Code No: **R231203** **R23** **SET - 1**

I B. Tech II Semester Regular Examinations, June/July-2024
BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

(Common to CSE, EEE, Ph. E)

Time: 3 hours Max. Marks: 70

*Note: 1. Question paper consists of two parts (**Part-A** and **Part-B**)*
*2. All the questions in **Part-A** is Compulsory*
*3. Answer **ONE** Question from each Unit in **Part-B***

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PART –A (10 Marks)

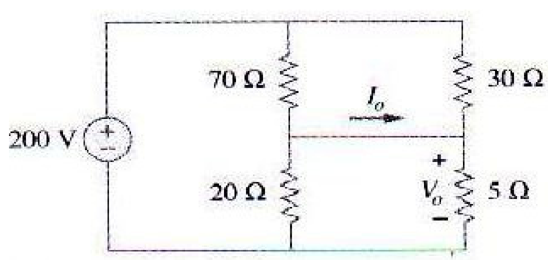
1. a) What is meant by unilateral and bilateral circuit? [1M]
b) What is the principle to vary speed, below rated speed in a DC motor? [1M]
c) List and give the applications of different types of DC machines. [1M]
d) What is hydel power? [1M]
e) What is Alternator? [1M]
f) What is the operating point of transistor amplifier? [1M]
g) What is OR gate? [1M]
h) What is continuity equation? [1M]
i) Write the input characteristic of NPN transistor. [1M]
j) What is Earthing? [1M]

PART – B (60 MARKS)

BASIC ELECTRICAL ENGINEERING

UNIT-I

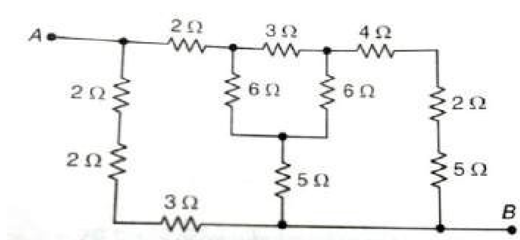
2. a) Calculate V and I in the circuit shown in figure. [5M]



b) Prove that the series combination of resistances is equivalent to the resistance in the D.C . [5M]

(OR)

3 a) Calculate the effective resistance between the points A and B in the circuit shown in figure. Derive the formulae used. [5M]



b) Explain in detail about Kirchhoff's Current and Voltage Law. [5M]
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UNIT-II

4. a) A dc generator has an armature e.m.f of 100 V when the useful flux per pole is 20 mWb and the speed is 800 r.p.m. Calculate the generated e.m.f (i) with the same rated flux and a speed of 1000 r.p.m (ii) with a flux per pole of 25 mWb and a speed of 900 r.p.m. [5M]
   b) The induced emf in a dc machine while running at 500 rpm is 180 V. Assuming constant magnetic flux per pole. Calculate the induced emf when the machine runs at 600 rpm. [5M]

(OR)

5. a) Discuss the function of no-volt and over load release in the three point starter. In which circuit these devices are connected and why? [5M]
   b) The wave connected armature of a two-pole 200 V generator has 400 conductors and runs at 300 rpm. Calculate the useful flux per pole. [5M]

UNIT-III

6. a) Explain about Layout and operation of various Wind Power Generation systems [5M]
   b) Discuss about Safety Precautions to avoid shock. [5M]

(OR)

7. a) Explain about two-part electricity tariff with an example. [5M]
   b) Explain about Personal safety measures for Earthing and its types. [5M]

BASIC ELECTRONICS ENGINEERING

UNIT-I

8. a) Discuss about the ideal characteristics of OP-AMP. Draw the frequency response curves of OP-AMP. [5M]
   b) Give the current component of PN junction diode and define diode current equation. [5M]

(OR)

9. a) Draw and explain the input-output characteristics of CE amplifier. [5M]
   b) Explain the difference between transition and diffusion capacitances of P-N diode. [5M]

UNIT-II

10. a) Derive the efficiency and ripple factor of half wave rectifier. [5M]
    b) Describe the operation of full bridge rectifier. What is its output current when rms input voltage is 82V ac and RL = 26 Ω? [5M]

(OR)

11. a) Draw the circuit diagram of common Emitter amplifier and derive expression for voltage gain, current gain, input impedance and output admittance using approximate model. [5M]
    b) Explain about Block diagram description of a DC power supply. [5M]

UNIT-III

12. a) Convert the following numbers with the given radix to decimal and then to binary. [5M]
    (a) 4433_5 (b) 1199_{12} (c) 5654_7 (d) 1221_3
    b) Design BCD to gray code converter and realize using logic gates. [5M]

(OR)

13. a) Design and implement a two bit comparator using logic gates [5M]
    b) Find the complement of the following Boolean functions and reduce them to minimum number of literals. a) (b c' +a' d) (ab' +cd') b) (b' d+ a' b c' +a c d+ a' b c) [5M]

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Code No: **R231203** **R23** **SET - 2**

I B. Tech II Semester Regular Examinations, June/July-2024
BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
(Common to CSE, EEE, Ph.E.)

