Assignment Booklet

BSCAEY Programme

B.Sc (Applied Sciences - Energy)

First Semester	
BEY-001	Thermal Science
BEY-019	Real Analysis and Discrete Mathematics
BEY-012	Electrical and Electronic Sciences
BEVAE-181	Environmental Studies (4)
BHDAE-182	Hindi Bhasha aur Sampreshan (4)
BEGAE-182	English communication skill(4)
BEYE-022	**Sanskrit** Bhasha aur Sampreshan (4)

SCHOOL OF ENGINEERING & TECHNOLOGY
INDIRA GANDHI NATIONAL OPEN UNIVERSITY
Maidan Garhi, New Delhi – 110 068

JANUARY 2025

Dear Student,

Please read the information on assignments in the Programme Guide that we have sent you after your enrolment. A weightage of 30%, as you are aware, has been earmarked for continuous evaluation, **which wouldconsist of one tutor-marked assignment** for this Programme. The assignment for BSCAEY (first semester) has been given in this booklet.

Instructions for Formatting Your Assignments

Before attempting the assignment, please read the following instructions carefully:

1) On top of the first page of your answer sheet, please write the details exactly in the following format:

ENROLLMENT NO :……

NAME :……

ADDRESS :……

……

……

PROGRAMME CODE: ……..

COURSE CODE: …….

COURSE TITLE: ……

STUDY CENTRE: ……..…… DATE: …….……...

PLEASE FOLLOW THE ABOVE FORMAT STRICTLY TO FACILITATE EVALUATION ANDTO AVOID DELAY.

2) Use only foolscap size writing paper (but not of very thin variety) for writing your answers.

3) Leave 4 cm margin on the left, top and bottom of your answer sheet.

4) Your answers should be precise.

5) These assignments submitted should be hand written in your own hand writing.

We strongly suggest that you should retain a copy of your answer sheets.

6) You cannot fill the Exam Form without submission of the assignments. So solve it and **submit it at the earliest.** If you wish to appear in the **TEE, June 2025,** you should submit your TMAs by **April 30, 2025.** Similarly, if you wish to appear in the **TEE, December 2025,** you should submit your TMAs by **September 30, 2025.**

7) Assignments will be submitted at **your respective regional centre.**

We wish you good luck!

Assignment -1

(To be done **after** studying the course material)

Course Code: BEY-001
Course Title: Thermal Science
Assignment Code: BEY-001/TMA/2025
Maximum Marks: 100

Last Date of Submission: May 31, 2025 (For June TEE), September 30, 2025 (For December TEE)

Note:

1. **For any question worth 5 marks the word limit is 200 words, for a 10 mark question it is 350 words.**

2. **All questions are compulsory. All questions carry equal marks.**

Q.1	What is thermodynamic equilibrium? Explain process and path as well.	10
Q.2	Discuss the parameters of 'equivalent evaporation' and 'boiler efficiency' to evaluate the performance of boilers.	10
Q.3	Describe the following boiler mountings i. Steam safety valve ii. Water Gauge	10
Q.4	Describe a velocity compounded impulse turbine with a neat sketch.	10
Q.5	Enlist and explain the two primary classification of a condenser to be used in a power plant. Also, discuss steam surface condenser configuration.	10
Q.6	Derive the expression for efficiency in a Diesel cycle.	10
Q.7	Differentiate, in detail between a four stroke and a two-stroke IC engine.	10
Q.8	Describe a closed cycle gas turbine power plant and its characteristics with a neat sketch.	10
Q.9	Enumerate some of the desirable properties of refrigerants.	10
Q.10	Describe the simple vapour compression refrigeration cycle in detail.	10

Assignment -2

(To be done **after** studying the course material)

Course Code: BEY-019
Course Title: Real Analysis and Discrete Mathematics
Assignment Code: BEY-019/TMA/2025
Maximum Marks: 100

Last Date of Submission: May 31, 2025(For June TEE), September 30, 2025 (For December TEE)

Note:

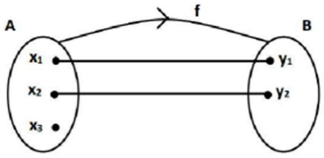
1. **For any question worth 5 marks the word limit is 200 words, for a 10 mark question it is 350 words.**

