EE-L

Total No. of Questions: 22 **Total No. of Pages: 02**

Roll No. _____ **Paper Code**
3E1216

B.Tech. III-Sem (Main & Back) January-2026
Electrical & Electronics Engg.
3EX2-01 Advance Mathematics
EE,EX
3E1216

Time : 3 Hours **Maximum Marks : 70**

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly. Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1._____ 2. _____

Part-A

(Answer should be given up to 25 words only)

All questions are compulsory **10x2=20**

Q. 1 Find $\Delta\left[\frac{2^x}{(x+1)!}\right]$

Q. 2 Prove that $\left(\frac{\Delta^2}{E}\right)e^x \cdot \frac{Ee^x}{\Delta^2 e^x} = e^x$

Q. 3 Define Lagrange's interpolation formulae for n observations.

Q. 4 Write the rate of convergence and iteration formulae of Regula Falsi method. T-435

Q. 5 Find the Laplace transform of $Sin^5 t$.

Q. 6 Define second shifting property of Laplace transform.

Q. 7 Examine Fourier transform of $f(x) = \begin{cases} 1-|x| & |x|<1 \\ 0, & |x|>1 \end{cases}$

Q. 8 What do you mean by region of convergence (ROC) of z-transform? Explain. T-435

Q. 9 Write sufficient condition for $f(z)$ to be analytic.

Q.10 Explain conformal and Isogonal mapping of a complex function.

Part B
(Analytical/Problem solving questions)

Attempt any Five questions. **5x4=20**

Q. 1 Evaluate $\int_0^5 \frac{dx}{4x+5}$ by using simpson's 1/3 rule, taking 10 equal parts. Hence, find the approximate value of $\log_e 5$.

T-435

Q. 2 Find the Fourier Cosine transform of $f(x)=\begin{cases} x & , 0<x<1 \\ 2-x & , 1<x<2 \\ 0 & , x>2 \end{cases}$

Q. 3 The population of a town, as obtained from census data, is shown in the following table. Using Newton Gregory interpolation formula, find the population of year 1936.

Year	1921	1931	1941	1951	1961
Population (In thousands)	19.96	39.65	58.81	77.21	94.61

Q. 4 Show that $f(z)=z|z|$ is not analytic anywhere.

Q. 5 Find the real root of the equation $3x=\cos x+1$, by Newton Rephson method correct up to four decimal places.

Q. 6 Find the analytic function $f(z)=u+iv$, whose real part u is $\frac{x}{x^2+y^2}$

Q. 7 Evaluate the given integral using Laplace transform : $\int_0^\infty e^{-4t}\cosh^3 t\, dt$

Part C
(Descriptive/Analytical/Problem Solving/Design question)

Attempt any three questions. **3x10=30**

Q. 1 Using Strirling's formula, estimate the value of $\tan 16^\circ$

x^0	0^0	5^0	10^0	15^0	20^0	25^0	30^0
y =tan x	0	0.0875	0.1763	0.2679	0.3640	0.4663	0.5774

Q. 2 Solve the following problems:-

(a) Find the Z-transform of $f(k)=3(2^k)-4(3^k), k\geq 0$

T-435

(b) Using Laplace transform, show that $\int_0^\infty e^{-t}t^3 \sin t\, dt=0$

Q. 3 Evaluate $\int_0^\pi \frac{\sin^2 x}{5+4\cos x}$ dx by using Trapezoidal rule and simpson's 3/8 rule.

Q. 4 Find the image of the strip $\frac{1}{4}\leq y\leq \frac{1}{2}$ under the transformation $w=\frac{1}{z}$. Also, show the regions graphically.

Q. 5 Find the Fourier sine and cosine transforms of: (a) x^{m-1} (b) $\frac{1}{\sqrt{x}}$

Total No. of Questions: 22 Total No. of Pages: 04

Roll No. _____ Paper Code 3E1250

B.Tech. III-Sem (Main & Back) January-2026
Aeronautical Engineering
3AN1-02/ Technical Communication/
All Branches
3E1250

Time : 3 Hours **Maximum Marks : 70**

Attempt all Ten Questions from Part A. Five questions out of seven questions from Part-B and three questions out of five questions from Part-C

Schematic diagrams must be shown wherever necessary. Any data missing may suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly. Use of following supporting material is permitted during examination (Mentioned in form No. 205)

1. NIL 2. NIL

Part A

(Answer should be given up to 25 words only)

All questions are compulsory. **10x2=20**

Q.1 What is technical communication ?