Time: 3 hours Max. Marks: 70

*Note: 1. Question paper consists of two parts (**Part-A** and **Part-B**)*
*2. All the questions in **Part-A** is Compulsory*
*3. Answer **ONE** Question from each Unit in **Part-B***

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PART –A (10 Marks)

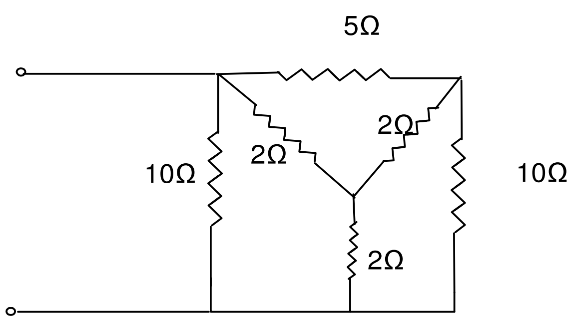
1. a) Explain the basic property of an inductance. [1M]
b) What is the function of commutator in DC generator? [1M]
c) What are various losses in Transformer? How would they change with respect to load variation? [1M]
d) What is wind power? [1M]
e) What is electrical machine? [1M]
f) Explain the difference between PNP and NPN transistors. [1M]
g) What is NAND gate? [1M]
h) Define current density of an intrinsic semiconductor. [1M]
i) Write the input characteristic of PNP transistor. [1M]
j) What is electrical shock? [1M]

PART – B (60 MARKS)

BASIC ELECTRICAL ENGINEERING

UNIT-I

2. a) Findtheequivalentresistancebetweenterminalsx-yintheresistancenetwork shown in figure 2(b) by using Y- Δ transformation. [5M]



b) Explain in detail about Kirchhoff's Current and Voltage Law. [5M]

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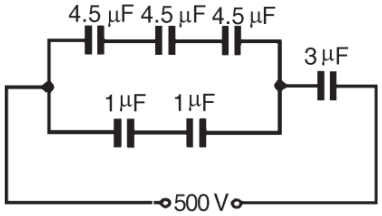
(OR)

3 a) For the arrangement shown in following figure, find (a) the equivalent circuit capacitance and (b) the voltage across a 4.5 μF capacitor [5M]



b) Prove that the energy stored in a capacitor is ½ C V^2 [5M]

UNIT-II

4. a) Explain the principle of operation of a DC generator and derive its emf equation. [5M]

b) A 250V 50 kW, long shunt compound generator supplies a load at 220V, and the load consists of five heaters of 5 kW and two hundred lights of 100 W each. The armature and series field and shunt field resistances are 0.05 Ω, 0.04 Ω and 50 Ω respectively. Find the load current, armature current and emf generated. [5M]

(OR)

5. a) A 240 V dc motor takes 5A when running on no load. The armature and field resistances are 0.5 and 175 Ω respectively. Determine its efficiency when it is assumed to be taking a full load current of 50A using Swinburne's test. [5M]

b) Explain the significance of Swinburne test and What you can attain from this test. [5M]

UNIT-III

6. a) Explain about Layout and operation of various Solar Power Generation systems and Wind power generation. [5M]

b) Explain the importance of "unit" used for consumption of electrical energy. [5M]

(OR)

7. a) Explain the Personal safety measures for Electric Shock. [5M]

b) Distinguish between Conventional and non-conventional energy resources. [5M]

BASIC ELECTRONICS ENGINEERING

UNIT-I

8. a) A half-wave rectifier diode, which has an internal resistance of 20 Ω while conducting, is to supply power to a 1 kΩ load from a 110 V ac (rms) source. Calculate (i) The peak current. (ii) The DC load current. (iii) The rms load current. (iv) The total input power [5M]

b) Derive expression for current density of an intrinsic semiconductor. [5M]

(OR)

9. a) Derive the efficiency and ripple factor of half wave rectifier. [5M]

b) Describe the similarities and dissimilarities in the operation of PNP and NPN transistors. [5M]

UNIT-II

10. a) Explain voltage series current shunt feedback amplifier with near sketch. [5M]

    b) Describe the operation of full bridge rectifier. What is its output current when rms input voltage is 40V ac and RL = 10 Ω? [5M]

(OR)

11. a) Draw the Common Emitter amplifier circuit diagram and explain its operation in detail. [5M]

    b) Explain the Block diagram of Public Address system. [5M]

UNIT-III

12. a) Convert the following numbers with the given radix to decimal and then to binary. [5M]
    (a) 4433_5(b) 1199_{12} (c) 5654_7 (d) 1221_3

    b) Reduce the following function using k-map technique [5M]
    F(A,B,C,D)=π(0,2,3,8,9,12,13,15) b) Minimize the expression using k-map y=(A+B+C') (A+ B+ C) (A' + B' + C') (A' + B +C) (A+B+C).

(OR)

13. a) Implement the function F with the following four two-level forms: [5M]
    (a) NAND-AND (b) AND-NOR (c) OR-NAND (d) NOR-OR
    F(A,B,C,D)= Σ m(0,1,2,3,4,8,9,12).

    b) Perform the following addition using excess-3 code i) 386+756 ii) 1010 + 444. [5M]

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Code No: **R231203** **R23** **SET - 3**

I B. Tech II Semester Regular Examinations, June/July-2024
BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

(Common to CSE, EEE, Ph.E.)

Time: 3 hours Max. Marks: 70

*Note: 1. Question paper consists of two parts (**Part-A** and **Part-B**)*
*2. All the questions in **Part-A** is Compulsory*
*3. Answer **ONE** Question from each Unit in **Part-B***

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PART –A (10 Marks)

1. a) State the Ohm's Law. [1M]
   b) Explain the effect of temperature on resistance. [1M]
   c) Define power factor. [1M]
   d) What is Solar power? [1M]
   e) What is Wheat Stone bridge? [1M]
   f) Explain the principle of operation of PN junction diode. [1M]
   g) What is Half wave bridge rectifier? [1M]
   h) What is AND gate? [1M]
   i) What is full wave bridge rectifier? [1M]
   j) Write the output characteristic of NPN transistor. [1M]

PART – B (60 MARKS)