2. **All questions are compulsory. All questions carry equal marks.**

Q.1 State whether the following statement are True or False and also give the reason in support of your answer.

a) Collection of intelligent students of IGNOU forms a set. 2

b) Following rule is a function from A to B 2



c) $\frac{d}{dx}(9-7x)^5 = 45(9-7x)^4$ 2

d) The negation of the following statement p is ¬p. 2

p: Longest chord of a circle is diameter

¬p: Diameter is the shortest chord of circle

e) Any term of an AP(except the first and last) is equal to half the sum of terms which are equidistant from it on both sides 2

Q.2 If the universal set is U = {1,2,3,4,5,6,7,9,10} and A = {2,3,6,7}, B= {4,6,8,9}, C= {6,7,8} are the subsets of U, then verify

a) De-Morgan's Laws 5

b) Left distributive law 5

Q.3 Evaluate the following:

a) $\int x^2 e^{2x} dx$ 5

b) $\frac{dy}{dx}, where\ y = (4x+5)^4 (9x+4)^5$ 5

Q.4 a) If x,y,z be respectively the p^{th}, q^{th} and r^{th} term of G.P., then evaluate 5
(q-r) logx + (r-p) logy + (p-q) logz

b) The numbers a,b and c are between 2 and 18, such that, (i) their sum is 25, (ii) the number 2, a and b are consecutive terms of an A.P. and (iii) the number b,c and 18 are consecutive terms of a G.P. Find the values of a,b,c. 5

Q.5 a) For the statement p and q, consider the following compound statements: 5

A. $\{\neg q \wedge (p \rightarrow q)\} \rightarrow \neg p$

B. $\{(p \vee q) \wedge \neg p\} \rightarrow q$

Then which of the following statement is correct:

(i) A is a tautology but not B

(ii) A and B both are not tautologies

(iii) A and B both are tautologies

(iv) B is a tautology but not A

b) Which of the following Boolean expression is a tautology? 5

(i) $(p \wedge q) \vee (p \vee q)$

(ii) $(p \wedge q) \vee (p \rightarrow q)$

(iii) $(p \wedge q) \wedge (p \rightarrow q)$

(iv) $(p \wedge q) \rightarrow (p \rightarrow q)$

Q.6 Solve the following discrete difference equations:

a) $Y_{t+2} + 12y_{t+1} + 30y_t = 2 + 3t^2$ 5

b) $Y_{t+2} + 15y_{t+1} + 5y_t = 1 + 6t + 13t^2$ 5

Q.7 a) Evaluate $\lim_{x \to \frac{\pi}{6}} \dfrac{\sqrt{3}\sin x - \cos x}{x - \dfrac{\pi}{6}}$ 5

b) Evaluate $\lim_{x \to 0} \dfrac{\sqrt{1+x^3} - \sqrt{1-x^3}}{x^2}$ 5

Q.8 Differentiate the following functions:

a) $y = \sin^3 x \cos^3 x$ 5

b) $y = \dfrac{1}{ax^2 + bx + c}$ 5

Q.9 Evaluate the following:

a) $\int \dfrac{\sqrt{x}}{\sqrt{x}+2}\,dx$ 5

b) $\int \dfrac{\tan(\log x)}{x}\,dx$ 5

5

Q.10 Show that 5

a) $\int_0^{\frac{\pi}{2}} \dfrac{\cos x}{1 + \cos x + \sin x}\,dx = \dfrac{\pi}{4} - \dfrac{1}{2}\log 2$

b) Evaluate $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \dfrac{1}{1 + \tan x}\,dx$

Assignment -3

(To be done **after** studying the course material)

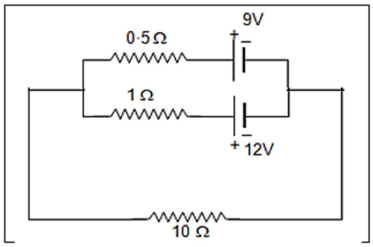
Course Code: BEY-012
Course Title: Electrical and Electronic Sciences
Assignment Code: BEY-019/TMA/2025
Maximum Marks: 100

Last Date of Submission: May 31, 2025(For June TEE), September 30, 2025 (For December TEE)

Note:

