	<u>Unean</u>
Name :	4
Roll No.:	A Agency (Vi Security and Excited)
Invigilator's Signature :	

2013 POWER PLANT ENGINEERING

Time Allotted: 3 Hours Full Marks: 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP - A

(Multiple Choice Type Questions)

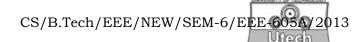
1. Choose the correct alternatives for any *ten of* the following:

 $10 \times 1 = 10$

- i) Load factor of power station is defined as
 - a) maximum demand / average load
 - b) average load x maximum demand
 - c) average load / Maximum demand
 - d) (maximum demand)² / average load.
- ii) A load curve indicates
 - a) average power used during the period
 - b) average kWh (KW) energy consumption during the period
 - c) Total energy used during the period
 - d) maximum power used peak period only

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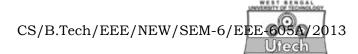
111)		wing e	-	pian	ı wc	лке	5 011	Willeli Olie of the	
	a)	Gas 1	power			b)	Ra	ankine	
	c)	otto				d)	di	esel.	
iv)	Mate	ch list	:-I (typ	e of b	oiler)	wi	th li	st-II (classification of	
	boile	er), select the correct answer using the code given							
	belo	w the	list						
		List -	- I				Li	st – II	
	A.	Babc	ock an	ıd Wilc	ox	1.	wate	r-tube with staight	
							type	tube	
	B.	Coch	rn			2.	wat	er tube with bent	
							type	e tube	
	C.	Stirli	ng			3.	Vert	tical fire tube	
	Cod	e:	A	В	C				
	a)		1	2	3				
	b)		3	2	1				
	c)		1	3	2				
	d)		None	of thes	se.				
v)	Boil	er effic	ciency	is the 1	atio	of			
	a)	Actua	al heat	t utilis	ed ir	ı ge	enera	ation of steam to the	
		heat	suppli	ed by t	he fu	ıel			
	b)	The	heat	supplie	ed b	y t	the	fuel to Actual heat	
		utilis	ed in g	generat	ion o	of st	em		
	c)	entha	alpy of	steam	to t	he e	entha	alpy of water at given	
		feed	temper	ature					
	d)	Entro	opy of	steam	to t	he	entro	opy of water at given	
		feed	temper	rature					
6531				:	2				



- vi) The mechanical efficncy of a diesel engine is defined as
 - a) B.B.P/I.H.P
- b) I.H.P / B.H.P
- c) B.H.P \times I.H.P
- d) (B.H.P)²/I.H.P.
- vii) Thermal efficiency of closed cycle gas turbine plant increases by
 - a) reheating
- b) intercooling
- c) regenerator
- d) all of above.
- viii) The power output from a hydro-electric power plant depends on three parameters
 - a) head, type of dam and discharge
 - b) head, discharge and efficiency of the system
 - c) Efficiency of the system, type of draft tube and type of turbine used
 - d) type of dam, discharge and type of catchment area
- ix) The Knocking tendency in C.I engine increases with
 - a) decrease of compression ratio
 - b) increase in compression ratio
 - c) increasing the temperature of inlet air
 - d) increasing cooling water temperature.
- x) Gross head of a hydropower station is
 - a) the difference of water level between the level in the storage and tail race
 - b) the height of water level in the river where the storage is provided
 - c) the height of water level in the river where tail race is provided
 - d) none of these.



- xi) The specific speed of turbine is given by
 - a) N x(P) $^{1/2}/H^{5/4}$
- b) N x (P) $^{1/2}/H^{3/4}$
- c) N x (P) $^{1/2}/H^{3/2}$
- d) N x (P) $^{1/2}/H^{2/3}$.
- xii) The function of moderator in nuclear reactor is
 - a) to slow down the fast moving electron
 - b) to speed up the fast moving electron
 - c) to start the chain reaction
 - d) to transfer the heat produced inside the reactor to a heat exchanger.
- xiii) In CANDU type nuclear reactor
 - a) Natural uranium is used as fuel and water as moderator
 - b) Natural uranium is used as fuel and heavy water as moderator
 - c) Enriched uranium is used as fuel and water as moderator
 - d) Enriched uranium is used as fuel and heavy water as moderator
- xiv) the function of solar collector is to convert
 - a) solar energy into electricity
 - b) solar energy into radiation
 - c) solar energy into thermal energy
 - d) solar energy into mechanical energy.



- xv) maximum wind energy available is proportional
 - a) square of diameter of rotar
 - b) air density
 - c) cube of the wind velocity
 - d) all of these.

GROUP - B

(Short Answer Type Questions)

Answer any *three* of the following.

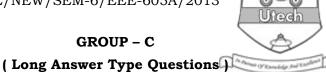
 $3 \times 5 = 15$

2. A Power station supplies the following loads to the consumers

Time in hours	0-6	0-10	10-12	12-16	16-20	20-22	22-24
Load in MW	30	70	90	60	100	80	60

Draw the load cuve and estimate the load factor of the plant.

- 3. What is meant by load curve? Explain its importance in power generation.
- 4. Explain with a sketch a fluidized bed combustion system.
- 5. Explain briefly the working a geothermal plant.
- 6. What is the necessity of generator cooling? What are methods used for generator cooling?



Answer any *three* of the following. $3 \times 15 = 45$

3

5

- 7. a) Draw a general layout of steam power plant and explain the working of different circuits.
 - b) Compare fire-tube and water-tube boiler.
- 8. a) The following readings were taken during the test of single cylinder four stroke diesel engine:

Cylinder diameter = 250 mm

Stroke length = 400 mm

Mean Effective pressure = 6.5 bar

Engine speed = 250 rpm

Net load on the brake = 1080 N

Effective diameter of the brake = 1.5 m

Fuel used per hour = 10 kg

Calorific value of fuel = 44300 Kj/Kg

Calculate:

- i) Indicated Power (ii) Brake Power (iii) Mechanical
 Efficiency (iv) Indicated Thermal Efficiency
 (v) Brake Thermal Efficiency.
- b) Explain the layout of gas turbine power plant.

6531 6

- 9. a) Sketch the layout of hydro electric power plant & explain the functions of each component in it. Discuss the advantages & limitations of this power plant.
 - b) Why is the Electricty the most convenient form of Energy?
- 10. a) What are different types of reactors commonly used in nuclear power stations? Describe the fast breeder reactor?
 - b) Explain briefly how tidal energy converted to electrical energy. 5
- 11. Write short notes on the following:

 3×5

- a) wind power
- b) pollution from nuclear power plant
- c) Solar Power.