Name:	
Enrolment No:	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, Dec 2019

Course: Electrical machines - I   Semester: III
Program: B. Tech. - Electrical   Time 03 hrs.
Course Code: EPEG 2010   Max. Marks: 100

SECTION A

S. No.		Marks	CO
Q 1	What is meant by magnetic leakage and fringing as applied to electrical machines?	4	CO1, CO2
Q 2	Write short note on "Magnetic materials".	4	CO1
Q 3	Why magnetic cores are laminated. Define stacking factor.	4	CO1, CO2
Q 4	A 4-pole, 440-V dc motor takes an armature current of 50 A. The resistance of the armature circuit is 0.28 Ω. The armature winding is wave-connected with 888 conductors and the useful flux per pole is 23 mWb. Calculate the speed of the motor.	4	CO3
Q 5	Calculate the magneto motive force (mmf) required to produce a flux of 0.015 Wb across an air gap of 2.5 mm long, having an effective area of 200 cm^2.	4	CO1

SECTION B

Q 6	Explain why is it necessary to use a starter for starting a dc motor. Draw a diagram of a three-point starter and explain the function of each component.	10	CO3
Q 7	Describe how a self-excited dc shunt generator builds up its terminal voltage as a prime mover runs it. Clearly bring out the importance of (a) the residual magnetism in the field core, (b) the value of the shunt field resistance, and (c) the speed of rotor, in the process of building the terminal voltage.	10	CO2
Q 8	Discuss the constructional features of Auto Transformer.	10	CO4
Q 9	Develop the equivalent circuit of a single-phase transformer. Mention the physical significance of all its parameters.	10	CO4

SECTION-C

Q 10	A 500-V, dc shunt motor takes 4 A on no load and runs at 1000 rpm. The armature resistance (including that of the brushes) is 0.2 Ω, and the field current is 1 A. On loading, if the motor takes a current of 100 A, determine its speed and estimate the efficiency at which it is working.	20	CO3

Q 11	A 600 kVA single phase transformer has an efficiency of 92 % both at full load and half load at unity power factor. Determine its efficiency at 60 % of full load at 0.8 power factor lagging. **OR** A single-phase, 50-Hz, 12-kVA, 200-V/400-V transformer gives the following test results : (i) Open-circuit test (with HV winding open) : 200 V, 1.3 A, 120 W (ii) Short-circuit test (with LV winding short-circuited) : 22 V, 30 A, 200 W Calculate (a) the magnetising current and the core-loss current, and (b) the parameters of equivalent circuit as referred to the low voltage winding.	20	CO4