KATHMANDU UNIVERSITY
End Semester Examination
August, 2018

Marks Obtained:

Level : B. Tech.
Year : III

Course : ENVE 399
Semester: II

Exam Roll No.:

Time: 30 mins.

F.M. : 20

Registration No:

Date AUG: 2 3 2018

SECTION "A"
[15 Q.× 1=15 marks]

Encircle the most appropriate answer.

1. Maximum used energy source in world at present context is.....
   a. Fossil fuel b. Solar energy c. Hydropower d. Forest product

2. Evacuated heat pipe tubes (EHPTs) are composed of multiple evacuated glass tubes each containing an absorber plate fused to a heat pipe.
   a. Unevacuated heat pipe tubes b. Open heat pipe tubes
   c. Evacuated heat pipe tubes d. Closed heat pipe tubes

3. On 1905 Einstein describe photoelectric effect and states that emf generated by photon is equal to .....
   a. E = hf b. E = 2 hf c. E = 3 hf d. $E = MC^2$

4. The largest power producing hydropower plant in Nepal at present day is Kaligandaki HP and it has the capacity of .....
   a. 174 MW b. 164 MW c. 154 MW d. 144 MW

5. Temperature in the crust increases at the rate of ..... per km deep down the crust.
   a. 25° C b. 30° C c. 35° C d. 45° C

6. ..... is the combination of dry steam turbine technology and binary cycle technology.
   a. Single cycle power plant b. Double cycle power plant
   c. Three cycle power plant d. Combine cycle power plant

7. Wind power is extracted from air flow using wind turbines or sails to produce ..... power.
   a. Potential b. Kinetic c. Mechanical d. Lighting

8. Wind energy is extended form of.....
   a. solar energy b. biogas c. geothermal energy d. hydropower plant

9. The most prevalent GHGs is .....
   a. Methane b. Nitrous Oxide c. Carbonmonoxide d. Carbondioxide

10. Oxyhydrogen is a mixture of oxygen and hydrogen which when ignited, releases .....steam that can be used to generate electricity.

a. high pressure and high temperature
b. high pressure and low temperature
c. low pressure and high temperature
d. low pressure and low temperature

Fill in the blanks

11. The extractable power from the wind is given by: $P = 1/2\rho AV^3C_p$. In the equation C_p is known as .....

12. Write down the maximum efficiency of the following components of hydropower
    a. Transmission line .....
    b. Generator .....

13. ..... take super-heated water usually at temperature over 200^0 C.

14. Batteries are self-contained units that store chemical energy and, on demand, convert it directly into ..... energy to power a variety of applications.

15. The full form of UNFCCC is .....

SECTION "B"
[5Q.×1 = 5 marks]

Define in a sentence.

a. E-Number:

b. Appropriate Technology:

c. Supper capacitors:

d. Runoff coefficient:

e. Full form of SOFC:

KATHMANDU UNIVERSITY
End Semester Examination
August, 2018

AUG 2 3 2018

Level : B. Tech.
Year : III
Time : 2 hrs. 30 mins.

Course : ENVE 399
Semester: II
F.M. : 55

SECTION "C"

Attempt ***ALL*** questions.

Students should attend the questions in serial order. Assume necessary data with logical explanation.

1. Write down any two adverse and beneficial impacts of wind energy.
A family with 5 members plans to install a solar water heater which is mainly used for bath. The hot-water temperature required for bath is 35 °C, while the annual average temperature of cold water is 20 °C. Assuming that each person needs 60 liters of hot water for taking bath a day, how much heat should be provided by the solar water heater to satisfy the family's demand for bath? The minimum heat demand is 8100 Kcal/day and there is a certain solar panel which can offer a heat supply of 1720 Kcal/m^2 in a day. Calculate the required installation area of solar panel in absence of auxiliary heating device. [2+2.5×2=7]

2. A rural municipality office in Mustang needs the following electric system for Muktinath Temple: [3+4=7]
   a. 5 watt 12 V d.c lamp, 15 in numbers to be used for 6 Hrs
   b. VHF telecommunication equipments of system voltage of -48V d.c, power consumptions in talk and receive mode (2 hrs/day) is 50 watt, power consumption in standby mode is 10 watt.
      i. Show all the load calculations in tabular form.
      ii. Calculate the solar array and battery bank.

3. Design the solar pumping system for the water supply scheme located at a village in Surkhet district of Karnali Province. The details of the WSS project is given below.
   a. population of people = 250 (average water consumption 25 lpcd)
   b. population of cattle = 50 (average water consumption 40 lit/day/cattle)
   c. monthly avg. solar insolation = 4.5 Kwh/m^2/day
   d. static head = 30 m
   e. draw down level = 5 m
   f. pipe friction loss = 1 m

   Calculate the kinetic power produced in a wind turbine at its rated wind speed. Define Beltz constant in the equation. [4+3=7]

