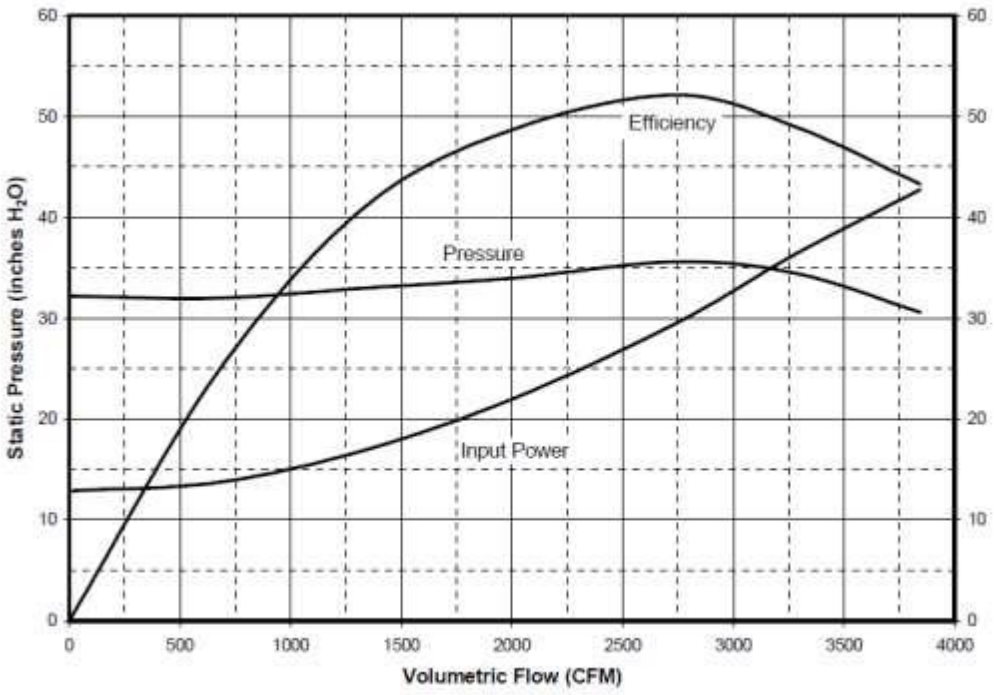
Name: **Enrolment No:**	UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
Online End Semester Examination, Dec 2020

Progra	**:**	**B.Tech. – Electrical Engineering**	**Semester**	**:**	**V**
Course	**:**	**Performance Analysis of Electrical Systems**	**Time**	**:**	**03 hrs**
Course Code	**:**	**EPEG 3014**	**Max. Marks**	**:**	**100**
Nos. of page(s)	**:**	**3**			

SECTION A

S. No.		Marks	CO
Q 1	Write the full form of following abbreviations: a) IGBC b) GRIHA c) LEED d) USEPA e) NABERS	**5**	**CO4**
Q 2	A commercial building located in warm and humid climatic region, has a built up area of 17814 m^2. The annual energy consumption of the building is 3735640 kWh from the Grid and 2964758 kWh from captive DG sets. The facility operates 12 hours a day and 250 days in a year. Calculate and give the following values: a) EPI = _____ b) AAHEPI = _____	**5**	**CO4**
Q 3	For each one of the following, mention whether they belong to "Prescriptive Method" or "Whole Building Performance Method". a) Compliance by meeting or exceeding specific levels for each individual element of building b) Allows Trade-off option for building envelope c) Allows use of energy simulation software d) Computer model of the proposed design (energy consumption) is compared with Standard Design e) Compliance if energy use in proposed design is less than energy use in standard design	**5**	**CO4**

Q 4	Given below is a set of curves for a centrifugal fan.  At its Best Efficiency Point (BEP) and to the nearest approximation give the following values: a) Static pressure in mmWC = _____ b) Flow in m^3/hr = _____ c) Shaft Power in kW = _____ d) Work out the static efficiency of the fan by calculation = _____ e) Power drawn by the motor if the motor operating efficiency is 90 % = _____	**5**	**CO1**
Q 5	Different flow control methods adopted in a fan system are ------ , ----- , ------ , ------ , and ------ .	**5**	**CO1**
Q 6	The main five components of a compressed air system are ---------- , ---------- , ---------- , --------- , and ---------- .	**5**	**CO1**
	SECTION B		
Q 1	Describe positive features on 'construction aspects' how an "energy efficient motor" is different from a "standard motor".	**10**	**CO3**

Q 2	A 75 kW, 415 V, 140 Amp, 4 pole, 50 Hz, 3-phase squirrel cage induction motor has a full load efficiency of 87.6%. The measured operating motor terminal voltages in a 3-phase supply are 415 V, 418 V & 420 V. The current drawn in 3-phase supply are 137 Amp, 132 Amp & 137 Amp. Estimate the additional temperature rise of motor, due to unbalanced voltage supply.	**10**	**CO3**
Q 3	Discuss the merits of VSD application in case of pumps.	**10**	**CO3**
Q 4	With the help of block diagram, describe Building Management System.	**10**	**CO4**
Q 5	Write short notes on any two of the following: a) Solar Heat Gain Coefficient (SHGC) b) Visible Light Transmittance (VLT) c) Cool Roof	**10**	**CO4**
	Section C		
Q 1	A Cooling Tower cools 1565 m^3/hr of water from 44º C to 37.6º C at 29.3º C wet bulb temperature. The cooling tower fan flow air rate is 989544 m^3/hr (air density =1.08 kg/m^3) and operates at 2.7 cycles of concentration. Find a) Range, b) Approach, c) % CT Effectiveness d) L/G Ratio in kg/kg e) Cooling Duty Handled in TR f) Evaporation Losses in m^3/hr g) Blow down requirement in m^3/hr h) Make up water requirement/cell in m^3/hr **OR** From the given cooling tower parameters, evaluate the following: i) Make up water requirement per day ii) Evaporation loss iii) Blow down loss Parameters: Cooling water temperature : 37^{O}C, Water flow rate through CT : 1260 m^3/h Outlet water temperature : 32 °C, Drift losses : 0.1 %, No. of concentrating cycles : 3	**20**	**CO2**