BASIC ELECTRICAL ENGINEERING

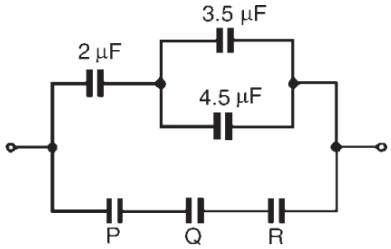
UNIT-I

2. a) What is the equivalent resistance when referred from the side RT1 and RT2 in the following given circuits? [5M]

   b) Two 6 µF capacitors are connected in series with one having a capacitance of 12 µF. Find the total equivalent circuit capacitance. What capacitance must be added in series to obtain a capacitance of 1.2 µF? [5M]

(OR)

3 a) In the following given circuit, capacitors P, Q and R are identical and the total equivalent capacitance of the circuit is 3 µF. Determine the values P, Q and R. [5M]



   b) Distinguish between an ideal voltage source and a practical Voltage source. [5M]

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UNIT-II

4. a) Explain the working of a Three Point starter with a neat diagram. [5M]
   b) A220-V, shunt motor, running at 700 rpm, has an armature resistanceof0.45 Ω and takes an armature current of 22 A. What resistance should be placed in series with the armature to reduce the speed to 450 rpm? [5M]

(OR)

5. a) Explain about non-conventional energy resources. [5M]
   b) Discuss the principle of operation of DC machine as a generator and motor. [5M]

UNIT-III

6. a) Write about Layout and operation of various Nuclear Power Generation systems. [5M]
   b) Describe about the Working principle of Fuse and Miniature circuit breaker(MCB). [5M]

(OR)

7. a) Write a note on Power rating of household appliances air conditioners and Laptops. [5M]
   b) Explain about breaker(MCB) merits and demerits. [5M]

BASIC ELECTRONICS ENGINEERING

UNIT-I

8. a) Describe the working of OP – AMP as an integrator with a neat connection. [5M]
   b) Explain the advantages and drawbacks of negative feedback amplifiers. [5M]

(OR)

9. a) Explain the operation of OPAMP as a non-inverting and inverting amplifier [5M]
   b) In a P-type semiconductor The Fermi level is 0.76eV above the Valance band at room temperature 200 ^{o} K. Determine the new position of the Fermi level when the temperature in 430 ^{o} and 600 ^{o} . [5M]

UNIT-II

10. a) Obtain the expression for efficiency of full wave rectifier with relevant waveforms and circuit [5M]
    b) Describe the operation of full bridge rectifier. What is its output current when RMS input voltage is 120V ac and RL = 150 Ω? [5M]

(OR)

11. a) Describe the working of simple zener voltage regulator. [5M]
    b) Describe the PNP transistor in common base configuration. How the transistor is used as an amplifier? [5M]

UNIT-III

12. a) Implement the following function using only NAND gates G = (a + b).(c. d + e). [5M]
    b) Implement the function F with the following four two-level forms: [5M]
    (a) NAND-AND (b) AND-NOR (c) OR-NAND (d) NOR-OR
    F(A,B,C,D)= Σ m(2,3,4,3,5,8,9,12)

(OR)

13. a) Implement the following function using only NOR gates F=a. (b+ c.d) + (b. c). [5M]
    b) Given the 8-bit data word 01011011, generate the 12 bit composite word for the hamming code that corrects and detects single errors. [5M]

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Code No: **R231203** **R23** **SET-4**

I B. Tech II Semester Regular Examinations, June/July-2024
BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

(Common to CSE, EEE, Ph.E.)

Time: 3 hours Max. Marks: 70

*Note: 1. Question paper consists of two parts (**Part-A** and **Part-B**)*
*2. All the questions in **Part-A** is Compulsory*
*3. Answer **ONE** Question from each Unit in **Part-B***

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PART –A (10 Marks)

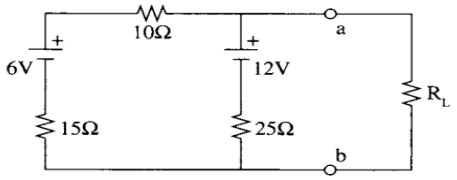
1. a) What are the limitations of Ohm's Law? [1M]
   b) What is the main necessity of using starter in the motor circuit? [1M]
   c) List different types of DC machines. [1M]
   d) What is Nuclear power? [1M]
   e) What is the function of R, L, and C circuits? [1M]
   f) What is P-N junction diode? How its terminals are identified? [1M]
   g) What is full wave bridge rectifier? [1M]
   h) What is OR gate? [1M]
   i) What is RC coupled amplifier? [1M]
   j) Define Amplifier. [1M]

PART – B (60 MARKS)

BASIC ELECTRICAL ENGINEERING

UNIT-I

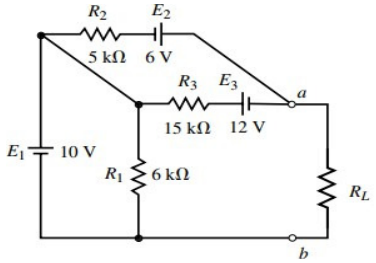
2. a) Determine the voltage across the terminals 'ab' in the following given circuit when RL = 0 Ω and RL = 10 Ω? [5M]



   b) A series circuit consisting of a 25Ω resistor, 64mH inductor and an 80μF capacitor is connected to a 110V, 50Hz single – phase supply. Calculate the current and voltage across each element. [5M]

(OR)

3 a) Determine the voltage across the terminals 'ab' in the following given circuit when RL = 10 kΩ. [5M]



   b) Prove that in series combination of resistances the equivalent circuit is the simple sum of individual resistances. [5M]

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UNIT-II

4. a) Draw the schematic diagram of DC shunt motor. Also write the back emf, current and voltage equations. [5M]

   b) A 500 V shunt motor takes a current of 5A on no-load. Calculate the efficiency of the motor when it takes 100 A. Take Ra = 0.5Ω and Rf = 250Ω. [5M]

