Code No. D-3524/CBCS

FACULTY OF ENGINEERING

B.E. (CIVIL) III - Semester (CBCS) (Backlog) Examination, March / April 2022

Subject: Electrical Technology

Time: 1 ½ Hours **Max. Marks: 38 Marks**

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

PART – A

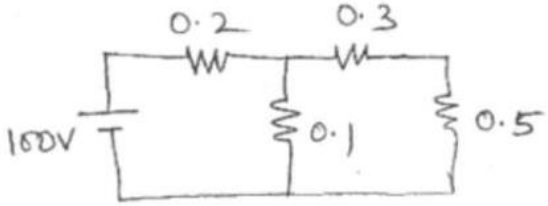
Note: Answer all questions. **(14 Marks)**

1. What is voltage divider rule?
2. Define power factor and frequency.
3. Define luminous efficiency, space to height ratio.
4. Define slip. Why IM cannot run at Synchronous speed?
5. Write properties of Ideal transformer.
6. Define Lumen and Candela.

PART – B

Note: Answer any three questions. **(3 x 8 = 24 Marks)**

7. a) Find R_{eq} in the given circuit and also find current through it.



b) State and explain Kirchhoff's laws.

8. A single phase, 6KVA, 250/500V Transformer gave the following results:

OC test:	250 V	1 A	90 W on LV side
SC test:	20 V	12 A	100 W on HV side

Find circuit constants and show them on equivalent circuit.

9. a) With nCIVILssary diagrams explain in detail about polar curves.
   b) Describe with neat sketch the construction of 3 phase wound type IM

10. a) Explain DOL starter with neat diagram.
    b) Derive power expression in 3 phase balanced circuit.

11. a) Obtain the expression for energy stored in an Inductor.
    b) A 6 pole, 50Hz squirrel cage IM runs at 970 RPM. Find
    (i) Frequency of induced currents in rotor (ii) the percentage slip.

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Code No. D-3525/CBCS

FACULTY OF ENGINEERING

B.E. (Civil) III – Semester (CBCS) (Backlog) Examination, March / April 2022

Subject: Mechanical Technology

Time: 1½ Hours **Max. Marks: 37 Marks**

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

PART – A

Note: Answer all questions. **(13 Marks)**

1. State features of Earth Compactor.
2. What are the applications of bulldozer in construction?
3. What is the function of Concrete vibrator?
4. Give the working principle of Jack hammer.
5. What is Aerial ropeway?

PART – B

Note: Answer any three questions. **(3 x 8 =24 Marks)**

6. (a) Explain the construction and operation of a Clamshell.
   (b) What is the basic difference between Cable excavator & Bucket wheel excavator?
7. (a) Explain the working principle of Fork lift truck.
   (b) Differentiate between Belt Conveyor and Screw Conveyor.
8. (a) Explain salient features of Swing & Non-Swing mobile crane and its specific applications.
   (b) Explain working principle of a Concrete Mixer.
9. Explain the construction, working principle & applications of Dragline.
10. Write short notes on:
    (a) Scraper.
    (b) Tractor.
    (c) Shaking & Vibrating Screens.

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Code No. D-3531/CBCS

FACULTY OF ENGINEERING

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

Subject: Electronic Engineering – 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 Write about interacting and non-interacting amplifier stages.
2 For four identical stages connected in cascade with gain of each stage is 10dB, what is overall gain?
3 What is the effect of current shunt negative feedback on Ri and Ro of amplifier?
4 Prove that stability of amplifier gain is improved with negative feedback.
5 What are the advantages of RC oscillators over LC oscillator?
6 What is Bakhausen criteria for oscillator?
7 Classify amplifiers based on various factors.
8 Compare class B push pull and complimentary symmetry power amplifiers briefly.
9 Draw two level negative clipper and explain briefly.
10 Explain how RC low pass circuit works as integrator.

PART – B

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

11 Draw a single RC-coupled FET amplifier and derive expressions for mid band gain, upper and lower cutoff frequencies.

12 Draw a voltage series negative feedback amplifier circuit. Find A_{vsf}, R_i & R_o Rs =1KΩ, Re = 2KΩ, Rc=5KΩ, hie =1KΩ, hfe=150, hre=hoe=0?

13 Derive expressions for frequency of oscillations and condition of oscillations for a RC phase shift oscillator?

14 (a) For a transformer coupled class A power amplifier, derive expression for its efficiency?
(a) How cross-over distortion in power amplifier occurs? How it can be eliminated?