T-435

Q.2 Identify two essential aspects of technical communication that ensure clarity and precision.

Q.3 Mention the primary communication skills for technical communication.

Q.4 What is the purpose of a technical manual ?

Q.5 Give the full form of Mom.

Q.6 Define the term "Information design."

T-435

Q.7 What do you know about the forms of technical discourse ?

Q.8 Name four different types of technical documents.

T-435

Q.9 Define the key function of technical reports in professional communication.

Q.10 What is a project proposal ?

Part B

(Analytical/Problem solving questions)

Attempt any Five questions **5x4=20**

Q.1 How can effective technical communication improve collaboration and decision - making in a workplace environment ?

Q.2 Draft an email to a company asking for more information about one of their new products. Use proper email format and polite, professional language.

Q.3 Based on the passage given below, make notes under the following heading. **The Evolution of Technical Communication.**

Technical communication has undergone significant changes over the past few decades, driven by advancements in technology and the evolving needs of industries. In the past, technical documents were often static, printed manuals with little room for updates. Today, technical communication is dynamic and interactive, often delivered through digital platforms. This shift has not only changed how information is presented but also how it is consumed.

One of the most important aspects of technical communication is clarity. Writers need to ensure that even complex information is presented in a way that is accessible to the intended audience. The requires careful consideration of language, structure, and design. Technical communicators must balance detail with simplicity, making sure that all essential information is included without overwhelming the reader.

T-435

Moreover, the role of technical communicator has expanded. They are not just writers, but also information designers, editors, and even project mangers. With the rise of digital tools, technical communicators often collaborate with engineers, designers, and developers to create comprehensive user guides, product documentation, and online help

systems. The increased reliance on digital communication platforms, such as websites and mobile application, has also made it necessary for technical communicators to develop skills in content management, search engine optimization (SEO), and user experience (UX) design.

T-435

Q.4 Write an official note to inform all department heads about an upcoming meeting regarding the annual budget review. Include relevant information.

Q.5 Discuss effective editing strategies that can improve the clarity and professionalism of technical documents.

Q.6 Imagine you work in the It department of a company , and you need to request additional software licenses from a vendor. Write a formal letter requesting a price quote for 50 new licenses of a software product.

Q.7 Write a short article for the company newsletter about the importance of cybersecurity in today's digital world.

Part C

(Descriptive /Analytical/Problem Solving/Design question)

Attempt any three questions **3x10=30**

Q.1 Discuss how technical communication differs from general communication in detail ?

Q.2 Do as instructed :

A. Identify the grammatically correct sentence.

a. He don't have any idea about the project.

b. He doesn't has any idea about the project.

T-435

c. He doesn't have any idea about the project.

d. He doesn't having any idea about the project.

B. Choose a sentence that uses punctuation correctly.

a. Please submit your report by Monday, July 15, 2024.

b. Please submit your report by Monday July 15 2024.

c. Please submit , your report, by Monday July 15, 2024.

d. Please submit your report, by Monday, July, 15, 2024.

T-435

C. Which of the following sentences is correct ?

a. The technician fixed the printer quickly.

b. The technician quickly fixed the printer.

c. Quickly, the technician fixed the printer.

d. The technician fixed the printer that was broken in the office.

D. Select the correct passive voice form of the sentence : "the engineer completed the project".

a. The project is completed by the engineer.

b. The project has been completed by the engineer.

c. The project was completed by the engineer.

d. The project was completing by the engineer.

E. Which sentence uses a conjunction correctly ?

a. She studied hard, or she could pass the exam.

b. She studies hard, so she passed the exam.

c. She studied hard, for she could pass the exam.

d. She studied hard, nor she passed the exam.

Q. 3 Imagine you are applying for a technical writer position at a software company. Write a letter introducing yourself, explaining why you are a good fit for the role, and summarizing your skills.

T-435

Q. 4 Discuss the linguistic abilities required for effective technical communication

Q.5 Explain the steps in writing technical articles for print and online.