(OR)

5. a) Derive the Torque equation for a DC Motor. [5M]

   b) A four pole DC generator has 1000 conductors. The flux per pole is 25mWb. Calculate the emf induced when the armature is lap connected and run at 1500 rpm. At what speed the generator must be driven to produce the same emf with the armature winding wave connected? [5M]

UNIT-III

6. a) Describe the working principle of fuse highlight the merits and demerits. [5M]

   b) Define unit used for consumption of electrical energy explain with examples. [5M]

(OR)

7. a) Explain about Layout and operation of various Power Generation systems of your own choice. [5M]

   b) How to calculate the consumption of electricity and bill for domestic purpose. Explain. [5M]

BASIC ELECTRONICS ENGINEERING

UNIT-I

8. a) Brief out the Current – voltage characteristic of a Diode with a neat circuit diagram. [5M]

   b) Sketch the conduction and valence bands before and after diffusion of carriers in a PN junction. [5M]

(OR)

9. a) Describe the operation of PN junction diode by including majority and minority carriers in your discussion. [5M]

   b) Draw the input output characteristics of NPN transistor in CC configuration and explain. [5M]

UNIT-II

10. a) Explain with a neat diagram the operation of a Full wave rectifier and also draw its output wave forms. [5M]

    b) Explain the working principle of electronic instrumentation system with block diagram. [5M]

(OR)

11. a) Explain how an OP-AMP can be used as a non-inverting amplifier. [5M]

    b) Explain about working of capacitor filter. [5M]

UNIT-III

12. For the function F(w,x,y,z) = Σ(0,1,2,8,10,11,15) and don't care conditions Σ(9,13), compute the following. [10M]
    a. Find the Max term expression of F (both in Π notation and as variable w, x, y and z
    b. Plot F on a Karnaugh map c. Find the simplest NOR-NOR realization for F.

(OR)

13. a) Draw the logic diagram of a JK flip- flop with excitation table and explain its operations. [5M]

    b) Simplify the following Boolean expressions using K-map and implement it by using NOR gates. a) F(A,B,C,D)=AB'C' +AC+A'CD' b)F(W,X,Y,Z)=w' x'y'z' + wxy'z' + w'x'yz + wxyz . [5M]

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Code No: **R231211** **R23** **SET - 1**

I B. Tech II Semester Regular Examinations, June/July-2024
BASIC CIVIL AND MECHANICAL ENGINEERING

(Common to CE, ME, ECE, IT, AME, Mining E, Agri E, CSE-Allied)

Time: 3 hours Max. Marks: 70

*Note: 1. Question paper consists of two parts (**Part-A** and **Part-B**)*
*2. All the questions in **Part-A** is Compulsory*
*3. Answer **ONE** Question from each Unit in **Part-B***

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PART –A (10 Marks)

1.	a)	What is the main focus of geotechnical engineering?	[1M]
	b)	What is the purpose of horizontal measurements in surveying?	[1M]
	c)	What is the importance of leveling in surveying?	[1M]
	d)	Name one environmental benefit of rail transportation.	[1M]
	e)	Define the term "dam" in one sentence.	[1M]
	f)	What are smart materials? Give examples.	[1M]
	g)	Define casting process.	[1M]
	h)	Define an engine.	[1M]
	i)	Draw the sketch of compound gear train.	[1M]
	j)	What is the function of pulley?	[1M]

PART – B (60 MARKS)

BASIC CIVIL ENGINEERING

UNIT-I

2.	a)	Explain the significance of transportation engineering in urban development, considering factors like traffic management and public transportation systems.	[5M]
	b)	Discuss the principles of open-channel flow and their applications in hydraulic engineering, including the design and analysis of channels, rivers, and storm water management systems.	[5M]

(OR)

3	a)	Discuss the challenges and opportunities in environmental engineering concerning pollution control and sustainable resource management.	[5M]
	b)	Discuss the environmental impact of construction materials throughout their life cycle, from raw material extraction and processing to transportation, installation, and end-of-life disposal	[5M]

UNIT-II

4.	a)	Describe the methods used for angular measurements in surveying and compare their advantages and disadvantages.	[5M]
	b)	Describe the process of setting out building foundations using surveying techniques, including leveling and angular measurements.	[5M]

(OR)

5.	a)	Elaborate on the concept of bearings in surveying, including types and their applications.	[5M]
	b)	Discuss the principles of triangulation and trilateration in surveying, including their applications and differences.	[5M]

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UNIT-III

6. a) Explain the concept of airport aprons and their role in aircraft parking, refueling, and maintenance. [5M]
   b) Explain the basic principles of harbor design and layout. [5M]

(OR)

7. a) Discuss the challenges associated with tunnel ventilation and fire safety, particularly in long and deep tunnels. [5M]
   b) Discuss the key differences between flexible and rigid pavements in terms of construction materials and structural behavior. [5M]

BASIC MECHANICAL ENGINEERING

UNIT-I

8. a) Explain the important properties of Engineering materials. [5M]
   b) Discuss the role of Mechanical Engineering in Manufacturing sector. [5M]

(OR)

9 a) What is thermoplastics and explain their properties? [5M]
   b) Discuss the role of Mechanical Engineering in Aerospace industries. [5M]

UNIT-II

10. a) With neat sketches explain various types of patterns. [5M]
    b) With a neat sketch explain the working of Water tube boiler. [5M]

(OR)

11. a) Explain about shaper mechanism. [5M]
    b) Write short notes on eco-friendly refrigerants. [5M]

UNIT-III

12. a) Derive the expression for the length of a belt in open-belt drive. [5M]
    b) With a neat sketch explain the working principle of steam power plant. [5M]

(OR)