15 Obtain the response of RC high pass circuit for:
(a) Pulse input
(b) Ramp input. Draw relevant waveforms and derive necessary expressions.

16 (a) Explain the effect of cascading of unidentical stages. Explain how lower and upper cut-off frequencies of cascade amplifier are calculated?
(b) Write about frequency stability of oscillator.

17 Write short notes on:
(a) Global verses local feedback (b) Crystal oscillator (c) Clamping theorem.

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Code No. D-3537/CBCS

FACULTY OF ENGINEERING

B.E. (ECE) III - Semester (CBCS) (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 Describe the different types of thermodynamic systems.
2 State the first law of Thermodynamics.
3 Differentiate between two stroke and four stroke engines.
4 Discuss the applications of reciprocating air compressors.
5 Define conduction and convection.
6 Classify heat exchangers.
7 Discuss the applications of gears and gear trains.
8 Define velocity ratio of a belt drive.
9 Discuss the features of oxy acetylene gas welding.
10 Discuss the applications of milling machines.

PART – B

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

11 (a) Discuss the zeroth law of thermodynamics and state its importance.
(b) A mass of 1.5 kg of air is compressed in a quasi static process from 0.1 MPa to 0.7 MPa as per the relation pv = constant. The initial density of air is 1.16kg/m^3. Determine the work done by the piston to compress the air.

12 (a) Explain the working of 4-stroke diesel (CI) Engine.
(b) The following particulars refer to a 2-stroke single cylinder diesel engine: Bore=100 mm, stroke=150mm, piston speed=300 m/min, torque developed=58 Nm, mechanical efficiency= 81%, indicated thermal efficiency=40%, calorific value of
fuel = 45000 kJ/Kg.
Determine: (i) Indicated Power (IP). (ii) Indicated Mean Effective Pressure (IMEP) (iii) Brake specific fuel consumption (bsfc).

13 (a) Discuss the working of a reciprocating air compressor with sketch.
(b) Discuss the various modes of heat transfer with their mathematical equations. Mention their applications.

14 (a) Derive an expression for the LMTD of parallel flow heat exchanger.
(b) Water is heated in a double pipe heat exchanger from 35˚C to 85˚C by hot gases that cool from 200˚C to 95˚ C. Determine the log mean temperature difference for the following cases of flow: (i) Parallel Flow (ii) Counter Flow.

15 (a) Derive the expression for length of a cross belt drive.
(b) Classify gear trains and explain any one gear train with a neat diagram.

..2

16 (a) Discuss and differentiate the principle of soldering and brazing.
(b) Describe the processes of extrusion, wire drawing and rolling.

17 (a) Discuss the mechanisms of milling and grinding machines.
(b) Discuss the principles of EDM and EBM.

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Code No. D-3541/CBCS

FACULTY OF ENGINEERING

B.E. (MECH/PROD/AE) III - Semester (CBCS) (Backlog) Examination,
March / April 2022
Subject: Mechanics of Materials

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

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

PART – A

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

1 Define Young's modulus.
2 Define Resilience and Proof Resilience.
3 Draw the Mohr's circle for the state of pure shear in a strained body and mark all salient points in it.
4 Write an expression of volumetric strain for a rectangular bar subjected to an axial load P.
5 Draw shear force and bending moment diagram for a cantilever beam carrying UVL throughout the span with zero intensity at free end and w kN at fixed end.
6 Explain "Point of Contraflexure".
7 Define "flexural rigidity".
8 List out the assumptions used to derive the torsion equation.
9 What is a spring? Name the two important types of springs.
10 List out the methods available to find the deflection of a beam.