Total No. of Questions: 22 **Total No. of Pages: 02**

Roll No. _____ **Paper Code**
3E1221

B.Tech. III-Sem (Main & Back) January-2026
Electrical & Electronics Engg.
3EX3-04 Power generation Process
EE,EX
3E1221

Time : 3 Hours **Maximum Marks : 70**

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly. Use of following supporting material is permitted during examination. (Mentioned in form No. 205)
1._____ 2._____

Part-A
(Answer should be given up to 25 words only)

All questions are compulsory T-435 **10x2=20**

Q. 1 State the basic working principle of a thermal power plant.
Q. 2 List two differences between open cycle and-cloved - cycle gas turbine plants.
Q. 3 Define pumped storage plant and mention its main purpose.
Q. 4 Differentiate between nuclear fission and nuclear fusion.
Q. 5 Define Load factor and Diversity factor.
Q. 6 Write two major impacts of thermal power plants on the environment.
Q. 7 Define power factor and mention one cause of low power factor.
Q. 8 What is meant by two-part tariff?
Q. 9 Define capacity factor and utilization factor.
Q.10 Differentiate between base load and peak load with suitable examples.

Part B
(Analytical/Problem solving questions)

Attempt any Five questions. T-435 **5x4=20**

Q. 1 Explain with a neat sketch the working of hydroelectric power plants.

Q. 2 Discuss the greenhouse effect and its impact on the global climate.

Q. 3 Discuss the concept of spot pricing and its advantages in modern power markets.

T-435

Q. 4 Explain the need for sustainable energy systems and conservation of natural resources.

Q. 5 A generating station has a connected load of 50MW and a maximum demand of 40MW. The annual energy generated is $175 \times 10^6 kwh$. Calculate the load factor and plant capacity factor.

Q. 6 Write short notes on:

(a) Annual fixed and operating costs of plants .

(b) Depreciation cost

Q. 7 Explain the following terms with respect to nuclear power station.

(a) Moderator (b) Control Rods (c) Coolant

Part C

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any three questions. **3x10=30**

Q. 1 (a) Explain the layout and working of a thermal power plant with a neat schematic diagram.

(b) Discuss its advantages and disadvantages compared to hydro power plants.

Q. 2 State the difference between different types of nuclear reactors used in power generation.

Q. 3 Compare thermal, hydro, nuclear, and gas power plants based on initial cost, running cost,efficiency, location of plant, pollution , life span, safety, cost of energy per kwn, losses.

Q. 4 Define Tariffs. Explain the different types of tariff structures used for electricity consumers.

T-435

Q. 5 Discuss renewable energy generation through , wind, solar and tidal sources with neat sketches.

Total No. of Questions: 22 **Total No. of Pages: 04**

Roll No. _____ **Paper Code**
3E1218

B.Tech. III-Sem (Main & Back) January-2026
Electrical & Electronics Engg.
3EX4-05 Electrical Circuit Analysis
EE,EX
3E1218

Time : 3 Hours **Maximum Marks : 70**

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly. Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1._____ 2._____

Part-A

(Answer should be given up to 25 words only)

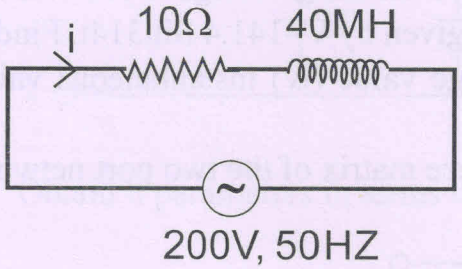
All questions are compulsory T-435 **10x2=20**

Q. 1 State and explain maximum power transfer theorem.

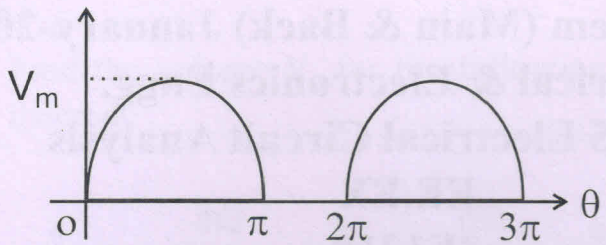
Q. 2 Derive condition for symmetry for (A-B-C-D) parameters.

Q. 3 Comparison of series and parallel R-L, R-C, RL-C circuit. T-435

Q. 4 A coil having resistance of 10Ω of inductance of 40MH is connected to 200V, 50 Hz supply. Calculate impedence of the coil, current, power factor and power consumed.