13. a) A shaft running at 100 rpm is to drive another shaft at 280 rpm. The distance between the shaft centres is 3 m. Find the length of open belt required if the smaller pulley is 30 cm in diameter. [5M]
    b) Write short notes on (i) servo controlled robots (ii) vision sensing (iii) tactile sensing. [5M]

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Code No: **R231211** **R23** **SET - 2**

I B. Tech II Semester Regular Examinations, June/July-2024
BASIC CIVIL AND MECHANICAL ENGINEERING
(Common to CE, ME, ECE, IT, AME, Mining E, Agri E, CSE-Allied)

Time: 3 hours Max. Marks: 70

*Note: 1. Question paper consists of two parts (**Part-A** and **Part-B**)*
*2. All the questions in **Part-A** is Compulsory*
*3. Answer **ONE** Question from each Unit in **Part-B***

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PART –A (10 Marks)

1.	a)	What does hydraulics engineering primarily deal with?	[1M]
	b)	Explain the term "benchmark" in surveying.	[1M]
	c)	What is the primary role of transportation in a nation's economic development?	[1M]
	d)	Why is railway electrification important in modern rail transport?	[1M]
	e)	What is the purpose of conveyance structures in water engineering?	[1M]
	f)	Give a classification of cast irons.	[1M]
	g)	What is the principle of forming process?	[1M]
	h)	How heat engines are classified?	[1M]
	i)	Mention the applications of Robot.	[1M]
	j)	What is a rope drive?	[1M]

PART – B (60 MARKS)
BASIC CIVIL ENGINEERING
UNIT-I

2.	a)	Discuss the importance of hydraulics and water resources engineering in addressing issues such as flood control and water conservation.	[5M]
	b)	Discuss the challenges and opportunities in sustainable urban drainage design, including the integration of green infrastructure and storm water harvesting systems.	[5M]
		(OR)	
3	a)	Discuss the role of building information modeling (BIM) and digital design technologies in enhancing collaboration, coordination, and efficiency throughout the building lifecycle.	[5M]
	b)	Discuss the characteristics and sources of aggregates used in construction, including natural materials such as gravel and crushed stone.	[5M]

UNIT-II

4.	a)	Compare and contrast different leveling instruments used in surveying, highlighting their features, accuracy, and limitations.	[5M]
	b)	A contour map represents a hill with contour lines spaced at 20-meter intervals. Determine the approximate height of the hill if the contour lines are concentric circles.	[5M]
		(OR)	
5.	a)	Discuss the steps involved in contour mapping, including data collection, interpretation, and representation.	[5M]
	b)	A traverse survey consists of four lines with the following bearings: AB = N45°E, BC = S60°E, CD = S30°W, and DA = N75°W. Determine the interior angles of the traverse.	[5M]
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UNIT-III

6. a) Discuss the components of an airport terminal and their functions in facilitating passenger movement and aircraft operations. [5M]

   b) Discuss the concept of integrated water resources management and its significance in ensuring water security. [5M]

(OR)

7. a) What role does transportation play in connecting markets and facilitating the movement of goods and services? [5M]

   b) Explain how dams contribute to water storage and management. [5M]

BASIC MECHANICAL ENGINEERING

UNIT-I

8. a) What are the composites? Explain. [5M]

   b) Classify metals and alloys with examples. Also mention important properties. [5M]

(OR)

9 a) What is thermosetting plastics and explain their properties? [5M]

   b) Discuss the role of Mechanical Engineering in Marine industries. [5M]

UNIT-II

10. a) Discuss the important characteristics of molding sand. [5M]

    b) Explain the Vapor-compression refrigeration system with a neat sketch. [5M]

(OR)

11. a) What is a lathe and explain different types of lathes? [5M]

    b) Explain the main components of electric vehicles. [5M]

UNIT-III

12. a) Two shafts are arranged parallel to each other at a distance of 6 m apart. Determine the length of the belt required to drive two pulleys with diameters 500 mm and 750 mm attached to the shafts to rotate in the same direction as that of the driving shaft. [5M]

    b) Explain about solar power plant. [5M]

(OR)

13. a) What is a gear train and explain the types of gear train? [5M]

    b) What are the advantages of having a robot that is equipped with adoptive control? [5M]

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Code No: **R231211** **R23** **SET - 3**

I B. Tech II Semester Regular Examinations, June/July-2024
BASIC CIVIL AND MECHANICAL ENGINEERING
(Common to CE, ME, ECE, IT, AME, Mining E, Agri E, CSE-Allied)

Time: 3 hours | Max. Marks: 70

*Note: 1. Question paper consists of two parts (**Part-A** and **Part-B**)*
*2. All the questions in **Part-A** is Compulsory*
*3. Answer **ONE** Question from each Unit in **Part-B***

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PART –A (10 Marks)

1. a) What is the primary ingredient in cement? [1M]
   b) What is the significance of contour lines in contour mapping? [1M]
   c) How does efficient transportation contribute to reduce production costs for businesses? [1M]
   d) What is the fundamental difference between flexible and rigid pavements? [1M]
   e) What is rainwater harvesting, in simple terms? [1M]
   f) What is the difference between a composite and alloy? [1M]
   g) What is 3D printing? [1M]
   h) Draw P-V diagram for 4-stroke cycle Petrol Engine. [1M]
   i) What is a gear drive? [1M]
   j) Give the classification of Engineering materials. [1M]

PART – B (60 MARKS)
BASIC CIVIL ENGINEERING
UNIT-I

2. a) Discuss the role of civil engineers in ensuring the safety and sustainability of infrastructure in society. [5M]
   b) Compare the properties and applications of different construction materials, including cement, aggregate, bricks, steel, and concrete. [5M]

(OR)

