Sylhet Engineering College, Sylhet
(Shahjalal University of Science & Technology)
Department of Electrical and Electronic Engineering

Final Examination, 2024 | **2nd Year 1st Semester**
Course No: ENG 201 | **Course Title: English**
Time: 03 (Three) hours | **Full Marks: 60**

N.B.: (i) Answer the questions from each PART as directed (ii) Use separate answer scripts for each PART
(iii) Marks allotted are indicated in the margin (iv) Special Instruction (if any)-------N/A.....

PART-A
(Answer all the questions)

Read the following passage and answer the questions below.

Urban green spaces, such as parks, gardens, and tree-lined streets, are increasingly vital in modern cities. These areas provide a range of benefits that enhance the quality of urban life. As cities grow denser, green spaces offer a counterbalance to concrete landscapes, improving both environmental and human well-being.

One major benefit is their role in combating air pollution. Trees and plants absorb carbon dioxide and release oxygen, while also filtering particulate matter from vehicle emissions. A 2023 study found that urban parks can cut down nearby air pollution levels by up to 20%. This is critical in cities where poor air quality contributes to respiratory issues. Additionally, green spaces help mitigate the urban heat island effect, where concrete and asphalt absorb and radiate heat, raising city temperatures. Shaded areas from trees can lower local temperatures by 3–5°C, making cities more comfortable during heatwaves.

Beyond environmental benefits, green spaces support mental and physical health. Access to parks encourages physical activities like walking, jogging, or cycling, which reduce the risk of obesity and heart disease. A 2024 survey showed that 65% of city residents who regularly visit parks report lower stress levels. Green spaces also foster social connections, as community gardens or park events bring people together, combating urban isolation. However, not all cities prioritize green spaces equally. Wealthier neighborhoods often have more parks, while lower-income areas may lack access, exacerbating health inequalities. Urban planners advocate for equitable distribution, but budget constraints and land scarcity pose challenges. Innovative solutions, like vertical gardens or rooftop greenery, are emerging, though their high costs limit widespread adoption.

Green spaces also boost local economies. Properties near parks often have higher values, and businesses in greener areas attract more customers. A 2022 report estimated that urban parks contribute $2.5 billion annually to city economies through tourism and increased property taxes. Yet, maintaining these spaces requires significant investment, and some cities struggle to balance upkeep with other priorities.

Despite their benefits, green spaces face threats. Urban expansion often leads to parkland being repurposed for housing or infrastructure. Climate change also poses risks, with droughts and storms damaging trees and landscapes. Community advocacy is crucial to protect these areas, as residents' voices can influence city policies.

In fine, urban green spaces are essential for sustainable, livable cities. They improve air quality, reduce heat, promote health, and drive economic growth. However, ensuring equitable access and protecting these spaces from development and climate impacts remain ongoing challenges. Cities must prioritize investment and innovation to maximize their benefits for all residents.

1. A) Identify True/ False/ Not Given from the passage. **5×2=10**

I. Urban green spaces can reduce air pollution by up to 20%.
II. All cities provide equal access to green spaces across neighborhoods.
III. Green spaces eliminate the need for other urban infrastructure.
IV. Community advocacy has no impact on the preservation of urban green spaces.
V. Vertical gardens are a common solution in all cities.

OR

B) Answer the following questions: **5×2=10**

I. **What do trees in urban green spaces help remove from the air?**
a. Oxygen
b. Water vapor
c. Particulate matter
d. Pollen

II. **Which factor limits the widespread use of rooftop greenery and vertical gardens?**
a. Public disinterest
b. High installation and maintenance costs
c. Lack of government approval
d. Poor weather conditions

III. **What is one health benefit mentioned in the passage from visiting parks?**
a. Better eyesight
b. Lower stress
c. Increased appetite
d. Faster speech

IV. **What problem is mentioned in lower-income neighborhoods regarding green spaces?**
a. Too many parks
b. Lack of access to parks
c. Excess tree planting
d. Unused garden space