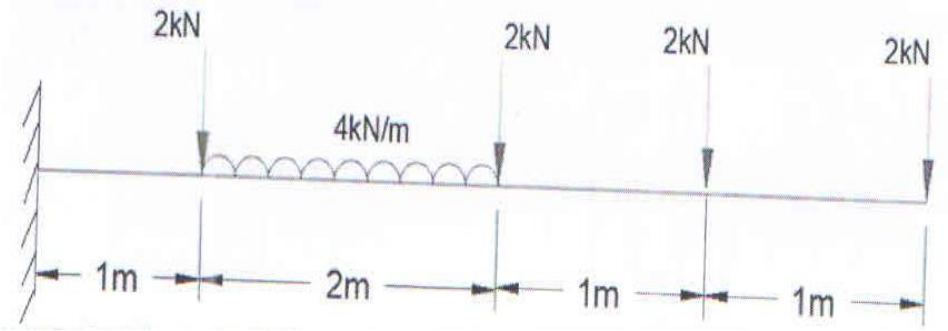
PART – B

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

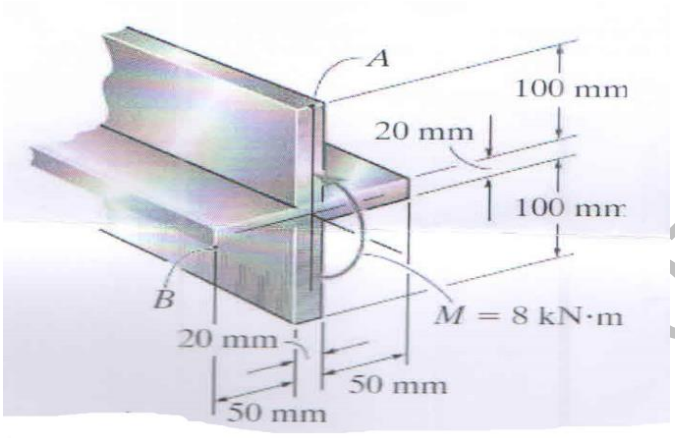
11 A reinforced concrete column 500 mm x 500 mm in section is reinforced with 4 steel bars of 25 mm dia, one in each corner. The column is carrying a load of 200 kN. Calculate the stresses in the concrete and steel bar. Take E_s=200 GPa, E_c=140 GPa.

12 A gun metal rod screwed at the ends passes through a steel tube. The tube has 25 mm external diameter and 20 mm internal diameter. The diameter of the rod is 16 mm. The assembly is initially at 400 K and the nuts on the rod are tightened on the ends of the tube. Find the intensity of stress in the rod and in the tube when the common temperature falls to 300 K.

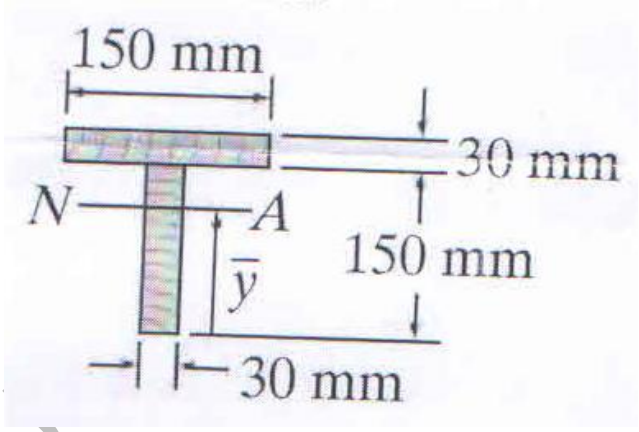
13 Draw the shear force and bending moment diagrams for a beam as shown in figure.



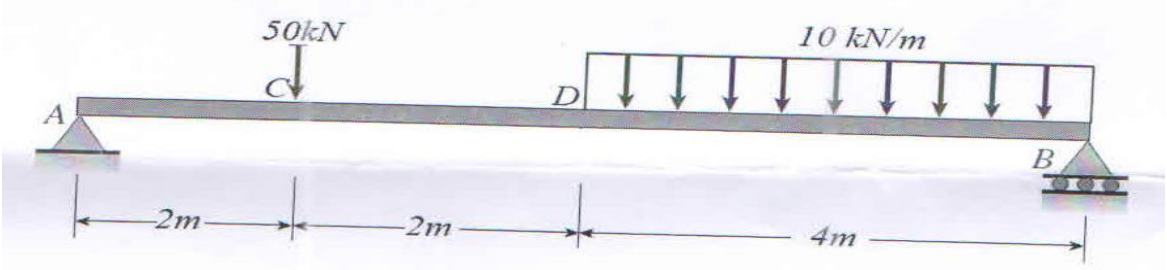
14 The aluminum strut has a cross-sectional area in the form of a cross as shown in figure below. If it is subjected to the moment M = 8 KN–m. Determine the maximum bending stress in the beam.



15 Find the maximum stress in beam of given T-section, subjected to maximum shear force of 20kN, draw shear distribution across the cross-section.