Q. 5 Find the average and RMS values of the wave forms shows.



Q. 6 Application of transmission parameters & hybrid parameters.

Q. 7 Explain the laplace transform.

Q. 8 Define the Nodal and mesh Analysis. T-435

Q. 9 Characteristics of impedance parameters and admittance parameters.

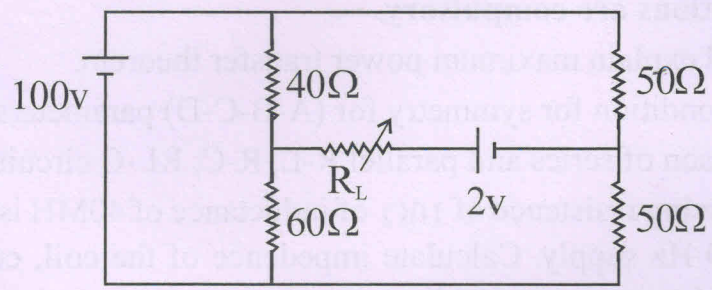
Q.10 Three idential coils each of [4.2+j5-6] ohms are connected in star across a 415V, 3-phase, 50Hz supply Determine (i) Vph (ii) Jph

Part B
(Analytical/Problem solving questions)

Attempt any Five questions. **5x4=20**

Q. 1 Write down restrictions on pole & zero locations for driving point function and transfer function.

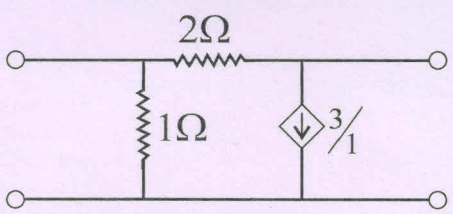
Q. 2 Find maximum power in R_L.



Q. 3 Explain the generation of alternating voltage in AC circuits.

Q. 4 An alternating voltage is given by V=141.4 Sin314t. Find (i) frequency (ii) rms value (iii) average value (iv) instantaneous value of voltage when it is 3MS. T-435

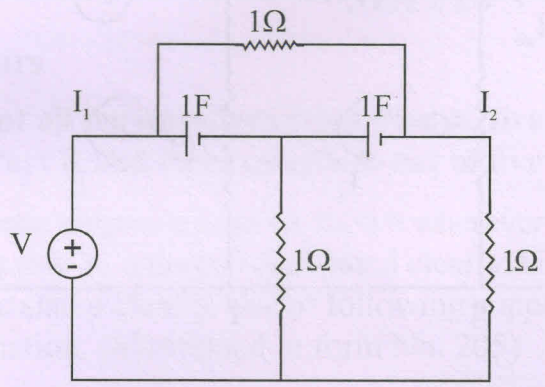
Q. 5 The open circuit impedance matrix of the two port networks shown is.



T-435

Q. 6 State and explain the Norton theorem.

Q. 7 For the given network, find the driving point admittance Y_{11} & transfer admittance Y_{12}.



Part C

(Descriptive/Analytical/Problem Solving/Design question)

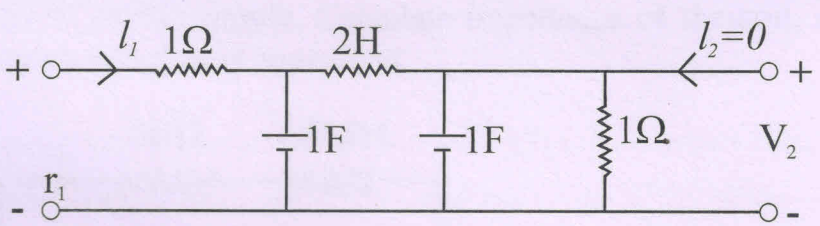
Attempt any three questions. **3x10=30**

Q. 1 Short note on:- T-435

(a) Ideal transformer

(b) Two-Port Network

Q. 2 For the given ladder network determine the voltage transfer function r_2/v_1.



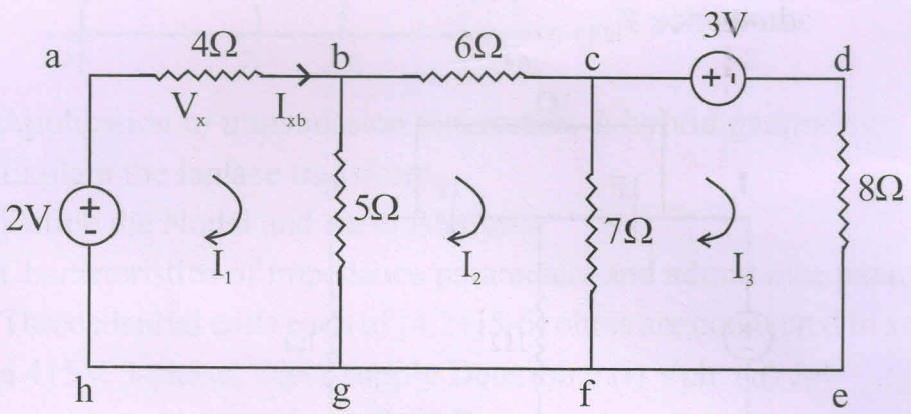
Q. 3 Obtain h parameters in terms of ABCD parameters.