4. List out the different types of HP according to power production. Describe run-off river and reservoir types of HP
   DoED, ministry of water resource, irrigation and energy decided to add 50 MW of wind generation to its system. If the individual unit area rated 3 MW in a 14 m/sec wind speed at standard condition and have power coefficient 0.36 and electrical mechanical efficiency of 90% each. What is the required area of each rotor? What is the rotor dia. if the rotor is two bladed horizontal axis propellers? If the turbine is required to deliver rated power at 20rpm and generator rated speed is 1800 rpm, what is the average torque at the low speed and high speed shaft? [3+4=7]

5. Define utilization, plant and load factors of a HP.
The load on hydel plant carries from a minimum of 10,000 Kw to a maximum of 35,000 Kw. Two turbo generator capacity 22,000 each have been installed. Calculate plant factor, load factor, utilization factor and total installed capacity of a plant. [3+4=7]

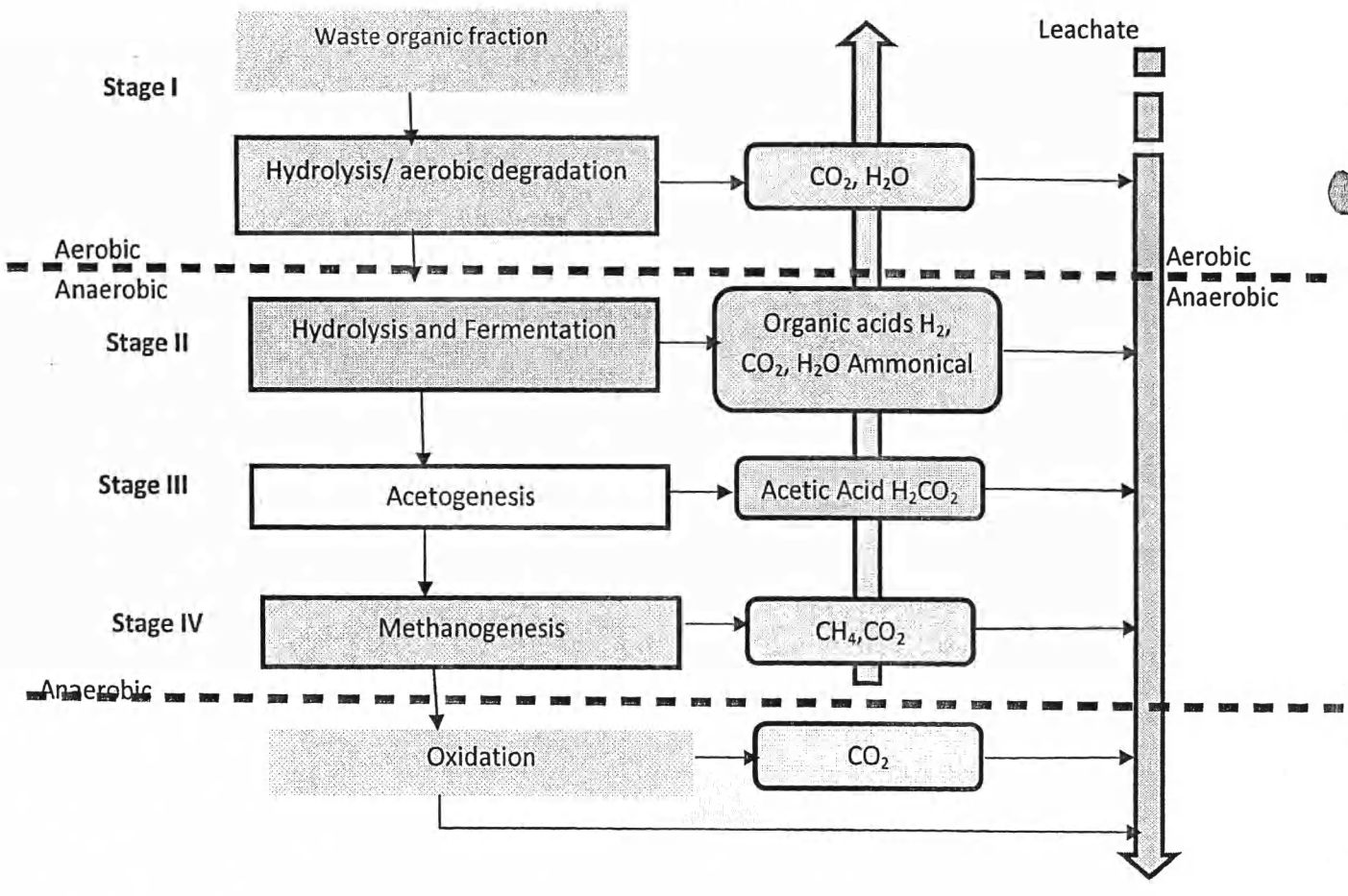
6. Define carbon and emission trading.
What are the sources for GHGs emission?
List out the different environmental impacts of the climate change. [3+2+2=7]

7. Calculate the heat value of ethanol in KJ/Kg. using the modified Dulong's formula. One HP station and other is thermal power plant of equal power capacity are working at a time in the country. The economic information for both plants are given below.
Determine the payback period of additional capital investment in the construction of HP. [2+3=5]

	Hydropower plant	**Thermal plant**
Capital cost	7.280 billion	3.43 billion
Annual expenditure	0.291 billion	1.04 billion

8. Write short notes on (***ANY TWO***): [2×2=4]
   a. Nuclear hazards
   b. Types of geothermal energy
   c. Biofuels

9. The figure below describes the waste decomposition process. Explain clearly what happens in different four stages. As an environment engineer in which stage are you interested to trap energy from waste and why? [4]



KATHMANDU UNIVERSITY
End Semester Examination
August, 2018

Marks Scored:

Level : B.Tech.
Year : III

Course : BIOT 305
Semester: II

Exam Roll No. :

Time: 30 mins

F.M. : 20

Registration No.:

Date AUG 23 2018

SECTION "A"
[20 Q.×1=20 marks]

Choose and tick [✓] the most appropriate answer.

