Time : (3 Hours) **Total Marks: 80**

N.B: (1) Question No. 1 is compulsory.

(2) Attempt any three from the remaining questions.

(3) Figures to the right indicate full marks.

(4) Each question is of 20 Marks

Q.1	Attempt any 4 questions	**Marks**
A	What are the similarities between electric and magnetic circuit? Explain the difference between electric and magnetic circuit.	**5**
B	Give classification of transducers.	**5**
C	What is the necessity of starters in DC machine?	**5**
D	Write difference between indicating and integrating instruments	**5**
E	Explain i) Magnetic flux ii) Leakage Flux iii) Magnetic saturation.	**5**
Q.2		**Marks**
A	Explain the construction and working principle of digital Tachometer.	**10**
B	Derive torque equation of Doubly excited system.	**10**
Q.3		**Marks**
A	What is back EMF in Dc motor and how it helps DC motor?	**10**
B	Explain the working principle, construction of moving coil instruments and hence derive the torque equation.	**10**
Q.4		**Marks**
A	What is the armature reaction in DC machine explain with neat diagram and give the remedies to overcome the armature reaction.	**10**
B	Explain in detail working principle of digital voltmeter and also the advantages of digital meters over analog meter.	**10**
Q.5		**Marks**
A	Explain Basic potentiometer circuit and how it is used for the calibration of ammeter.	**10**
B	Illustrate the working of ramp type digital voltmeter (DVM) with the help of block diagram and waveforms.	**10**
Q.6		**Marks**
A	Explain hysteresis and eddy current losses. Draw hysteresis loop ,How can these losses be reduced?	**10**
B	What are transducers explain LVDT and Thermocouples with diagram.	**10**

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