V. **What role do communities play in preserving green spaces?**
a. They maintain public trees and gardens
b. They can lobby for policies to protect them
c. They are responsible for funding park development
d. They can replace public parks with private ones

2. Choose ONE WORD AND/OR A NUMBER from the passage for each answer: **5×1= 5**

a) Green spaces help mitigate the urban _____ effect, which raises city temperatures.
b) The high _____ of innovative solutions like rooftop greenery restricts their widespread use.
c) A survey showed that 65% of park visitors report lower _____ levels.
d) Urban parks contribute $_____ billion annually to city economies.
e) Climate change risks include _____ damaging trees and landscapes.

3. Write down the summary of the passage. **5**

4. A) Fill in the blanks with appropriate verbs: **5×1= 5**

i) It would be pleasant if we (know) …...where to go.
ii) He worked instead of (play)……
iii) If you had played well, you (win)……..
iv) Two thirds of the children (be)……. in the function.
v) While (take) …… dinner, he received the phone.

B) Change the sentences as directed **5×1= 5**

i) He said, "I met her long ago". (Indirect)
ii) Karim said to me "Did you take the examination." (Indirect)
iii) He said, "We all are sinners". (Indirect)
iv) Since the water was salty, I could not drink it. (Compound)
v) The class being over, I talked to my teacher. (Complex)

PART-B

(Answer all the questions)

5. Write a paragraph on Uses and Abuses of social media. **10**

6. How did Jim and Della prove their love for each other in the short story "The Gift of the Magi" **10**

OR

A) Why Della is a glorious character? **05**

B) Explain: Reading maketh a full man, conference a ready man and writing an exact man. **05**

7. Many people believe that an effective public transport system is a key component of a modern city. Discuss the advantages and disadvantages of public transport. **10**

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Final Examination, 2024 — **2nd year 1st semester**
Course No: MATH 207E — **Course Title: Co-ordinate Geometry and Linear Algebra**
Time: 03 (Three) hours — **Full Marks:60**

N.B.: (i) Answer all questions from each PART (ii) Use separate answer scripts for each PART
(iii) Marks allotted are indicated in the margin (iv) Special Instruction (if any)---------N/A-----

PART A

1. **(a)** Transform the equation $17x^2 + 18xy - 7y^2 - 16x$-32y-18=0 to one in which there is no term involving x, y, xy, both sets of axes being rectangular. **05**

   (b) If two Straight lines represented by the equation $x^2(tan^2\varphi + cos\varphi^2) - 2xytan\varphi + y^2sin^2\varphi = 0$ makes angle α *and* β with x-axis respectively, then show that tanα-tanβ = 2. **05**

2 **(a)** Find the acute angle between the lines whose direction cosines are given by the relations l+m+n = 0 and $l^2 + m^2 - n^2$=0. **05**

   (b) Reduce the equation $36x^2 + 24xy + 29y^2$-72x+126y+81 = 0 to the standard form. **05**

3. **(a)** Find the equation of the plane passing through the line of intersection of the planes 2x-y=0 and 3z-y=0 and perpendicular to the plane 4x+5y-3z+7=0. **05**

   (b) Find the equation of the planes which is parallel to the plane 4x-4y+7z-3=0 and 4 units distance from the point (3,1,-2). **05**

OR

   (a) Find the equation of the straight line perpendicular to the both line $\frac{x-1}{1} = \frac{y-1}{2} = \frac{z+2}{3}$, $\frac{x+2}{2} = \frac{y-5}{-1} = \frac{z+3}{2}$ and passing through their intersection point. **05**

   (b) Show that the lines are coplanar $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4}$, $\frac{x-2}{3} = \frac{y-3}{4} = \frac{z-4}{5}$ and find the equation of the plane containing them. **05**