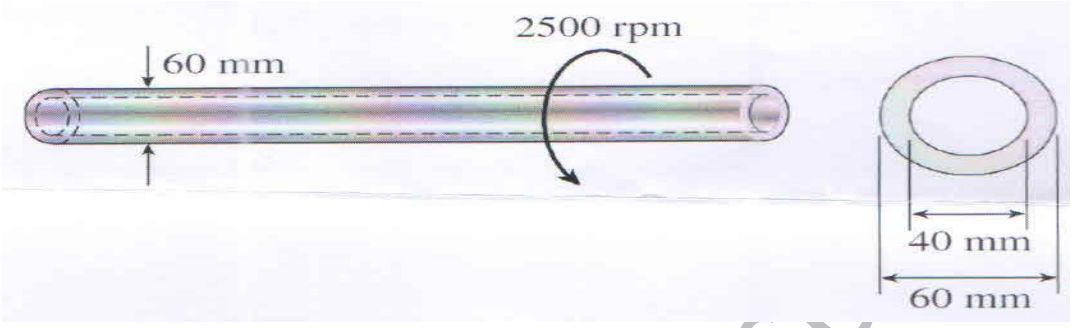
16 For the simply supported beam shown in figure. Find (i) the slope at each end (ii) Deflection at C and D (iii) Maximum deflection. Take E = 200kN/mm^2 and I =6.50 x10^{8}mm^4.



17 The drive shaft for a truck (outer diameter 60mm and inner diameter 40 mm) is running at 2500 rpm (see figure).

(a) If the shaft transmits 150 kW, what is the maximum shear stress in the shaft?

(b) If the allowable shear stress is 30 MPa, what is the maximum power that can be transmitted?



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Code No. D-3549/CBCS

FACULTY OF ENGINEERING

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

Subject: Basic 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 The reverse saturation current in a germanium diode is 6μA. Calculate the current flowing through the diode when applied forward bias voltage is 0.2V at room temperature.

2 Define mobility of a carrier.

3 In a transistor if $\propto = 0.5$, determine the value of β.

4 Explain the significance of Q point.

5 Negative feedback is preferred to other method of modifying Amplifier characteristics. Why?

6 State the condition in $(1+A\beta)$ which a feedback amplifier must satisfy in order to be stable.

7 What is the slew rate of an op-amp whose output voltage changes by 30V in 4μ sec?

8 List the linear applications of an OP-AMP.

9 List the applications of CRO.

10 Draw the symbols of photo diode, photo transistor and SCR.

PART – B

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

11 (a) Define and derive Ripple factor, % regulation, efficiency of FWR.
(b) Explain the V-I Characteristics of reverse biased PN junction diode.

12 (a) Calculate the values of collector current and emitter current for a transistor with = 0.99 and = 5 μA. The base current is measured as 20 μA.
(b) Explain why CE provides large current amplification while CB cannot.

13 (a) Draw the circuit of an emitter follower. Identify the type of negative feedback. Calculate the input and output resistance with feedback.
(b) With a neat diagram explain about Wein Bridge oscillator and derive the expression for frequency of oscillation.

14 (a) Explain any one applications of OP-AMPs with a neat circuit diagrams.
(b) How LED differs from photodiode? Explain.

15 (a) Explain the working and V-I characteristics of SCR.
(b) List the differences between LED and LCD.

16 (a) Write about the application of Op-AMP as an instrumentation amplifier. With neat circuit diagram, obtain the expression for output voltage.
(b) Discuss about the frequency stability of crystal oscillator.

17 (a) Explain avalanche and zener breakdown mechanisms.
(b) Explain Early effect and Punch through effect.

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Code No. D-3555/CBCS

FACULTY OF ENGINEERING

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

Subject: Probability and Random 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. If A and B are independent events, prove that their complementary events are also independent.
2. If A, B & C are any three events such that P(A) = P(B) = P(C) = 1/6, P(A∩B) = P(B∩C) = 0 and P(A∩C) = 1/12. Find the probability that at least one of the events A, B, C occurs.
3. Determine the characteristic function of Poisson distribution.
4. If a random variable X is uniformly distributed over (0,100), Find its mean and variance.
5. If two random variables X and Y are independent then prove that E(Y|X)=E(Y).
6. For a random variable X, prove that Var (aX + b) = a 2Var(X), where a & b are constants.
7. Define mean and correlation of ergodic process.
8. Write any two properties of Auto-correlation.
9. List any four properties of power spectral density.
10. Define White Noise and give its power spectral density.