3 a) Explain the role of civil engineers in ensuring the durability and safety of structures through material selection and testing in the construction process. [5M]
   b) Discuss the role of structural engineering in ensuring the safety and resilience of buildings and infrastructure against natural disasters. [5M]

UNIT-II

4. a) Discuss the objectives of surveying and its importance in various fields. [5M]
   b) A surveyor takes a magnetic bearing of 120 degrees for a line AB. If the magnetic declination is 5 degrees east, calculate the true bearing of line AB. [5M]

(OR)

5. a) Explain the process of conducting horizontal measurements in surveying, mentioning the tools and techniques involved. [5M]
   b) A surveyor conducts a differential leveling survey along a straight line. The first and last benchmarks have reduced levels of 50 meters and 80 meters, respectively. If there are five intermediate benchmarks, each spaced 20 meters apart, calculate the rise or fall between consecutive benchmarks. [5M]
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UNIT-III

6. a) How does transportation infrastructure influence the accessibility of employment opportunities for individuals? [5M]
   b) Explain the role of environmental engineering in addressing water pollution and contamination issues. [5M]

(OR)

7. a) Discuss the environmental considerations in tunnel construction, including impacts on groundwater and surface water resources. [5M]
   b) Describe the interdisciplinary nature of water resources and environmental engineering and its relevance to society. [5M]

BASIC MECHANICAL ENGINEERING

UNIT-I

8. a) Discuss the role of Mechanical Engineering in Automotive sector. [5M]
   b) Compare the properties of Ferrous and non-ferrous metals. [5M]

(OR)

9 a) Explain the effect of alloying elements on steels. [5M]
   b) Give the chemical composition and main characteristics of the five types of cast-iron. [5M]

UNIT-II

10. a) Explain various pattern allowances and its function. [5M]
    b) Differentiate between 2-stroke and 4-stroke cycle I.C. engine. [5M]

(OR)

11. a) Write different types of resistance welding. [5M]
    b) Explain air refrigeration system using Bell–Coleman cycle. [5M]

UNIT-III

12. a) Describe the terms Creep and Slip associated with belt drives. [5M]
    b) What are different configurations in Robotics? Discuss. [5M]

(OR)

13. a) Explain with a neat sketch working principle of a Nuclear power plant. [5M]
    b) Write the applications of robotics. [5M]

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Code No: **R231211** **R23** **SET - 4**

I B. Tech II Semester Regular Examinations, June/July-2024
BASIC CIVIL AND MECHANICAL ENGINEERING
(Common to CE, ME, ECE, IT, AME, Mining E, Agri E, CSE-Allied)

Time: 3 hours Max. Marks: 70

*Note: 1. Question paper consists of two parts (**Part-A** and **Part-B**)*
*2. All the questions in **Part-A** is Compulsory*
*3. Answer **ONE** Question from each Unit in **Part-B***

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PART –A (10 Marks)

1. a) Briefly explain the concept of prefabricated construction techniques. [1M]
b) What are bearings in surveying? [1M]
c) What are the two main types of highway pavements? [1M]
d) Define harbor engineering in one sentence. [1M]
e) What is the primary focus of water resources? [1M]
f) What is the role of chromium in steel? [1M]
g) Define CNC machine. [1M]
h) Draw P-V diagram for 4-stroke cycle Diesel Engine. [1M]
i) What is a belt drive? [1M]
j) What is the role of manganese in steel? [1M]

PART – B (60 MARKS)

BASIC CIVIL ENGINEERING

UNIT-I

2. a) Compare and contrast structural engineering with geotechnical engineering, highlighting their primary focuses and methodologies. [5M]
b) Explain about the necessity of Building Planning. [5M]

(OR)

3 a) Explain the role of civil engineers in ensuring the durability and safety of structures through material selection and testing in the construction process. [5M]
b) Discuss the regulatory frameworks and ethical considerations involved in building construction and planning. [5M]

UNIT-II

4. a) Discuss the challenges faced in leveling over large distances and the methods employed to overcome them. [5M]
b) In a construction site, a leveling instrument is set up at a known elevation of 100 meters. The staff reading at a benchmark is 1.5 meters, and the staff reading at a point on the ground is 3.2 meters. Determine the reduced level of the point on the ground. [5M]

(OR)

5. a) Explain the concept of magnetic declination and its impact on bearings and compass surveys. [5M]
b) The instrument is set up at point A, and the staff readings are taken at both points. If the staff reading at point A is 1.2 meters and at point B is 2.8 meters, calculate the height difference between the two points. [5M]
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UNIT-III

6. a) Draw hydrological cycle and mention its parts. [5M]
   b) Explain the concept of water balance in a watershed and discuss its importance in water resources management. [5M]

(OR)

7. a) Explain the concept of pavement design and the factors considered in determining the appropriate pavement type for a given road. [5M]
   b) Explain the concept of water scarcity and its implications for communities and ecosystems. [5M]

BASIC MECHANICAL ENGINEERING

UNIT-I

8. a) What are smart materials? Explain. [5M]
   b) Explain types of steels and their properties. [5M]

(OR)

9. a) Explain types of plastics. [5M]
   b) What are the different types of composites? Explain. [5M]

UNIT-II

10. a) What are the different types of gas welding? Discuss. [5M]
    b) Discuss the principle of conservation of energy as applied to an engine system with reference to the first law of thermodynamics. [5M]

(OR)

11. a) What is a forming process and explain hot and cold forming? [5M]
    b) What are the desirable properties of an ideal refrigerant? Explain. [5M]

UNIT-III

12. a) Explain about different mechanical power transmission systems. [5M]
    b) What are the main components of a robot? [5M]

(OR)