PART B

4. **(a)** Solve the following system of linear equation: **04**

$$6x_1 + x_2 + 4x_4 = -3$$
$$-9x_1 + 2x_2 + 3x_3 - 8x_4 = 1$$
$$7x_1 - 4x_3 + 5x_4 = 2$$

(b) Define Equal matrix, trace of a matrix and invertible matrix. **03**

(c) Solve the following system of linear equation using Gaussian Elimination method: **03**

$$2x + 2y + 2z = 0$$
$$-2x + 5y + 2z = 1$$
$$8x + y + 4z = -1$$

5. **(a)** Check whether the vector V= {(a,b,c), where b=a+c} of R^3 is a subspace or not. **02**

(b) Check if function f is a subspace of F $(-\infty, \infty)$ for which f(0) = 1. **02**

(c) Suppose that $v_1 = (2, 1, 0, 3)$, $v_2 = (3, -1, 5, 2)$, and $v_3 = (-1, 0, 2, 1)$. Check if the vector (2, 3, −7, 3) is in span {v1, v2, v3}. **04**

(d) If a subspace of R^3 is given by the plane $3x - 2y + 5z = 0$ then find a basis and state its dimension. **02**

6. **(a)** Find the characteristic equation, the eigen values and bases for the eigenspace of the matrix **05**

$$A=\begin{bmatrix} 0 & 0 & -2 \\ 1 & 2 & 1 \\ 1 & 0 & 3 \end{bmatrix}$$

(b) Show that the vectors $p_1 = 1 - 3x + 2x^2$, $p_2 = 1 + x + 4x^2$, $p_3 = 1 - 7x$ do not form a basis for p_2. **05**

OR

(a) Define Linear transformation. Find a linear transformation $T: R^4 \rightarrow R^4$ whose Im(T) is generated by the set $\{(1,2,0,-4), (2,0,-1,-3)\}$ **05**

(b) Define subspace of a vector space. Show that the intersection of two subspaces of a vector spaces is also a subspace. **05**

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Final Examination, 2024 — **2nd year 1st semester**
Course No: ACC 201E — **Course Title: Financial and Managerial Accounting**
Time: 03 (Three) hours — **Full Marks:60**

N.B.: (i) Answer all questions from each PART (ii) Use separate answer scripts for each PART
(iii) Marks allotted are indicated in the margin (iv) Special Instruction (if any)---------N/A-----

Part-A

1. (a) Explain the accounting equation and its components. Why is it considered the foundation of accounting? How does each type of business transaction affect the accounting equation? Provide examples. **03**

(b) Why is accounting information important to investors and creditors when making decisions? **01**

(c) On August 1, Vince Morelli established Vince's Travel Agency. The following transactions were completed during the month. Prepare a tabular analysis of the August transactions. **06**

Aug. 01- Invested $15,000 cash to start the agency.
Aug. 03- Paid $600 cash for April office rent.
Aug. 06- Purchased office equipment for $3,000 cash.
Aug. 08- Incurred $700 of advertising costs in the Chicago Tribune, on account.
Aug. 12- Paid $800 cash for office supplies.
Aug. 15- Services rendered: $3,000 cash is received from customers, and the balance of $7,000 is billed to customers on account.
Aug. 20- Withdrew $500 cash for personal use.
Aug. 25- Paid Chicago Tribune $500 of the amount due in transaction (Aug. 08).
Aug. 28- Paid employees' salaries $2,500.
Aug. 30- Received $4,000 in cash from customers who have previously been billed in transaction (Aug-15).

2. (a) Using examples, explain how debit and credit entries are used to record business transactions. **02**

(b) What is a ledger, and how does it differ from a journal? **02**

(c) Selected transaction for Joe Root, an interior decorator, in the first month of business are as follows **03+03**

Jan.	2	Root invested $11,000 cash in the business.
	3	Purchased office equipment for $5,000 cash for use in business
	9	Purchased supplies on account for $600.
	11	Billed customers $2,100 for service provided.
	16	Paid $350 cash for advertising.
	20	Received $700 cash from customer billed on January 11.
	23	Paid creditor $300 cash on balance billed on January 9.
	28	Withdraw $1,000 cash for personal use by owner.