PART – B

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

11. a) Two persons A and B alternately throw a pair of die. A wins, if he gets the sum of two dice 5 before B gets 4. B wins, if he gets the sum of two dice 4 before A gets 5. If A starts the game, find the probability that B wins the game?
    b) For a binary communication channel the probability that a transmitted 0, received 6M as 0 is 0.95. The probability that a transmitted 1, received as 1 is 0.9. If the probability that a 0 is transmitted is 0.4, Find the probability that
    i) 1 is received.
    ii) If 1 is received, What is the probability that 1 was transmitted?

12. a) A fair coin is tossed 900 times. What is the probability that the number of heads is between 420 and 465?
    b) Given the RV 'X' with the density function $f(x) = 2x \; for 0 < x < 1$ = 0 else where
    Determine the pdf
    Of $Y = 8x^3$

13. Two random variables X & Y are jointly distributed over the region $0< x <y <1$

as f (x, y) = { kx ; $0< x <y <1$

{0 ; otherwise.

Find i) k ii) Means of X & Y iii) Variances of X & Y iv) Co-variance of X & Y

14. a) State the properties of cross correlation function.

b) If U(t) = X cos t + Y sin t. and V(t) = Y cos t + X sin t, where X and Y are independent RVs such that E(X) = E(Y) = 0, $E(X^2) = E(Y^2) =1$. Prove that {U(t)} and {V(t)} are individually WSS processes.

15. Consider a white Gaussian noise of zero mean and power spectral density No/2 applied to a low-pass RC filter whose transfer function is given. Find the auto-correlation function of the output random process. $H(f) = \frac{1}{1+i2\pi fRC}$.

16. a) A fair coin is tossed 3 times and if X represents the number of heads appeared.

Find the distribution of X.

b) The process X(t) is a WSS and normal with E{X(t)} =0 and

Determine i) $P\{X(t) \leq 3\}$

ii) $E\{X(t+1) - X(t-1)]^2\}$

17. a) For the joint probability distribution of two discrete random variables X& Y given below. Find i) P(X< 2, Y< 3) ii) P(X< 2/Y< 3) iii) P(X+Y< 4)

X/Y	1	2	3
$1/36$	$4/36$	$3/36$	$2/36$
$2/36$	$3/36$	$7/36$	$5/36$
$3/36$	$5/36$	$2/36$	$5/36$

b) Suppose that customers arrive at a bank according to a Poisson process with mean rate of 3 per minute. Find the probability that during a time interval of 2 minutes.

(i) exactly 4 customers arrive

(ii) more than 4 customers

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Code No. D-2355/AICTE

FACULTY OF ENGINEERING

B.E. (ECE/MECH/PROD/AE/IT) III - Semester (AICTE) (Main) Examination, March / April 2022

Subject: Effective Technical Communication in English

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

Note: (i) First question is compulsory and answer any four questions from the remaining six questions. Each question carries 14 marks.
(ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.
(iii) Missing data, if any, may be suitably assumed.

1 (a) Describe the importance of style in Technical Communication.
(b) List some rules of email etiquette.
(c) What is the difference between solicited and unsolicited proposals?
(d) What does SOP stand for in operation manual?
(e) What is a progress report?
(f) List the various types of manuals. What are their features?
(g) What are the important aspects of oral and visual presentations?

2 (a) Explain the process of communication.
(b) What are the different types of technical communication? Explain how oral communication differs from written communication.

3 (a) Explain the formal channels in an organization along with a flowchart.
(b) Define the ABC of technical communication in detail.