13. a) Explain the different types of power plants? [5M]
    b) A shaft running at 90 rpm is to drive a parallel shaft at 150 rpm. The pulley on the driving shaft is 50 cm in diameter. Find the diameter of the pulley on the driven shaft: (a) Neglecting belt thickness (b) Taking account of belt thickness which is 5 mm (c) Assuming in the case of (b) a total slip of 5 percent. [5M]

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Code No: **R201214** **R20** **SET - 1**

I B. Tech II Semester Supplementary Examinations, June/July-2024
BASIC ELECTRICAL ENGINEERING

(Common to ECE, EIE, ECT)

Time: 3 hours Max. Marks: 70

Answer any FIVE Questions ONE Question from Each Unit
All Questions Carry Equal Marks

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UNIT-I

1	a)	Explain the constructional details of a DC Machine.	[7M]
	b)	The armature of a 4-pole 230 V wave wound generator has 400 conductors and runs at 400 rpm. Calculate the useful flux per pole.	[7M]

(OR)

2	a)	Explain the principle of operation of a DC Motor.	[7M]
	b)	List and explain the various losses in a DC machine.	[7M]

UNIT-II

3	a)	Derive the emf equation of a Single-phase transformer.	[7M]
	b)	Find the cross-sectional area of the core of a 10 turn's transformer for a voltage of 50 V at 50 Hz. The flux density is 0.9 Wb/m^2.	[7M]

(OR)

4	a)	Explain how the efficiency and regulation of a transformer can be calculated from Open circuit and Short circuit test.	[7M]
	b)	Find the efficiency of a 150 kVA transformer at 25% full load at 0.8 power factor lagging if copper losses are 1600 W at full load and iron losses are 1400 W.	[7M]

UNIT-III

5	a)	Distinguish in detail between Salient Pole type of rotor and non-salient type of rotor in synchronous machine.	[7M]
	b)	What is Armature reaction and explain its effects in synchronous machine.	[7M]

(OR)

6	a)	Explain the constructional aspects of a three-phase synchronous motor.	[7M]
	b)	A 440 V, three-phase alternator, running at rated speed, has a 2 A excitation current when short circuit is applied at its terminals. The short circuit magnitude is 50 A (full load current). At this excitation the open circuit voltage is 160 V/phase. Assuming the armature circuit resistance to be 0.6Ω per phase, obtain the value of regulation of the alternator at 0.85power factor leading load.	[7M]

UNIT-IV

7	a)	Explain the principle of operation of a Three-phase induction motor.	[7M]
	b)	A 10-pole induction motor is supplied by a 6-pole alternator, which is driven at 1400 rpm. If the motor runs with a slip of 2%, what is its speed?	[7M]

(OR)

8	a)	Explain the concept of production of rotating field in three phase induction motor.	[7M]
	b)	Draw and explain the equivalent circuit of a Three phase induction motor.	[7M]

UNIT-V

9		Draw and explain a typical torque speed curve of a single-phase induction motor on the basis of the double revolving field theory.	[14M]

(OR)

10		Draw and explain the equivalent circuit of a single-phase induction motor.	[14M]

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Code No: **R201216** **R20** **SET - 1**

I B. Tech II Semester Supplementary Examinations, June/July-2024

COMPUTER ORGANIZATION

(Common to CSE, IT)

Time: 3 hours Max. Marks: 70

Answer any FIVE Questions ONE Question from Each Unit
All Questions Carry Equal Marks

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UNIT-I

1 a) Write about different types of assembly instructions based on the functions they perform. [7M]

b) What are different ways of representing signed integers? Give examples. [7M]

(OR)

2 a) Implement the function F (A, B, C, D) = ∑0, 1, 2, 3, 4, 8, 9, 12.with the following four level forms. i) NAND-AND ii) NOR-OR iii) AND-NOR iv) OR –AND. [7M]

b) Construct a 16 X 2 memory subsystem from two 8 X 2 ROM chips with higher order interleaving. [7M]

UNIT-II

3 a) Construct a 3 × 3 multiplexer using a Carry-Save Adder. [7M]

b) Compare positive edge triggering and negative edge triggering in flip-flops and explain their effect on output of a flip-flop using suitable example. [7M]

(OR)

4 a) Explain about overflow generation in unsigned two's complement Addition. [7M]

b) Draw the logic diagram of a universal shift register and explain its operation in detail. [7M]

UNIT-III

5 a) Differentiate between hardwired and micro programmed control Units. [7M]

b) Explain the Hardware implementation of Booth's multiplication algorithm. [7M]

(OR)

6 a) Explain briefly about micro sequencer operations. [7M]

b) Show the logic to generate the control signals for data register, address register and instruction register of the relatively simple CPU. [7M]

UNIT-IV

7 a) What are the characteristics of Multiprocessors? Discuss. [7M]

b) Explain various addressing modes with examples. [7M]

(OR)

8 a) Explain about General Register Organization of Central Processing unit. [7M]

b) Describe the steps of Address sequencing in Micro programmed control. [7M]

UNIT-V

9 a) What is Virtual CPU? Discuss in detail the functionality of a DMA controller. [7M]

b) Explain the process of handshaking with an example. [7M]

(OR)

10 a) Explain about External fragmentation in physical memory caused by Segmentation. [7M]

b) Distinguish between Synchronous data transfer and Asynchronous data transfer. [7M]

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Code No: **R201221** **R20** **SET - 1**

I B. Tech II Semester Supplementary Examinations, June/July-2024

DIGITAL LOGIC DESIGN

(Common to CSE-CS&T, CSE-AI&ML, CSE-AI, CSE-DS, CSE-AI&DS, CSE-CS, CSE-IOT&CS INCL BCT, CSE-CS&BS,CSE-IOT, AI&DS, Cyber Security)