Requirements

I. **Prepare journal entries for the transaction listed above.**
II. **Give posting the account in the bracket to ledger entries (cash, Supplies, equipment, accounts receivable, accounts payable)**

3. (a) What types of errors can still exist even if a trial balance is balanced? **01**

(b) "Depreciation is a valuation process that results in the reporting of the fair value of the asset." Do you agree? Explain. **02**

(c) Prepare a trail balance from the following entries on July 31 2024 for Silikon Int. **07**

Cash-$26,000, Accounts receivable-$15,000, Equipment-$40,000, Cottage-$50,000, Capital-$85,000, Drawing-$5000, Service Revenue-$11,200, Salaries Expense-$2,500, Unearned Revenue-$2,500, Accounts Payable-$6,000, Mortgage Payable-$35,000, Utilities Expense-$200, Prepaid Insurance-$1,500, Insurance Premium-$500, Supplies-$1,500, Salaries Payable-$1,500, Advertisement-$500, Notes Payable-$1,500.

OR

(a) "A company's net income appears directly on the income statement and the owner's equity statement, and it is included indirectly in the company's balance sheet." Do you agree? Explain. **03**

(b) Eve Myles Travel Agency purchased land for $90,000 cash on December 10, 2012. At December 31, 2012, the land's value has increased to $93,000. What amount should be reported for land on Eve Myles's balance sheet at December 31, 2012? Explain. **03**

(c) Maria Contreras is the owner of a successful printing shop. Recently, her business has been increasing, and Maria has been thinking about changing the organization of her business from a proprietorship to a corporation. Discuss some of the advantages Maria would enjoy if she were to incorporate her business. **04**

Part-B

4. (a) The following is the Trial Balance of Orni Enterprise for the quarter ended March 31, 2021. **07+03**

Accounts Title	Debit (Tk.)	Credit (Tk.)
Cash	180,400	
Accounts receivable	145,200	
Prepaid insurance	46,800	
Equipment	624,000	
Mortgage payable		947,800
Notes payable		123,000
Orni capital		1,150,000
Service revenue		141,800
Land	640,000	
Insurance expense	7,800	
Building	1,288,000	
Depreciation expense	73,600	
Accumulated Depreciation-Building		456,000
Interest expense	26,000	
Interest payable		26,000
Accumulated Depreciation- Equipment		187,200
Total	**30,31,800**	**30,31,800**

Other data

1. Depreciation of Tk. 5,000 per quarter on equipment.
2. Interest accrued on mortgage payable, issued on January 1, Tk. 3,000.
3. Insurance expires at the rate of Tk. 1,500 per month,
4. Service provided on account at March 31, Tk. 7,500.
5. Salaries accrued but not paid Tk. 1000.

6. 10% interest on notes payable accrued but not paid.

Requirements:

(a) Prepare an income statement and owner's equity statement for the 3 months ending March 31.

(b) Prepare balance sheet as at March 31.

5. **(a)** Differentiate between money market and capital market. **01**

(b) Define NPV and Payback period. Why IRR is important for capital budgeting. **03**

(c) From the cash flow of 'X' corporation given below, fulfill the following requirement. **3+2+1**

i. Calculate NPV assuming interest on 08%, and 13% respectably.

ii. Calculate discounted payback period for 'X' corporation on interest rate of 10%.

iii. Calculate IRR of 'X' Corporation.

Year	Cash flow
0	-4000
1	2000
2	1200
3	1000
4	700

6. **(a)** Explain the significance of the current ratio and quick ratio in evaluating a business's short-term financial health. **02**

(b) Identify the contributions of non-banking institutions in supplying capitals for business organizations. **02**

(c) XYZ Company has the following financial information in a certain year: **06**
Current Asset-$10000, Current Liabilities-$310, Inventories-$615, Sales-$3000, Receivables-$375, Total Debt.- $1060, Total Assets-$20000, EBIT (Operating Income)-$283.8, Interest Charges-$88, Net Income-$117.5.