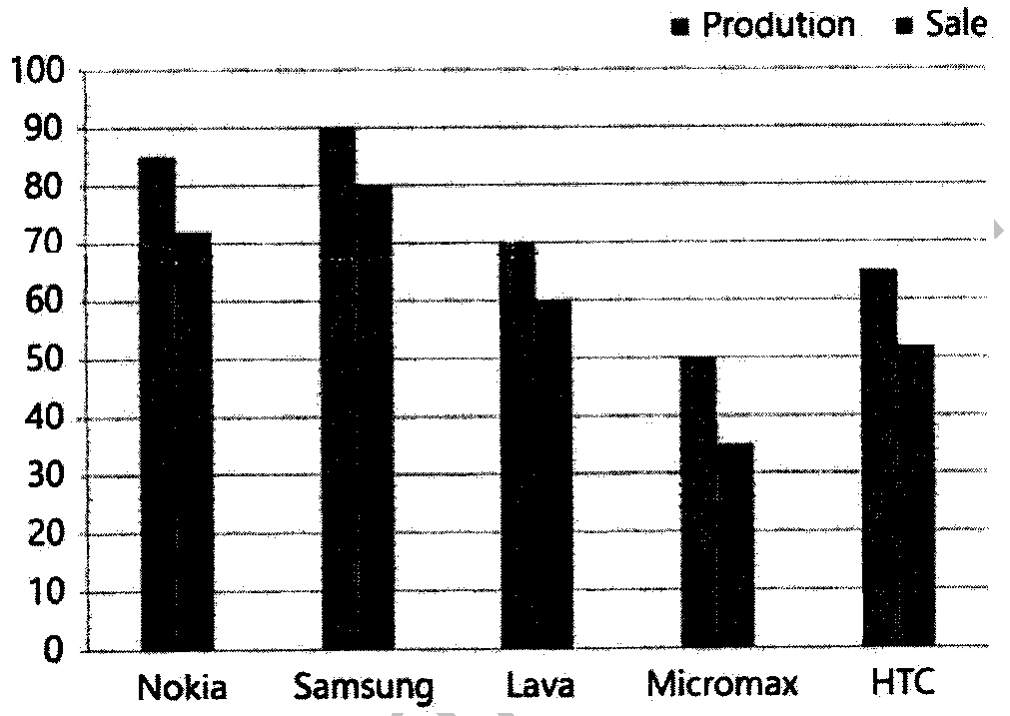
4 (a) Explain the classification of memos and their purposes in an organization.
(b) The head of your organization is worried about the amount of time employees spending on cellphones during the office time. Draft a memo to be signed by him and circulated among all employees, cautioning them against overuse of cellphones during working hours.

5 (a) Enumerate the standard elements of business letters.
(b) As a Purchase Manager of a reputed firm, write a complaint letter to the Sales Manager of InfoTech Computers for the late delivery of 15 computers ordered. Invent necessary details.

6 (a) Write a user manual for Airpods using necessary elements of user guide.
(b) Write a feasibility report on having a lab class management software where teacher can broadcast screen with the students in English Lab Classes in Computer Aided Language Lab.

7 (a) Write the importance of information transfer. List the advantages of verbal and non-verbal information.

(b) Observe the following bar graph and prepare a write up showing the production and the sale of different mobile phone brands.



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Code No. D-2396/AICTE

FACULTY OF ENGINEERING

B.E. (DS) III – Semester (AICTE) (Main) Examination, March / April 2022

Subject: Python Programming

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

Note: (i) First question is compulsory and answer any four questions from the remaining six questions. Each Question carries 14 Marks.
(ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.
(iii) Missing data, if any, may be suitably assumed.

1.

(a) What is method Resolution Order?

(b) Write a Python statement that swaps values of two variables. (Only one line statement)?

(c) What is PIP?

(d) Give the differences between Generator function

(e) Compare fruitful and void function?

(f) What is strings and Text Files in Python?

(g) Defined the namespace, Higher Order Function?

2. (a) Describe the Use of Inheritance in Python?

(b) Write in detail about Using Python Packages?

3. (a) What are operators in Python? Describe Specifically about identity operator and membership operator?

(b) Write a Python script to print the following pattern?

```
*   *   *   *
 *   *   *
  *   *
   *
```

..2

4. (a) Write short note on the following?

   (i) Multiline comments (ii) Docstring in Python

   (iii) Rules and Naming convention for variables and constants

   (iv) Python import statement

   (b) Write a Program illustrating the use of numeric literals and string literals?

5. (a) Write a Python code to create an account object with at least two functions?

   (b) Write a Program to draw overlapping circles inclined to 30 degrees on the computer screen?

6. (a) Explain the list Accessing Methods and List Comprehension?

   (b) Write a Python Program to read a word and print the number of letters, vowels and percentage of vowels in the word using a dictionary?

7. (a) Demonstrate implantation of hierarchical inheritance in Python, with a Program?

   (b) What happens if except clause is written without any Exception type? Explain with an example?

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Code No. D-2391/AICTE

FACULTY OF ENGINEERING

B.E. (AI & ML) III – Semester (AICTE) (Main) Examination, March / April 2022

Subject: Python Programming

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

Note: (i) First question is compulsory and answer any four questions from the remaining six questions. Each Questions carries 14 Marks.
(ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.
(iii) Missing data, if any, may be suitably assumed.

