**18EE603**

**Hall Ticket Number:**

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| **III/IV B.Tech (Regular/Supplementary) DEGREE EXAMINATION** | | | | | | | | | |
| **June,2022** | | | | **Electrical & Electronics Engineering** | | | | | |
| **Sixth Semester** | | | | **Electrical Drives** | | | | | |
| **Time:** Three Hours | | | | | **Maximum: 5**0 Marks | | | | |
| *Answer Question No. 1 Compulsorily.* | | | | | | (10X1 = 10 Marks) | | | |
| *Answer* ***ANY ONE*** *question from each Unit.* | | | | | | (4X10=40 Marks) | | | |
| 1. | a) | State the factors that can influence the choice of a motor to drive the load. | | | | CO1 | |  |
|  | b) | Why closed loop control of an electrical drive is required. Mention some examples. | | | | CO1 | |  |
|  | c) | Why regenerative braking is not applicable for a DC series motor. | | | | CO2 | |  |
|  | d) | Define plugging, dynamic baking of a DC motor. | | | | CO2 | |  |
|  | e) | Mention the ways to obtain the four quadrant operation of separately excited motor. | | | | CO2 | |  |
|  | f) | What are the advantages of electrical drive over a mechanical drive? | | | | CO1 | |  |
|  | g) | Define regenerative braking of a IM motor drive. | | | | CO3 | |  |
|  | h) | What is pole amplitude modulation of an induction motor drive. | | | | CO3 | |  |
|  | i) | What are the applications of BLDC motor drive | | | | CO4 | |  |
|  | j) | What are the applications of stepper motor drive | | | | CO4 | |  |
| **Unit - I** | | | | | | | | |
| 2. |  | Explain the four quadrant operation of a lift using the necessary conventions. | | | | CO1  **10M** | | |
|  |  | **(OR)** | | | |  |  | |
| 3. | a) | Define an electrical drive, what are the advantages and disadvantages of electrical drive over an mechanical drive. | | | | CO1 | **5M** | |
|  | b) | Explain the process of closed loop speed control with a block diagram. | | | | CO1 | **5M** | |
| **Unit - II** | | | | | | | | |
| 4. | a) | Derive the expression for speed control of a separately excited DC motor for continuous conduction mode of operation when fed from a single phase full controlled converter. | | | | CO2 | **5M** | |
|  | b) | Briefly explain the regenerative braking and dynamic braking of a separately excited DC motor drive. | | | | CO2 | **5M** | |
|  |  | **(OR)** | | | |  |  | |
| 5. | a) | Derive the expression for speed control of a separately excited DC motor when fed from a chopper for motoring mode. | | | | CO2 | **5M** | |
|  | b) | A 230V, 960 r.p.m, 200A, separately excited DC motor has an armature resistance of 0.02Ω. The motor is fed from a chopper which provides both motoring and braking operations. The source has a voltage of 230V, calculate a) the duty ratio of the chopper for motoring operation at rated torque and 350r.p.m b) the duty ratio of the chopper for motoring operation at rated torque and 350r.p.m | | | | CO2 | **5M** | |
| **Unit - III** | | | | | | | | |
| 6. | a) | Explain the speed control of the induction motor drive by using pole amplitude modulation technique. | | | | CO3 | **5M** | |
|  | b) | Briefly explain the v/f ratio control of an induction motor drive. | | | | CO3 | **5M** | |
|  |  | **(OR)** | | | |  |  | |
| 7. | a) | A 400V, 3-phase, 50Hz, 6-pole star connected induction motor has the following parameters. Rs = Rrꞌ= 1Ω, Xs = Xrꞌ= 2Ω. For the regenerative braking operation determine the maximum over hauling torque that the motor can hold and determine the range of speed for safe operation. | | | | CO3 | **5M** | |
|  | b) | Explain the static rotor resistance control of an induction motor drive. | | | | CO3 | **5M** | |
| **Unit - IV** | | | | | | | | |
| 8. |  | Briefly explain the speed control of a synchronous motor drive employing a load commutated inverter. | | | | CO4 | **10M** | |
|  |  | **(OR)** | | | |  |  | |
| 9. | a) | Briefly explain the space vector pulse width modulation technique. | | | | CO4 | **5M** | |
|  | b) | Briefly explain the operation of BLDC motor drive. | | | | CO4 | **5M** | |

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