Requirements: Calculate ration analysis of the following ratios.

i. Current Ratio,
ii. Quick Ratio
iii. Inventory Turnover Ratio
iv. Days sales outstanding,
v. Debt ratio
vi. Time-Interest-Earned Ration
vii. Operating Margin
viii. Profit Margin

OR

(a) The Petry Company has $1,312,500 in current assets and $525,000 in current liabilities. Its initial inventory level is $375,000, and it will raise funds as additional notes payable and use them to increase inventory. How much can its short-term debt (notes payable) increase without pushing its current ratio below 2.0? **02**

(b) Why would the inventory turnover ratio be more important for someone analyzing a grocery store chain than an insurance company? **02**

(c) Project S costs $15,000, and its expected cash flows would be $4,500 per year for 5 years. Mutually exclusive Project L costs $37,500, and its expected cash flows would be $11,100 per year for 5 years. If both projects have a WACC of 14%, which project would you recommend? Explain. **06**

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Department of Electrical & Electronic Engineering

Final Examination, 2024 | **2nd Year 1st Semester**

Course No: EEE 221 | **Course Title: Electronics I**

Time: 03 (Three) hours | **Full Marks: 60**

N.B.: (i) Answer all questions from each PART (ii) Use separate answer scripts for each PART

(iii) Marks allotted are indicated in the margin (iv) Special Instruction (if any)---------N/A-----

PART-A

(Answer all questions)

1. **(a)** Discuss the V-I characteristics of diode with clear diagram indicating knee voltage and reverse saturation current. **05**

   (b) Prove that $r_d = {}^{26mV}/_{I_d}$, where the symbols mean the usual. **03**

   (c) What is the difference between normal diode & Zener diode. **02**

2. **(a)** Prove that factor of a full-wave rectifier is 1.11 **04**

   (b) What is Clipper? Find the Output voltage for the network shown in Fig. 2(b) with the given applied signal. **01+03**

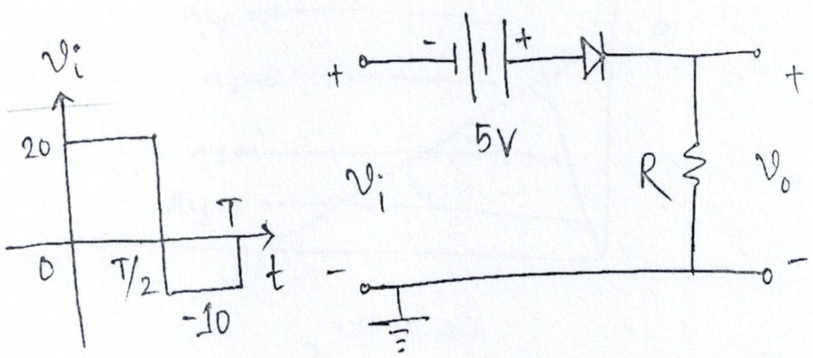

Fig. 2(b)