1.
(a) Describe the print function.
(b) Write short notes on membership operators in Python.
(c) What is a module? Write syntax for importing the modules.
(d) Describe mkdir() and getcwd() methods of OS module.
(e) Write a short note on global interpreter lock?
(f) Describe the basic HTML tags.
(g) Differentiate commit and rollback methods.

2. (a) Define List? Explain any 5 list built-in-methods with example?
(b) List and explain various numeric types supported by python?

3. (a) Explain the following file functions and methods with the clear syntax, description, and illustration: I) Open() II) Write () III) read()

(b) How does the try-except statement work? Demonstrate with an example python code.

4. (a) Explain the match(), search(), findall() and sub() methods of 're' module with suitable examples.
(b) What is a thread? Explain the uses of threads with a sample program?

5. (a) Explain **jinja2** template with the example program.
(b) Describe the request object attributes with a sample program.

6. (a) Explain basic SQL operations with suitable examples?
(b) Write a detailed explanation of the cursor object attributes.

7. (a) Create a calculator application. Write a program with two user inputs and an operator in the format: N1 OP N2, where N1 and N2 are floating-point or integer values, and OP is one the following: +,-,*,/, % ,**, representing addition, subtraction, multiplication, division, modulus/remainder, and exponentiation, respectively, and displays the result of carrying out that operation on the input operands.
(b) Write a python program to copy the contents from one file to another file.

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Code No. D-2024/O/AICTE

FACULTY OF ENGINEEERING

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

Subject: Energy Science and Engineering

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

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

PART – A

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

1. Mention the various sources of energy
2. State the differences between conventional and renewable energy sources.
3. What are the methods to dispose radioactive waste?
4. Mention the various types of collectors
5. Identify the various fossil fuels used in power generation
6. Write short notes on Nuclear reactor core
7. Discuss various methods of mechanical energy storage
8. Summarize the concept of Co-generation
9. What are the methods of pollution control?
10. Explain the significance of energy efficiency rating

PART – B

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

11. a) Discuss briefly the merits and demerits of conventional energy sources.
    b) Distinguish between the thermal power and hydroelectric power.

12. Explain in detail, the working principle and various components of steam turbine power plant schematically.

13. a) Explain briefly the energy storage devices with its applications.
    b) Explain the process of biomass conversion into useable fuel.

14. a) Explain the nuclear fission reaction with a neat sketch.
    b) What are spillways? Explain the necessity of hydro energy spillways.

15. How tides are produced? Classify the tidal energy power plant and its limitations.

16. Explain the concept of waste heat recovery classification along with its applications and advantages.

17. Write short notes on

    a) Wave energy power plant
    b) Types of Pollutants

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Code No. D-2037/N/AICTE

FACULTY OF ENGINEERING

B. E. (ECE) III – Semester (AICTE) (Backlog) Examination, March / April 2022

Subject: Electronic Devices

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

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

PART – A

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

1. What are transition and diffusion capacitance of a PN junction?
2. Define drift and diffusion currents of a semiconductor?
3. What are the advantages and disadvantages of bridge rectifier?
4. Define transformer utilization factor and efficiency of a rectifier?
5. What is early effect in BJT – Explain briefly.
6. Define current stability factor and voltage stability factor of BJT amplifier?
7. Draw hybrid-π model of Transistor and write typical values of it's parameters?
8. Compare CE, CB and CC configurations of BJT amplifier?
9. Write differences between BJT and FET?
10. Differentiate MOSFET and JFET?

PART – B

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

11. Explain V-I characteristics of PN junction Diode for forward bias and reverse bias with neat circuit diagram and waveforms?

12. Draw and explain Full wave rectifier with inductor filter adnd derive expression for ripple factor?

13. Obtain operating point and stability factor of self bias BJT amplifier using silicon transistors with R_L = 4 kohms, R_1 = 100 Kohms, R_2 = 10 Kohms, Vcc = 15 V Ic=10mA and β = 100?

14. Derive expressions for voltage gain, current gain, input resistance and output resistance of a CE-BJT amplifier using simplified h-parameter model?

15. Explain construction of a JFET. Obtain characteristics of CS amplifier?

16. (a) Explain diode switching characteristics with waveforms?

    (b) Convert π-parameters to h-parameters for a BJT?

