT) (Backlog) Examination, November 2021

Subject: Mathematics-III (Probability & Statistics)

Time: 2 Hours

Max .Marks: 70

Note: Missing data, if any, may be suitably assumed

PART – A

Answer any five questions.   **(5x2=10 Marks)**

1 State Baye's theorem.
2 A random variable X has the following probability distribution:

x	0	1	2	3
P(x)	$\frac{1}{6}$	$\frac{1}{2}$	$\frac{3}{10}$	$\frac{1}{30}$

Find E(X)
3 A die is thrown 4 times. Getting a number greater than 2 is a success. Find the probability of getting exactly one success.
4 Find the moment generating function of poisson distribution.
5 A continuous random variable X is uniformly distributed with mean 1 and variance 3. Find P(X<0).
6 Define exponential distribution.
7 Write normal equations for fitting a straight line of the form $y = a + bx.$
8 Show that the coefficient of correlation is the geometric mean of the regression coefficients.
9 Explain briefly F-test.
10 Write any two applications of Chi-square test.

PART – B

Answer any four questions.   **(4x15= 60 Marks)**

11 (a) State and prove theorem of total probability.
   (b) A factory has four independent units A, B, C and D which produce 40%,30%,20% and 10% of identical items, respectively. The percentages of defective items produced by these units are 2%, 1%, 0.5% and 0.25% respectively. If an item is selected at random, find the probability that the item is defective.

12 (a) Find the mean and variance of binomial distribution.
   (b) If X is a poisson variate such that 3P(x=4)= $\frac{1}{2}$ P(x=2)+P(x=0), find the mean of X and P(x$\leq 2).$

13 (a) Define uniform distribution. Find the moment generating function of the uniform distribution.
   (b) In a normal distribution exactly 7% of the items are under 35 and 89% of the items are under 63. Find the mean and standard deviation of the distribution.

14 (a) Find the rank correlation coefficient from the following data:

x	10	15	12	17	13	16	24	14	22
y	30	42	45	46	33	34	40	35	39

(b) In two large populations, there are 30% and 25% respectively of fair haired people. Is this difference likely to be hidden in samples of 1200 and 900 respectively from the two populations? Test at 5% level of significance.

15 Fit a poisson distribution to the following data and test the goodness of fit at 5% level of significance.

x	0	1	2	3	4
$f(x)$	109	65	22	3	1

16 (a) A continuous random variable X has the probability density

function $f(x) = \begin{cases} a+bx, 0 \le x \le 1 \\ 0 \qquad \text{elsewhere} \end{cases}$.

If the mean of the distribution is $\frac{1}{3}$, find the values of a and b.

(b) Find the variance of normal distribution.

17 (a) If θ is the acute angle between the two regression lines, show that

$\tan\theta = \frac{1-r^2}{r} \frac{\sigma_x \sigma_y}{\sigma_x^2 + \sigma_y^2}$, where r, σ_x, σ_y have their usual meanings. Explain the

significance of the formula when r=0 and r=$\pm$1.

(b) Find the least squares approximations of the form $y = ae^{bx}$ for the following data :

x	0.5	1.0	2.0	2.5	3.0
y	0.57	1.46	5.10	7.65	9.20

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Code No: 15048/AICTE/BL

FACULTY OF ENGINEERING

BE III – Semester (AICTE) (CSE) (Backlog) Examination, November 2021
Subject: Programming Languages

Time: 2 Hours   Max marks: 70
Missing data, if any, may be suitably assumed
PART - A

Note: **Answer any Five questions**.   **(5x2=10 Marks)**

1. What does it mean for a program to be reliable?
2. What three extensions are common to most EBNFs?
3. Define lexeme and token?
4. What are the design issues for union?
5. How does C supports relational and Boolean expressions?
6. What are the advantages and disadvantages of static local variables?
7. What are the different types abstractions in programming languages?
8. What are the design issues for exception handling?
9. What does it mean for a language to be nonprocedural?
10. What does a lambda expression specify?

PART - B

Note: Answer any Four questions.   **(4x15=60 Marks)**

11. a) What are the different categories of programming languages?
    b) What are the factors that influence the basic design of programming languages?

12. a) What is a Record Type? Briefly discuss different design issues of Record Types.
    b) What are Primitive Data Types? Discuss the characteristics of any two Primitive Data Types.

13. a) Explain associative arrays with an example
    b) Discuss array types in detail.

14. a) Write short notes on overloaded operators.
    b) Explain about parameter passing methods. With examples for each

15. a) Discuss Design Issues for OOP Languages.
    b) Discuss the following with respect to subprograms:
        i. Design issues
        ii. Local referencing environments

16. a) Write short notes on Java Threads.
    b) Explain about semaphores.

17. a) Discuss the following:
        i. LISP Data Types and Structures
        ii. LISP Evaluation
     b) Compare functional languages and Imperative languages.

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