   (c) Briefly explain the amplifying action of a transistor. **02**

3. **(a)** Determine the following for the circuit shown in Fig. 3(a) **05**

   i. V_{BC}
   ii. I_B
   iii. I_C
   iv. V_{CE}
   v. I_{Csat}

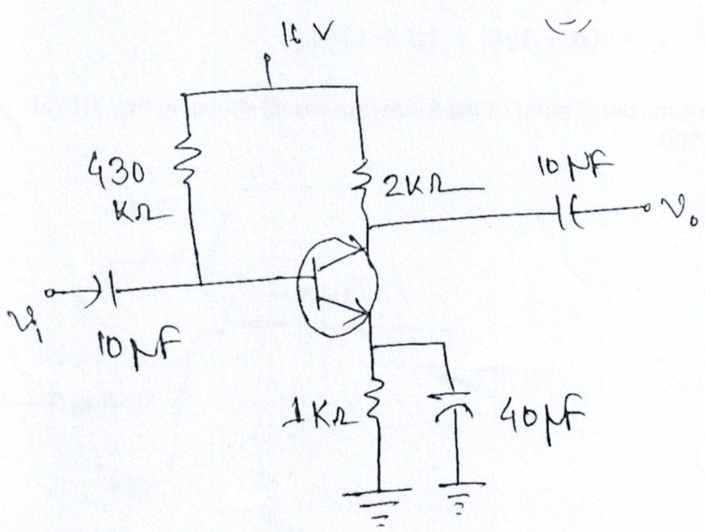

Fig. 3(a)

(b) (i) Determine the common-emitter hybrid equivalent circuit for $I_E = 3.2\ mA, h_{fe} = 150, h_{oe} = 25\ \mu S\ amd\ h_{ob} = 0.5\ \mu S$. **05**

(ii) Also determine the common-base r_e model for the data given above in question 3(bi).

Or,

(a) Determine the quiescent levels of I_{CQ} and V_{CE_Q} for the given circuit shown in Fig. 3(a-Or). **05**

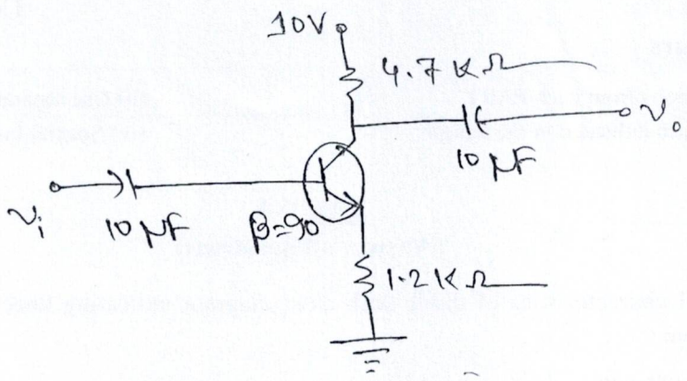

Fig. 3(a-Or)

(b) Given the load line of the figure shown in Fig. 3(b-Or) the defined Q-point, determine the required values of V_{cc} , R_c, R_b for a fixed-bias configuration. **05**

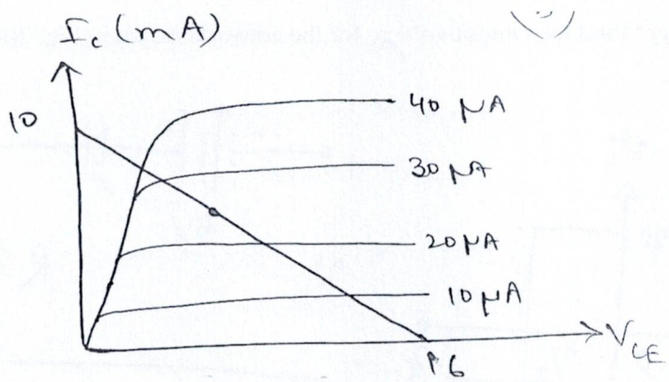

Fig. 3(b-Or)

PART-B

(Answer all questions)

4. (a) Prove the following relationships **03+01**

i. $r = \frac{1}{1-\alpha}$

ii. $I_c = (\beta + 1)I_B + (\beta + 1)I_{CBO}$

(b) Determine the Q point of the following circuit shown in Fig. 4(b) also draw the dc load line. Assume $\beta = 100$. **06**