Time: 3 hours Max. Marks: 70

Answer any FIVE Questions ONE Question from Each Unit
All Questions Carry Equal Marks

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UNIT-I

1 a) Write the procedure to convert binary to gray code and gray code to binary? Convert $(10110)_2$ to Gray code and $(110101)_G$ to binary number. [7M]

b) Convert the following to the corresponding bases [7M]
i) $(9BCD)_{16} = (\ )_8$ ii) $(323)_4 = (\ )_5$ iii) $(9BCD)_{16} = (\ )_{10}$

(OR)

2 a) Perform the decimal subtraction in 8-4-2-1 BCD using 9's complement [7M]
i) Subtract 79 from 26 ii) Subtract 748 from 983.

b) Distinguish between weighted and non-weighted codes with example. Write the code words for 0-9 using BCD and Excess-3 code? [7M]

UNIT-II

3 a) Obtain the simplified expression in sum of products for the following Boolean function [7M]
i. $F(A,B,C,D) = \sum(2,3,12,13,14,15)$
ii. BD+B′C′D+CD+A′B′C+B′C′D′

b) What are universal gates and why they are called as universal gates? Implement the following functions using only NOR Gates [7M]
i. F=A.(B+ C) + (B. C) ii. F = A + B'C + (B + C)' + B'C'

(OR)

4 a) Reduce the following expression using Boolean algebra rules [7M]
i. ((AB +ABC)' +$A(B+AB)$)'
ii. T(x, y, z) = (x + y) {[x' (y' + z')]'} +x' y' +x' z'

b) Distinguish between canonical and standard forms by giving an example. Write down the procedure to convert a AND-OR gate network to all NAND gate network and illustrate with an example. [7M]

UNIT-III

5 a) Differentiate multiplexer and de-multiplexer. Draw a 2:1 multiplexer for the function $f(x, y, z) = \sum(0,2,3,5,7)$. [7M]

b) Design a combinational circuit which converts BCD to Excess-3 code. [7M]

(OR)

6 a) What is a combinational logic circuit? Implement a Full adder using two half adders and one OR gate. [7M]

b) Draw the logic diagram of 2:4 Decoder with an ENABLE input using: i) NAND gates ii) NOR gates. Show that the realization using NAND gates is more convenient to distinguish the selected output with a value of 0. [7M]

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UNIT-IV

7 a) What is the race around condition? Design a flip flop which overcomes this drawback and explain with neat diagram. [7M]

b) Analyze latch with NOR gates, derive transition, flow and state tables. [7M]

(OR)

8 a) What is a flip-flop? Write down the characteristic equation of S-R flip flop. Convert an SR Flip-Flop into JK Flip-Flop. [7M]

b) Explain the operation of clocked D-flip-flop with NAND gates using truth table. Give its timing diagram. [7M]

UNIT-V

9 a) Explain the operation of 5-stage twisted ring counter with circuit diagram, state transition diagram and state table. [7M]

b) What is a register? Discuss the applications of shift registers? [7M]

(OR)

10 a) Explain about decade ripple counter with the help of circuit diagram and timing diagrams? [7M]

b) With suitable logic diagrams explain about Buffer register and Controlled buffer register? [7M]

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Code No: **R19BS1204** **R19** **SET - 1**

I B. Tech II Semester Supplementary Examinations, June/July-2024

APPLIED PHYSICS

(Common to EEE, ECE, CSE, EIE, IT)

Time: 3 hours Max. Marks: 75

Answer any FIVE Questions ONE Question from Each Unit

All Questions Carry Equal Marks

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UNIT-I

1. a) What are Newton's rings and how are they formed? How can the refractive index of a liquid be determined using these fringes? Explain. [8M]

   b) Explain Rayleigh's criterion for resolving power. Obtain an expression for resolving power of a microscope. [7M]

(OR)

2. a) Describe Fraunhofer diffraction due to double slit. Obtain the conditions for bright and dark bands. [8M]

   b) How to determine the refractive index of a liquid? Explain briefly the experimental procedure. [7M]

UNIT-II

3. a) Define wave function and obtain the expression for time dependent Schrodinger wave equation. [8M]

   b) Explain the uncertainty principle briefly with examples. [4M]

   c) Calculate the de-Broglie wavelength associated with electrons, which are accelerated by a voltage of 50kV. [3M]

(OR)

4. a) Describe the Davisson-Germer experiment for the wave nature of the particle. [8M]

   b) Derive an expression for the energy of a particle of mass 'm' confined to infinite potential well. Why such a particle cannot have zero energy? [7M]

UNIT-III

5. a) Discuss in detail the Kronig-Penny model of band theory of solids. [8M]

   b) Discuss any four drawbacks of the classical free electron theory. Enumerate salient postulates in quantum free electron theory. [7M]

(OR)

6. a) Distinguish between conductors, semiconductors, and insulators on the basis of band theory of solids. [8M]

   b) Write short notes on the effective mass of an electron and a hole. [7M]
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UNIT-IV

7. a) Obtain the expression for carrier concentration in the conduction band of an intrinsic semiconductor. [8M]

   b) Explain how the Fermi level of extrinsic semiconductors is dependent on temperature with energy band diagrams. [7M]

(OR)

8. a) Explain drift and diffusion currents in a semiconductor and they are related to each other through Einstein's equation. [8M]

   b) Derive an expression for carrier concentration in a P-type semiconductor. [7M]

UNIT-V

9. a) What is meant by local field in a dielectric, and how it is calculated for a cubic structure? [8M]

   b) Explain the different types of polarization mechanisms involved in a dielectric material. [7M]

(OR)

10. a) Explain the hysteresis of ferromagnetic material with the help of the B-H curve. [8M]

    b) Distinguish between hard and soft magnetic materials. [7M]

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