17. Write short notes on:

    (a) Photo Diode (b) Enhancement MOSFET (c) Zener voltage regulator.

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FACULTY OF ENGINEERING

B.E. (ECE) III - Semester (AICTE) (Backlog) Examinations, March / April 2022
Subject: Electronic Devices

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 reverse recovery time (t_{rr}) of a diode?
2. Differentiate between Zener and Avalanche breakdown mechanisms.
3. Find I_{DC} of a half wave rectifier when transformer secondary voltage is 100V.
4. Illustrate advantages and disadvantages of bridge rectifier?
5. Write the condition to avoid thermal breakdown in a transistor.
6. Find β, α and I_C when I_E = 80mA, I_B =200μA.
7. Draw the small signal approximate model of a transistor in CE configuration.
8. Explain hybrid –π model of a transistor.
9. Given I_D =20mA,I_{DSS}=5mA and Vp=4.1V calculate transconductance of FET.
10. Sketch the process flow of IC fabrication technique.

PART - B

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

11. a) Explain the working of PN junction under forward bias and reverse bias with neat diagram?
    b) Differentiate between diffusion and transition capacitance in a diode?

12. a) Derive ripple factor of FWR with Inductor filter? Write the formula for regulation?
    b) Design filter for FWR with L filter operating at 60Hz to provide a dc output with 4% ripple for a 100Ω load.

13. a) Derive the stability factor equation for a Collector to base bias circuit.
    b) An NPN transistor with β=100 is used in a common emitter circuit with a Resistance from collector to base. Assume VBE = 0.7V ,VCC =12V ,RC =1KΩ.The bias is obtained by connecting a 100 KΩ resistance from collector to base. Find
    (i) Quiescent point (ii) Stability factor S

14. a) Draw an approximate hybrid model for CB amplifier and derive current gain AI,, input impedance Ri, voltage gain Av and output impedance Ro.
    b) For a CB amplifier driven by a voltage source of internal resistnce R_S = 600Ω ,the load impedance is R_L =1KΩ. The h-parameters are h_{fb}= 22 Ω, h_{fb}= -0.98 and h_{ob} =0.25μA.Compute the current gain A_I , the input impedance R_i , Voltage gain A_V and output impedance R_o.

15. a) Explain the construction and operation of n-channel JFET and draw drain and transfer characteristics.

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b) Differentiate between depletion and enhancement mode MOSFETs.

16. a) Draw the energy band diagram of PN junction Diode.

b) Define h-parameters for CE configuration. Explain why they are preferred for Analysis of transistor?

17. Write short notes on the following.
a) Bridge Rectifier
b) Photolithography process
c) Bias stabilization Techniques

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Code No. D-2041/O/AICTE

FACULTY OF ENGINEERING

B.E. (MECH/PROD/AE/CSE/IT) III - Semester (AICTE) (Backlog) Examinations, March / April 2022

Subject: Basic Electronics

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

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

PART – A

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

1 Define drift Current in a semiconductor.
2 A JFET has a drain current of 4 mA. If loss = 6mA and Vp = -6V.
3 List the ideal characteristics of an OP – AMP.
4 Derive relation β and α.
5 What are the advantages of negative feedback.
6 What are universal gates? Why it is so called.
7 Explain strain gauge – briefly.
8 What are the applications of CRO.
9 Draw the circuit of Full adder and its truth table.
10 Explain Early Effect.

PART – B

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

11 a) Explain v-I Characteristics of a P-N junction diode and write the applications of diode.
b) Explain the operation of a Capacitor filter with full wave rectifier and derive an expression

12 a) Draw the Circuit of an integrator using Operational amplifier and explain its working. Derive an expression for its output voltage
b) Explain the working of JFET. Describe its drain and transfer characters.

13 a) Draw the Circuit of an integrator using Operational amplifier and explain its working. Derive an expression for its output voltage.
b) Explain the construction and working of BJT.

14 a) Classify negative feedback amplifiers and explain them.
b) State Barkhausen criterion for oscillations

15 a) Explain about Crystal Oscillator.
b) Differentiate between Avalanche and Zener breakdown mechanisms
c) Draw the block diagram of operational amplifier and write the function of each block.

16 a) Explain the operation of a Bridge rectifier.
b) Draw the symbols and truth tables for AND, OR, NAND, NOR, XOR gates.

17 Discuss a) R-2R Ladder DAC b) Instrumentation amplifier c) LVDT

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