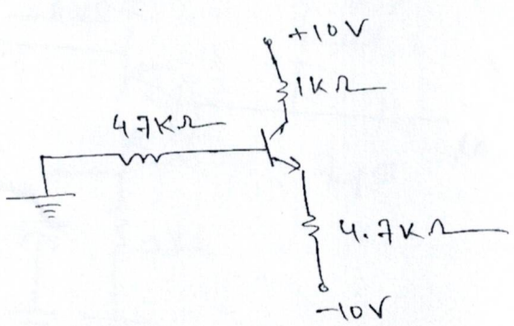

Fig. 4(b)

5. **(a)** What is Pinch-off voltage. The name is misleading. Why? **03**

(b) Clearly discuss the need for stabilization in transistor circuit. **03**

(c) Describe the construction of a n-channel type MOSFET. **04**

6. **(a)** With clear diagram, discuss the channel formation in the n-channel enhancement-type MOSFET **05**

(b) Sketch the transfer curve for a p-channel device with $I_{DSS} = 3\ mA$ and $V_p = 4$ V **03**

(c) Obtain the transfer curve from the drain characteristics shown in Fig. 6(c) **02**

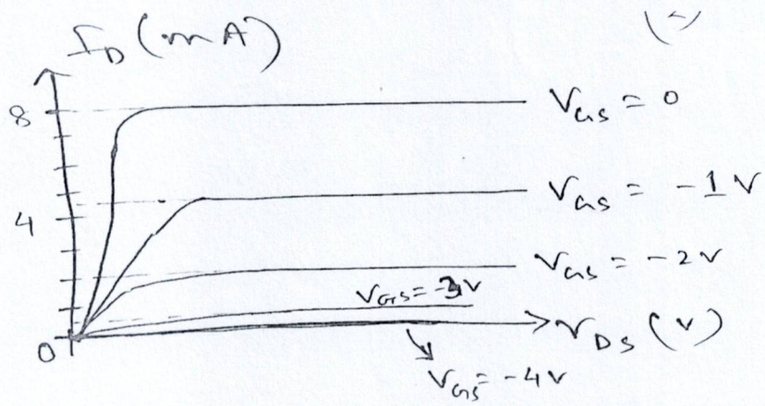

Fig. 6(c)

Or,

(a) With clear diagram, discuss the construction of n-channel JFET. **05**

(b) From the JFET characteristics, discuss the "voltage-controlled resistance region." **03**

(c) Sketch the transfer curve for an n-channel D-type MOSFET with $I_{DSS} = 10\ mA$ and $V_p = -4\ V$. **02**

Sylhet Engineering College, Sylhet

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Department of Electrical & Electronic Engineering

Final Examination, 2024 — **2nd Year 1st Semester**

Course No: EEE 303 — **Course Title: Energy Conversion I**

Time: 03 (Three) hours — **Full Marks: 60**

N.B.: (i) Answer all questions from each PART (ii) Use separate answer scripts for each PART

(iii) Marks allotted are indicated in the margin (iv) Special Instruction (if any)---------N/A-----

PART-A

(Answer all questions)

1. **(a)** What is synchronous speed? What is rotor current frequency? **1+1**

   (b) Show the exact voltage drop of transformer with required vector diagram. **04**

   (c) What does it mean "**Dy_n**" for a 3-phase transformer? A 120-kVA, 6,000/400-V, Y/Y 3-ph, 50-Hz transformer has an iron loss of 1,600 W. The maximum efficiency occurs at 3/4 of full load. Find the efficiencies of the transformer at **1+3**
   (i) full-load and 0.8 power factor (ii) half-load and unity power factor
   (iii) the maximum efficiency.

