BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION)

CLASS: BTECH **SEMESTER: IV**
BRANCH: EEE **SESSION : SP/2020**

SUBJECT : EE251 DC MACHINES AND TRANSFORMER

TIME: 2 HOURS **FULL MARKS: 25**

INSTRUCTIONS:
1. The total marks of the questions are 25.
2. Candidates may attempt for all 25 marks.
3. Before attempting the question paper, be sure that you have got the correct question paper.
4. The missing data, if any, may be assumed suitably.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

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Q1		A 100-kVA 8000/277-V distribution transformer has the following resistances and reactances: R_P= 5 ohm R_S= 0.005 ohm X_P= 6 ohm X_S= 0.006 ohm R_C = 50 k ohm X_M= 10 k ohm The excitation branch impedances are given referred to the high-voltage side of the transformer. (a) Find and draw the equivalent circuit of this transformer referred to the low-voltage side. (b) Find the per-unit equivalent circuit of this transformer.	[5]	1,3	3
Q2		Assume that Q1 transformer is supplying rated load at 277 V and 0.85 PF lagging. i. What is this transformer's input voltage? What is its voltage regulation? ii. What are the copper losses and core losses in this transformer under the conditions of part (i)? iii. What is the transformer's efficiency under the conditions of part (i)?	[5]	1, 3	3
Q3		What effects are produced in transformer by change in primary voltage for constant kVA output?	[5]	1, 3, 4	4
Q4		A three-phase transformer bank is to handle 500 kVA and have a 34.5/11-kV voltage ratio. Find the rating of each individual transformer in the bank (high voltage, low voltage, turns ratio, and apparent power) if the transformer bank is connected to *(a)* Y-Y, *(b)* Y-Δ, *(c)* Δ-Y, *(d)* Δ-Δ.	[5]	1, 3	3
Q5	(a)	What are the conditions for satisfactory parallel operation of transformers?	[2]	1, 2	2
Q5	(b)	What is an autotransformer? State its merits and demerits over the two winding transformer.	[3]	1, 2	2

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