NON-CONVENTIONAL ENERGY SOURCES (SEMESTER - 6)

CS/B.TECH(EEE)/SEM-6/EEE-606/2/09

1. .....
Signature of Invigilator

2. .....
Signature of the Officer-in-Charge

Reg. No. | | | | | | | | | | | | | | |

Roll No. of the Candidate | | | | | | | | | | | | | | |

CS/B.TECH(EEE)/SEM-6/EEE-606/2/09

ENGINEERING & MANAGEMENT EXAMINATIONS, JUNE – 2009

NON-CONVENTIONAL ENERGY SOURCES (SEMESTER - 6)

Time : 3 Hours] [Full Marks : 70

INSTRUCTIONS TO THE CANDIDATES :

1. This Booklet is a Question-cum-Answer Booklet. The Booklet consists of **32 pages**. The questions of this concerned subject commence from Page No. 3.
2. a) In **Group – A**, Questions are of Multiple Choice type. You have to write the correct choice in the box provided **against each question**.
   b) For **Groups – B** & **C** you have to answer the questions in the space provided marked 'Answer Sheet'. Questions of **Group – B** are Short answer type. Questions of **Group – C** are Long answer type. Write on both sides of the paper.
3. **Fill in your Roll No. in the box** provided as in your Admit Card before answering the questions.
4. Read the instructions given inside carefully before answering.
5. You should not forget to write the corresponding question numbers while answering.
6. Do not write your name or put any special mark in the booklet that may disclose your identity, which will render you liable to disqualification. Any candidate found copying will be subject to Disciplinary Action under the relevant rules.
7. **Use of Mobile Phone and Programmable Calculator is totally prohibited in the examination hall.**
8. You should return the booklet to the invigilator at the end of the examination and should not take any page of this booklet with you outside the examination hall, **which will lead to disqualification**.
9. Rough work, if necessary is to be done in this booklet only and cross it through.

No additional sheets are to be used and no loose paper will be provided

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FOR OFFICE USE / EVALUATION ONLY

Marks Obtained

	Group – A										Group – B			Group – C			***Total Marks***	***Examiner's Signature***
Question Number																		
Marks Obtained																		

.....
Head-Examiner/Co-Ordinator/Scrutineer

6850 (15/06)

DO NOT WRITE ON THIS PAGE

ENGINEERING & MANAGEMENT EXAMINATIONS, JUNE – 2009

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GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : 10 × 1 = 10

i) Solar pond is a pond

a) for fish cultivation b) shallow body of water

c) for trading photovoltaic cells d) none of these. ☐

ii) In lift and drag type machines the maximum ratio of lift to drag force is

a) 30 : 1 b) 20 : 1

c) 10 : 1 d) none of these. ☐

iii) Global or planetary winds are caused due to

a) differential heating of equator b) axial spin of earth

c) both (a) and (b) d) none of these. ☐

iv) Sunrise or sunset hour angle (ω_s) is given by

a) $\cos(\omega_s) = (-\tan\phi \tan\delta)$ b) $\cos(-\omega_s) = (-\tan\phi \tan\delta)$

c) $\sin(\omega_s) = (\tan\phi \tan\delta)$ d) $\sin(\omega_s) = (-\tan\phi \tan\delta)$. ☐

v) As per Bits criterion (C_p man) Maximum Power Co-efficient is

a) 0·593 b) 0·493

c) 0·393 d) None of these. ☐

vi) Local winds are caused due to

a) differential heating of land and water bodies

b) uneven heating of hill slopes and low land

c) both (a) and (b)

d) none of these. ☐

vii) By convention Latitude is

a) + ve in northern hemisphere b) – ve southern hemisphere

c) both (a) and (b) d) none of these. ☐

viii) A flat plate collector is used for

a) space heating b) water heating

c) both (a) and (b) d) none of these. ☐

ix) Thin film solar cells have

a) very high efficiency

b) very low efficiency

c) efficiency same as crystalline solar cells

d) none of these. ☐

x) Nacelle of a horizontal axis turbine contains

a) rotor b) rotor brakes, gear box

c) generator and switch gear d) none of these. ☐

xi) The wind generator is generally

a) d.c. generator b) synchronous generator

c) induction generator d) none of these. ☐

GROUP – B
(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. Briefly describe the geothermal sources mentioning the application of geothermal energy.

3. What is Ocean thermal energy system ? Give its working principle.

4. Describe with diagram the working of Pyrometer.

5. Describe the various parts of a VAWT or HAWT and this operation.

6. Mention advantages and disadvantages of Geothermal energy over other energy forms.

GROUP – C

(Long Answer Type Questions)

Answer any *three* questions. 3 × 15 = 45

7. a) What are the different types of wind mills ?

   b) How is the performance of wind mills determined ?

   c) With a neat sketch, describe a Wind-electric generating power plant.

   d) Describe the different types of Wind machines and state their relative advantages and disadvantages.

8. a) Give all assumptions and terms used in empirical formula for derivation of average daily global solar radiation.

   b) Calculate the average value of solar radiation on a horizontal surface for (June 19) at 10°N. Constants *a* & *b* are 0·30 & 0·51 respectively.

   The average sunshine hrs/day = 9·1. I_{sc} = solar const/hr = 1353 W/m ^{2} or 4871 kJ/m ^{2} . *h* in *SI* units & 1165 k.cal/m ^{2} .hr in MKS units.

9. a) What are the different components of Tidal power plants ?

   b) Explain the operation of different arrangements of tidal power plants.

   c) State the advantages and limitations of Tidal power generation.

10. a) What is solar pumping ?

    b) A hetero-junction cell area of 6 cm ^{2} gave results V_{oc} = 400 mV, ISC = 200 WA, under isolation (0·8 sun). What is the energy conversion efficiency of this device ?

    (Fill factor = 80%)

11. What are the different types of reactors used in a Nuclear power station ? Describe them mentioning relative advantages and disadvantages.

END