2. **(a)** Why are open circuit and short circuit tests performed? Explain with required circuit. **02**

   (b) Why does transformer rating in KVA? Draw the exact equivalent circuit of transformer referred to primary side. **1+1**

   (c) The following data refer to a I-phase transformer: Turn ratio 19.5: 1 ; $R_1 = 25\ \Omega$; $X_1 = 100\ \Omega$; $R_2 = 0.06\ \Omega$; $X_2 = 0.25\ \Omega$. No-load current =1.25 A leading the flux by 30°. The secondary delivers 200 A at a terminal voltage of 500 V and p.f. of 0.8 lagging. Determine by the aid of a vector diagram, the primary applied voltage, the primary p.f. and the efficiency. **06**

3. **(a)** Define core type and shell type transformer. **02**

   (b) Explain what does it happen when a transformer is loaded? In term of voltage, current and flux. You should draw the respective figures or circuits or both of them. **04**

   (c) The number of turns on the primary and secondary windings of a single-phase transformer are 350 and 38 respectively. If the primary winding is connected to a 2.2 kV, 50-Hz supply, determine (*a*) the secondary voltage on no-load, (*b*) the primary current when the secondary current is 200 A at 0.8 p.f. lagging, if the no-load current is 5 A at 0.2 p.f. lagging, (*c*) the power factor of the primary current. **04**

OR

(a) What are the tests to find copper loss and core loss of induction motor? Draw the circuit. **02**

(b) Explain the working principle of an ideal transformer. You should draw the respective figures or circuits or both of them. **04**

(c) The primary of a certain transformer takes 1 A at a power factor of 0.4 when it is connected across a 200-V, 50-Hz supply and the secondary is on open circuit. The number of turns on the primary is twice that on the secondary. A load taking 50 A at a lagging power factor of 0.8 is now connected across the secondary. What is now the value of primary current? **04**

PART-B

(Answer all questions)

4. **(a)** What is all day efficiency of a transformer? Why does core loss of transformer remain same although load is changing? **1+2**

(b) Establish the EMF equation of transformer? Explain step up and step down property of transformer from EMF equation? **03**

(c) A 600-kVA, 1-ph transformer when working at u.p.f. has an efficiency of 92 % at full-load and also at half-load. Determine its efficiency when it operates at unity p.f. and 60 % of full-load. **04**

5. **(a)** Explain briefly why does rotor rotate? **03**

(b) $P_2 : P_m : I^2R :: 1 : (1 - s) : s$; where symbol represent standard value or meaning. **03**

(c) How can we increase the starting torque of induction motor? A 746-kW, 3-phase, 50-Hz, 16-pole induction motor has a rotor impedance of (0.02 + j 0.15) W at standstill. Full-load torque is obtained at 360 rpm. Calculate **(i)** the ratio of maximum to full-load torque **(ii)** the speed of maximum torque and **(iii)** the rotor resistance to be added to get maximum starting torque. **1+3**

6. **(a)** What is electrical braking of 3 phase induction motor? Why does 3 phase induction motor require a star-delta stater? **1+1**

(b) For 3 phase induction motor proof that resultant flux is 1.5 times of individual maximum flux. **04**

(c) A 440-V, 3-φ, 50-Hz, 4-pole, Y-connected induction motor has a full-load speed of 1425 rpm. The rotor has an impedance of (0.4 + J 4) ohm and rotor/stator turn ratio of 0.8. Calculate **(i)** full-load torque **(ii)** rotor current and full-load rotor Cu loss **(iii)** power output if windage and friction losses amount to 500 W **(iv)** maximum torque and the speed at which it occurs **04**

OR

(a) What are the types of single-phase induction motor stater? Draw all the circuit diagram. **02**

(b) For single phase induction motor proof that total torque $T = T_f + T_b$ **04**

(c) Discuss the revolving field theory of single-phase induction motors. Find the mechanical power output at a slip of 0.05 of the 185-W, 4-pole, 110-V, 60-Hz single-phase induction motor, whose constants are given below: **04**

Resistance of the stator main winding $R_1 = 1.86$ ohm
Reactance of the stator main winding $X_1 = 2.56$ ohm
Magnetizing reactance of the stator main winding $Xm = 53.5$ ohm
Rotor resistance at standstill $R_2 = 3.56$ ohm
Rotor reactance at standstill $X_2 = 2.56$ ohm