Q. 4 Plot pole zero diagram & obtain v(t) of given network.

$$Y(S)=\frac{3S}{(S+2)(S^2+2S+2)}$$

T-435

Q. 5 Find the voltage V_x for the following circuit using superposition theorem. T-435



Total No. of Questions: 22 **Total No. of Pages: 02**

Roll No. _____ **Paper Code**
3E1217

B.Tech. III-Sem (Main & Back) January-2026
Electrical & Electronics Engg.
3EX4-06 Analog Electronics
EE,EX
3E1217

Time : 3 Hours **Maximum Marks : 70**

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly. Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1._____ 2._____

Part-A
(Answer should be given up to 25 words only)

All questions are compulsory **10x2=20**

Q. 1 Distinguish between clamping and clipping circuits.

Q. 2 A transistor has $\beta = 100$ and $IB = 40\mu A$. Determine IC.

Q. 3 State two differences between enhancement - type and depletion-type MOSFETs. T-435

Q. 4 In a CS MOSFET amplifier, gm=3 mA/V and RD=4kΩ . Compute voltage gain.

Q. 5 State two advantages of using a differential amplifier as an imput stage.

Q. 6 What is the function of an instrumentation amplifier?

Q. 7 List any two practical limitations of an ideal differentiator circuit.

Q. 8 A comparator used $\pm 12V$ saturation limits. If reference voltage is 3V, sketch the expected output levels.

Q. 9 Define hysteresis width in a Schmitt trigger. T-435

Q.10 Write any two assumptions used in a small-signal BJT model.

Part B
(Analytical/Problem solving questions)

Attempt any Five questions. T-435 **5x4=20**

Q. 1 Explain the working of a zener regulated power supply. For Vin=20 V, Vz=12 V, Rs=220 Ω compute load current range for RL=300 - 800 Ω.

Q. 2 Describe the operation of a current mirror and derive expression for mirror current assuming $\beta \to \infty$.

Q. 3 A MOSFET amplifier has $gm = 4mA/V$, $rd = 50k\Omega$, $RD = 12k\Omega$. Calculate overall voltage gain using small-signal model.

Q. 4 A differential amplifier has AD=300, ACM=0.8. If input differential voltage is 6mV and common-mode voltage is 2mV, calculate output differential and CM voltages.

Q. 5 Explain the working of an instrumentation amplifier and derive its differential gain formula.

Q. 6 Explain a monostable multivibrator using op-amp. Derive pulse-width expression.

Q. 7 Describe the process of clipping and clamping using diodes . Illustrate with suitable waveforms for a biased clipper.

Part C
(Descriptive/Analytical/Problem Solving/Design question)

Attempt any three questions. **3x10=30**

Q. 1 Using carrier drift and diffusion mechanism, derive the I-V characteristics of a PN junction diode and explain how piecewise-linear appromixation is obtained.

Q. 2 Derive expressions for voltage gain, input resistance and output resistance of a CE amplifier using the hybrid-π model. For β=150, gm=40 mA/V, rπ=3kΩ, RC=2.2 kΩ compute Av and Ri.

Q. 3 Describe the internal block diagram of operational amplifier and explain each stage (input differential stage, gain stage, level shifter, output stage). T-435

Q. 4 Derive the transfer functions of inverting and non-inverting integrators. For $R = 47\Omega$ and $C = 0.1\mu F$, find output waveform for a 1 kHz sine wave of amplitude 2V.

Q. 5 Explain precision rectifier behavior at low voltage levels. Design a full wave precision rectifier and calculate peak output for input 15 Vpp with ideal op-amp.

Total No. of Questions: 22 Total No. of Pages: 02

Roll No. _____ Paper Code 3E1219

B.Tech. III-Sem (Main & Back) January-2026
Electrical & Electronics Engg.
3EX4-07 Electrical Machine - I
EE,EX
3E1219

Time : 3 Hours **Maximum Marks : 70**

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly. Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1._____ 2. _____

Part-A
(Answer should be given up to 25 words only)

All questions are compulsory **10x2=20**

Q. 1 What is fringing in a magnetic path?

Q. 2 What is flux density? T-435

Q. 3 State Biot- Savart law.

Q. 4 Define reluctance of a magnetic circuit.

Q. 5 Explain why hysteresis occurs in magnetic materials?

Q. 6 A coil has 500 turns and carries 2 A. Calculate in MMF.

Q. 7 What is armature demagnetizing effect?

Q. 8 A pole has 0.03 Wb flux and 10 turns. Find flux linkage.

Q. 9 Write the EMF equation of a DC generator.

Q.10 Mention two advantages of wave winding. T-435

Part B
(Analytical/Problem solving questions)

Attempt any Five questions. **5x4=20**

Q.1 Explain the effect of air-gap length on magnetic reluctance.