1. Which method is used in analysis of thousands of gene activity at once?
   [ ] RNA sequencing [ ] DNA sequencing
   [ ] Comparative genomics [ ] System biology

2. SoliD sequencing technique uses the following method:
   [ ] Pyrosequencing [ ] Bridge amplification
   [ ] Ligation [ ] Single molecule

3. What type of database is BLOCKS?
   [ ] Primary [ ] Secondary [ ] Tertiary [ ] Quaternary

4. After retrieving the information about a nucleotide sequence in NCBI; information about length of the coding sequence is displayed in
   [ ] Header [ ] Feature table [ ] Sequence [ ] Identifier

5. Sequence identifiers downloaded from SWISSPROT resemble the format:
   [ ] gi|gi_number|gb|accession.version|locus [ ] ref|accession|locus
   [ ] sp|accession|locus [ ] pdb|entry|chain

6. Two protein sequences can be regarded homologous if they share a sequence identity of 20% while comparing pairwise sequence alignments of minimum
   [ ] 100 residues [ ] 150 residues [ ] 200 residues [ ] 250 residues

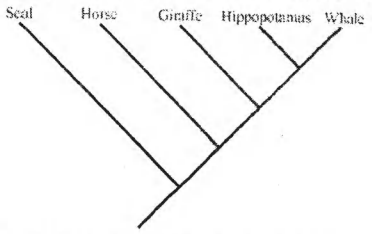
7. To make an alignment with higher score, Lysine can be substituted by:
   [ ] Proline [ ] Valine [ ] Tyrosine [ ] Arginine

8. The default query word size used for nucleotide blast is:
   [ ] Nine [ ] Ten [ ] Eleven [ ] Twelve

9. The database and query required for blast X is _____ &_____ respectively:
   [ ] Protein & translated nucleotide [ ] Translated nucleotide & protein
   [ ] Translated nucleotide; translated nucleotide [ ] Protein & amino acid

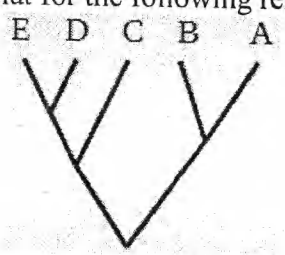
10. For which Markov model, the current state is dependent on two previous states:
    [ ] Zero order [ ] First order [ ] Second order [ ] Third order

11. By reference to the tree below, which of the statement is an accurate relationship?



[ ] Seal is more closely related to horse than to whale
[ ] Seal is more closely related to whale than to horse
[ ] Seal is equally related to horse and whale
[ ] Seal is related to horse but not to a whale

12. Write down the Newicks format for the following relation.



[ ] (((E,D),C)(A,B))
[ ] (((D,E),C),(A,B))
[ ] ((D,E)),C),(B,A))
[ ] (((C,D),E),(B,A))

13. Which of the following can be observed in coincidental substitution?
[ ] 1 change, 1 difference
[ ] 2 changes, 1 difference
[ ] 2 changes, no difference
[ ] 3 changes, no difference

14. Parsimony methods can give _____ information when rates of sequence change _____ in the different branches of a tree that are represented by the sequence data.
[ ] misleading, vary
[ ] useful, change
[ ] misleading, are constant
[ ] sometimes contradicting, are constant

15. For sequences that have _____, a phylogenetic analysis is _____
[ ] diverged considerably, more challenging
[ ] not diverged, more challenging
[ ] diverged considerably, less challenging
[ ] diverged considerably, less work to do

16. The consensus of Kozak sequence is:
[ ] AATAAA [ ] GCCACCATGG [ ] GTAAGT [ ] AGGAGGT

17. Alpha helices are stabilized by hydrogen bonds between:
[ ] i and i+2 residues
[ ] i and i+3 residues
[ ] i and i+4 residues
[ ] i and i+5 residues

18. A sequence of Ala-Glu-Gln-Lys-Leu-Met has a tendency to form:
[ ] Alpha helix [ ] Beta sheet [ ] Turns [ ] No preference

19. Which of the following is not a component of RNA secondary structure?
[ ] Hairpin loop [ ] Kissing hairpins [ ] Multi-branch loop [ ] Interior loop

20. Masking a blast is generally used ..... purpose:
[ ] To obtain high sequence alignment by random matches
[ ] To overcome high complexity regions in sequences during alignment
[ ] To overcome low complexity regions in sequences during alignment
[ ] To support segment that are overexpressed by small number of residues