VIGNAN'S INSTITUTE OF INFORMATION TECHNOLOGY
Question Bank 1st MID PORTION
(2019 BATCH) IV B.Tech- II Semester (VR19), April 2024

Name of the Subject: Green Engineering Systems

Subject Code: 1003194251 No of Units: 2.5

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Please follow the difficulty level while preparing the question paper:

UNIT	Difficulty Level	No. of Questions	
		Essay Type	Short Answer Type
3	LEVEL – 1 (Easy) – 25 % LEVEL – 2 (Average) – 50 % LEVEL – 3 (Difficult) – 25 %	4	10
4		8	20
5		8	20

UNIT - I

Q. No		Descriptive Questions	Level of Bloom Taxnomy	CO	marks (5 M)
1	A	Describe the role and potential of new and renewable sources of energy.	L1	1	5
	B	Describe Sun earth's angles and their relationship.	L1	1	5
2	A	Using the relation of hour angle ($\omega=15*(t_s-12)$) what will be the angle in degree at 3 hours after the solar noon.	L1	1	5
	B	Using the relation of hour angle ($\omega=1/4*t_m$) what will be the angle in degree at 2 h 20 min before the solar noon?	L1	1	5
3	A	Describe the Solar spectrum with a neat sketch.	L2	1	5
	B	Justify extraterrestrial solar radiation ($I_0=I_{sc}[1+0.034*\cos(360*n/365.25)]$)	L3	1	5
4	A	Justify declination angle ($\delta=23.45*\sin[360*(284+n)/365]$) with the seasonal profile.	L3	1	5
	B	Describe in brief the sun earth coordinate system with different sun earth angles.	L2	1	5
5	A	Describe with neat diagram flat plate air solar collector.	L2	1	5
	B	Describe with neat diagram flat plate water solar collector.	L2	1	5
6	A	Classify and briefly explain different types of Solar collectors.	L2	1	5
	B	What are the advantages and disadvantages of a solar collectors?	L2	1	5
7	A	Describe the incident angle with a neat sketch when the flat plate collector is placed at an inclined angle of 20 degrees due south.	L3	1	5

	B	Describe the incident angle with neat sketch when the flat plate collector is placed at horizontal surface.	L3	1	5
8	A	Describe different solar radiation measuring instruments. Illustrate any one with neat sketch.	L2	1	5
	B	Describe photo voltaic energy conversion? Explain with neat diagram.	L2	2	5

Q. No	**Short Answer Questions**	**Level of Bloom Taxnomy**	**CO**	**marks (2 M)**
1	Describe Air Mass ratio.	L2	1	2
2	Describe solar constant.	L2	1	2
3	Describe terrestrial solar radiation.	L2	1	2
4	Describe extraterrestrial solar radiation.	L2	1	2
5	Describe natural circulation in flat plate water heating system.	L2	1	2
6	Describe forced circulation in flat plate water heating system.	L2	1	2
7	Describe the working principle of Photo Voltaic cell.	L3	2	2
8	Describe array and string.	L1	2	2
9	Describe an optimal tilt.	L1	1	2
10	Describe the irradiance at standard test condition (STC) at 1.5 air mass (AM) ratio.	L3	1	2
11	What will be the air mass ratio when Sun is perpendicular to the horizontal surface?	L3	1	2
12	What will be the zenith angle at 1.5 air mass ratio?	L3	1	2
13	Describe the thermosiphon process.	L3	1	2

UNIT - II

Q. No		**Descriptive Questions**	**Level of Bloom Taxnomy**	**CO**	**marks (5 M)**
1	A	Describe sensible heating and latent heating describe with a neat sketch.	L1	2	5
	B	Describe different type of concentrating collectors with neat sketch.	L1	2	5
2	A	Explain solar energy storage using solar pond with neat sketch.	L2	2	5
	B	Describe space heating and cooling? Explain with suitable diagram?	L2	2	5
3	A	Explain solar thermal power plant using parabolic trough collector system?	L3	2	5
	B	Explain energy conversion system using parabolic Stirling engine or dish collector system?	L3	2	5
4	A	Explain solar tower? Explain working principle with neat sketch?	L2	2	5
	B	Describe heliostat solar field? Explain with diagram?	L2	2	5
5	A	Describe solar distillation or desalination process with diagram?	L2	2	5
	B	Explain different types of solar cooker?	L2	2	5
6	A	Describe central power tower or solar chimney with neat sketch?	L3	2	5
	B	Explain solar thermal power plant using central receiver type system?	L3	2	5
7	A	Explain crop drier with neat sketch?	L1	2	5
	B	What are the design considerations of a horizontal axis wind machine?	L1	2	5
8	A	Describe the difference between horizontal axis wind mills and vertical axis wind mills. Explain with neat sketch.	L2	2	5
	B	What are the various characteristics of the wind? Discuss the advantages and disadvantages of horizontal and vertical axis windmills.	L2	2	5

Q. No	Short Answer Questions	Level of Bloom Taxnomy	CO	marks (2 M)
1	Describe sensible heat and latent heat.	L1	2	2
2	Describe active and passive cooling.	L2	2	2
3	Describe active and passive heating.	L2	2	2
4	Describe absorption coefficient.	L1	2	2
5	Describe the reflective index.	L2	2	2
6	Describe the working principle of solar pond.	L3	2	2
7	Describe geometric concentration ratio.	L2	2	2
8	Give the disadvantage of the wind energy conversion systems.	L2	2	2
9	Write the advantages and limitations of the wind energy system.	L2	3	2
10	What are Betz criteria?	L3	3	2
11	Describe wind cutoff speed?	L3	3	2
12	Describe the vertical axis wind mill.	L2	3	2
13	Describe the horizontal axis wind mill.	L2	2	2
14	Describe the working principle of the central tower.	L3	2	2
15	Describe the working principle of solar chimneys.	L3	2	2

UNIT – III

Q. No		Descriptive Questions	Level of Bloom Taxnomy	CO	marks (5 M)
1	A	Describe the basic bio-mass conversion principle.	L1	3	5
	B	Explain aerobic digestion, its different phases, and its process.	L1	3	5
2	A	Explain the working of KVIC digester (Floating gas holder plant)	L2	3	5
	B	What are the factors, which affect the size of the biogas plants?	L2	3	5
3	A	Briefly explain the factors which influence the generation of gas from biomass.	L2	3	5
	B	What are the advantages and disadvantages of a floating drum bioconversion plant?	L2	3	5
4	A	Explain the purification process of bio-gas.	L3	3	5
	B	How we can use bio-gas in IC engines? Explain in detail.	L3	3	5

Q. No	Short Answer Questions	Level of Bloom Taxonomy	CO	marks (2 M)
1	Describe Bio-mass.	L1	3	2
2	Describe aerobic digestion.	L1	3	2
3	Describe anaerobic digestion.	L1	3	2
4	What are the various components of biogas?	L1	3	2
5	Describe bio-fuel.	L3	3	2
6	Describe fixed dome bio-gas.	L2	3	2
7	Describe floating dome bio-gas.	L2	3	2
8	Describe the carbon/nitrogen (C/N) ratio.	L3	3	2
9	Describe the limitation of biogas-gas plants.	L2	3	2
10	State the benefits of the biogas plant.	L2	3	2

Signature of faculty **Signature of the HoD**