Q.2 A magnetic circuit has reluctance $3\times10^5\ A/Wb$ and MMF =900AT. Calculate Flux.

Q.3 Explain armature reaction. T-435

Q.4. A 6-pole lap wound generator has 900 conductors, flux / pole=0.02 Wb, speed = 800rpm. Find generated EMF.

Q.5 Explain the energy stored in a magnetic field and derive the formula.

Q.6 A DC shunt generator has $Rf = 150\Omega$. Find field current at 220 V. Also find field copper loss.

Q.7 Draw and explain torque-speed characteristics of series and shunt motors.

Part C

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any three questions. **3x10=30**

Q. 1 Explain the construction of a DC generator with neat labeled diagrams.

Q. 2 A 6-pole generator, wave wound, had 720 conductors. Flux/pole=0.025 Wb, Speed =900 rpm. Find: (a) EMF, (b) Output power at 22 A.

Q. 3 Discuss losses and efficiency testing in DC machines.

Q. 4 A shunt motor shows unstable speed when connected to a weak supply system.

(a) Draw block diagram of electromechanical feedback explaining how back EMF acts as natural stabilizer.

(b) Explain mathematically how line voltage fluctuations distort torque-speed characteristics ? T-435

(c) Show using calculations how armature reaction can worsen instability?

(d) Suggest methods (design+operational) to stabilize speed.

Q. 5 A student claims that "armature reaction always reduces EMF in a generator". Critically analyse the statement.

(a) Provide conditions where armature reaction may increase, decrease, or not affect EMF.

(b) Use mmf diagrams to show each case.

(c) Discuss how brush shift alters the flux pattern.

(d) Link armature reaction effects to machine performance under over - excited and under excited conditions.

Total No. of Questions: 22 **Total No. of Pages: 02**

Roll No. _____ **Paper Code**
3E1220

B.Tech. III-Sem (Main & Back) January-2026
Electrical & Electronics Engg.
3EX4-08 Electromagnetic Fields
EE,EX
3E1220

Time : 3 Hours **Maximum Marks : 70**

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly. Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1._____ 2._____

Part-A

T-435

(Answer should be given up to 25 words only)

All questions are compulsory **10x2=20**

Q. 1 Difference between scalar and vector quantity.

Q. 2 Define ohms law in point form.

Q. 3 Applications of Gauss law.

Q. 4 Enlist any four properties of electromagnetic fields / wave.

Q. 5 Characteristics of Motional electromotive forces.

Q. 6 Definition of Boundary conditions and electric dipole.

Q. 7 Explain the surface and volume charge distributions.

Q. 8 Derive the poynting theorem. T-435

Q. 9 Advantages and disadvantages of static magnetic field.

Q.10 State the Coulomb's law in electrostatics.

Paper Code
3E1220

Part B

(Analytical/Problem solving questions)

Attempt any Five questions. T-435 **5x4=20**

Q. 1 Use Biot-Savart's law for any finite current carrying conductor to find magnetic field intensity.

Q. 2 Point charge $Q = -0.2uc$ placed at origin in free space. find electric field intensity & electric potential at (0,6,8)m.

Q. 3 Explain the concept of Magnetic scalar potential.

Q. 4 For a vector field show that the divergence of the curl of any vector field is zero.

Q. 5 Formulate wave equation for perfectly dielectric medium.

Q. 6 Derive the Laplace equation.

Q. 7 Compare electric and magnetic fields using any six points.

Part C

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any three questions. **3x10=30**

Q. 1 Formulate electromagnetic wave equation from Maxwell's equation for perfectly conducting and insulating media.

Q. 2 Prove that $\overline{E} = -\Delta.V$. Also derive the Poission's and Laplace equation.

Q. 3 Derive Gauss laws in the point form for an electric field and magnetic field. T-435

Q. 4 Calculate the magnetic field intensity $\overline{H}$ due to infinite conductor carrying current I along z axis.

Q. 5 Derive electric field intensity due to an infinite plane having density $\rho_s\left(c/m^2\right)$