(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	State Faraday's first and second law of electromagnetic induction?	**5**
B	Explain Kelvin's double bridge.	**5**
C	Explain why starter is required in DC machines?	**5**
D	Differentiate between PMMC and MI instrument.	**5**
E	What is rotating MMF?	**5**
Q.2		**Marks**
A	Explain in brief the principle of electro-mechanical energy conversion and develop a model of electro-mechanical energy conversion device.	**10**
B	Explain Dynamometer type Wattmeter.	**10**
Q.3		**Marks**
A	Explain calibration of voltmeter and ammeter using potentiometer.	**10**
B	Explain Retardation test on DC motor.	**10**
Q.4	Explain in detail armature reaction and methods to reduce armature reactions in DC Motor.	**Marks**
A		**10**
B	Explain Q meter with neat diagram.	**10**
Q.5		**Marks**
A	Explain the concept of doubly excited machines and derive the expression for the electromagnetic torque.	**10**
B	Differentiate between working of thermistor and thermocouple.	**10**
Q.6		**Marks**
A	Explain the static and dynamic characteristics of measuring instruments	**10**
B	Explain the construction and working principle of digital storage Oscilloscope.	**10**

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