Reg. No.



VII SEMESTER B.TECH (ELECTRICAL & ELECTRONICS ENGINEERING)

END SEMESTER EXAMINATIONS NOV/ DEC 2016

SUBJECT: ENERGY AUDITING AND MANAGEMENT [ELE 423]

REVISED CREDIT SYSTEM

Time. 5	nours Date. 23 h		WAA. WARKS. 3
Instructi	ons to Candidates:		
*	Answer ANY FIVE FULL questions.		
*	• Missing data may be suitable assumed.		
1A.	With respect to Energy Conservation Act (iii) Designated Consumer.	r, 2001, define (i) Building, (ii) End	ergy Audit 03
1B.	A food containing 80% water is to be dried If the initial temperature of food is 16 °C, per unit weight of original material, for d heat of vaporization of water at 100 °C a kJ/kg. The specific heat capacity of the for °C. Find also the energy required per kg w	d at 100 °C, down to moisture conte calculate the quantity of heat energ rying under atmospheric pressure. nd at standard atmospheric pressu od is 3.8 kJ/kg °C and of water is 4. ater removed.	nt of 10%. y required The latent re is 2257 186 kJ/Kg 04
1C .	Write a short technical note on how Ene present Energy Scenario of India. Clearly H of India and explain two methods to overc	rgy security can be achieved consi highlight the existing status of Energ ome the shortfalls.	dering the gy security 03
2A.	 An energy auditor works out the percentaratio of line current drawn to the rated cura) a) Do you agree with the above methanswer with reasons. b) List any other method, which is also a supervised of the supervised of th	ge loading of a particular induction crent of the motor. hodology adopted by the auditor? Ju to an indicator of motor loading.	motor as a 1stify your 02
2B.	Explain the working of soft starters and its	advantage over conventional start	ers. 03
2C.	A 34 kW/45 HP, 415 Volt Delta connected 1475 RPM. The No Load Test yielded the f 16.1 A, Frequency = 50 HZ; Stator phase power = 1063.74W Determine	d 3 Phase IM has a full load current following result;- V = 415 V; No load resistance at 30 °C = 0.264 Ohms a	of 57 A at l current = & No Load
	 a) Calculate the Core + Friction & Win b) Stator copper losses if the operatin c) Full load slip & rotor input ; Motor d) Motor efficiency at full load & full load 	ndage losses ng temperature is 120 °C. input assuming IEC standard for st oad power factor.	ray losses 05
3A.	Salt in crude oil must be removed before The crude oil is fed to a washing unit when	the oil can undergo processing in re a freshwater feed to the unit mixe	a refinery. es with the

3A. Salt in The c oil and dissolves a portion of the salt contained in the oil. The oil (containing some salt, but no water) is removed from the top of the washer, while the water (containing salt, but no oil) is removed from the bottom. If the spent wash water contains 15% salt and the crude oil contains 5% salt, determine the final concentration of the output products if the ratio of crude oil (with salt) to water is 4:1.

Time: 3 Hours

Data: 25 November 2016

MARKS: 50

- a) pump flow,
- b) pump head
- c) motor power.

Assume motor and pump efficiency remains same at the reduced speed **03**

- 3C. Explain how Force Field Analysis helps in energy policy & planning. Apply Force Field Analysis to evaluate the goal of National Solar Mission.03
- **4A.** Explain the methodology followed for carrying out assessment of lighting systems employed in Industries. Also, explain any three ECON measures for Lighting Systems.
- **4B.** A power plant which operates for 8400 hours annually, has a boiler of 80% efficiency which uses fuel with a GCV of 10300 kCal/kg. Steam produced is sent to the turbine through steam pipeline of 100 mm diameter, which is not insulated for 100 metre length. Find out the fuel savings if it is properly insulated with 65 mm insulating material.

Fuel Oil cost	– Rs.15000/tonne	
Surface temperature without insulation	– 170 °C	
Surface temperature after insulation	– 65 °C	
Ambient temperature	– 25 °C	05

- **5A.** Explain how the Electricity Act, 2003 has ensured a qualitative transformation in the areas of generation, transmission and distribution.
- **5B.** A PV array of 500W has been installed to pump water from bore well of 2 meters deep, using a submersible motor & pump system to an overhead tank. The length of the pipe required to pump the water is 30 m. Following are the costs involved for sub systems and their life spans:
 - PV array- INR 400/watt, life span = 15 yrs
 - Motor & Pump system- Rs 100/Watt, Life span 8 years
 - Pipe cost- Rs 400/m; life span 5 yrs
 - Cost of digging bore well Rs 500/m
 - Maintenance cost Rs 3000/yr
 - Misc. cost : Rs 100/Watt

If interest rate is 10% and inflation is 6%, calculate Life cycle cost of the water for the period of 15 yrs and also calculate water cost per year. **05**

- **5C.** List separately, any two duties and two responsibilities of an Energy Manager. **02**
- 6A. Explain the 5S management principle with respect to its significance, implementation technique and potential benefits.04

03

05

Month	Diesel Consumption	Electrical Energy
	(liter)	(KW-hr)
March, 2013	4045	14108
April, 2013	4240	14620
May, 2013	1475	5193
June, 2013	985	3325
July, 2013	280	932
Aug, 2013	170	500
Sept, 2013	220	797
Oct, 2013	1465	5217
Nov,2013	415	1454
Dec, 2013	120	367
Jan, 2014	280	983
Feb, 2014	765	2595

6B. The Diesel Generator set installed behind the MIT Cafeteria yielded the following data during a one year energy monitoring program.

Using linear regression technique, determine the equation of the best fit line for the data given to predict the amount of diesel required if Electricity Generation for the month of March, 2014 is 15000 kWhr. Determine the Pearson's correlation coefficient, to comment on the validity of the best fit line for further analysis.

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