1. **For any question worth 5 marks the word limit is 200 words, for a 10 mark question it is 350 words.**

2. **All questions are compulsory. All questions carry equal marks.**

Q.1	a)	What is Power and Energy? Explain the term active power and reactive power?	05
	b)	Explain Kirchhoff's Voltage Law (KVL).	05
Q.2	A.	In the circuit, in Figure , find a) the value and direction of current in 10 Ω resistance, and b) the current supplied by each battery.  	05
	B.	Explain Law's of Electrostatic. Describe energy stored in a Capacitor.	05
Q.3		An inductive coil of resistance 25 ohm and reactance 10 ohm is connected in series with a capacitor of reactance 60 ohm. The circuit is connected across 400 V AC supply, determine (a) Current, (b) Phase difference between voltage and current, (c) Magnitude of voltage across the inductive coil, and (d) Total power absorbed.	10
Q.4		Explain working principle, construction details and EMF equation of Transformer.	10
Q.5	a)	Write various applications of synchronous motor and an induction motor?	05
	b)	Draw and explain torque-slip curve of three-phase induction motor.	05
Q.6		Explain Diode with neat diagram.	10
Q.7		Describe Transistor as an Amplifier.	10
Q.8		Explain the characteristics of SCR and Traic.	10
Q.9		What are Flip Flops? Explain the functions of the following: (a) T flip flop (b) Clocked SR flip flop (e) Full subtractor	10
Q.10	a)	What is Transducer? Give classification of transducers.	05
	b)	With the help of a diagram explain the functioning of a microprocessor based micro-computer?	05

Assignment -4

(To be done **after** studying the course material)

Course Code: BEVAE-181
Course Title: AECC On Environmental Studies
Assignment Code: BEVAE-181/TMA/2025
Maximum Marks: 100

Last Date of Submission: May 31, 2025(For June TEE), September 30, 2025 (For December TEE)

Note:

1. **For any question worth 5-7 marks the word limit is 200 words, for a 8 mark question it is 300 words.**

2. **All questions are compulsory. All questions carry equal marks.**

Q.1		Why ecological significance of forest is more important in present day context? Explain.	8
Q.2	a)	Explain the characteristics of Western Ghats for inclusion as Biodiversity hotspots.	4
	b)	Why hydropower is regarded as the best source of energy? Explain it in detail.	4
	c)	The importance of Biomass has been increasing day by day in our surroundings among renewable resources. Explain it with suitable examples.	4
	d)	How does air pollution affect the atmospheric processes?	4
	e)	What is Disposal of waste? Why segregation of waste is needed?	4
Q.3		"As humans civilization progressed, man started altering the environment in the pursuit of creating an economic, social and cultural environment of his own choice. This slowly resulted in the depletion of natural resources and degradation of environment." Explain it in context of national legislations of water acts?	7
Q.4		Explain the human-environment relationship by taking examples of biotic and abiotic components?	7
Q.5		"Biosphere reserves are internationally recognized areas established to promote and demonstrate a balanced relationship between Humans and the Biosphere." Elaborate this statement in the context of conservation of nature?	8
Q.6		Explain the following terms in about 60 words each:	
	a)	Seed Bank	2
	b)	Incineration	2
	c)	Biological Oxygen Demand	2
	d)	Public Health	2
Q.7	a)	What is lentic and lotic ecosystem? Explain these two with suitable examples.	5
	b)	What is ecological succession? Explain the types of succession with suitable diagrams.	5
	c)	Explain the biocentrism and ecocentrism in context of human's attitude towards nature?	5

d) Define natural calamities and its types with suitable examples. 5

Q.8 Explain the causes of ozone depletion? How do ultraviolet rays affects human health, animals, plants, micro-organisms, water and air quality. 7

Q.9 "Education for environmental awareness is essential for the younger generation as well as for the older generation." Explain the statement with suitable examples. 7

Q.10 "Water Harvesting is one of the effective measures to combat drought." Explain this statement with suitable arguments. 8

Assignment -5

(To be done **after** studying the course material)

Course Code: BEGAE-182
Course Title: English Communication Skills
Assignment Code: BEGAE-182/TMA/2025
Maximum Marks: 100

Last Date of Submission: May 31, 2025(For June TEE), September 30, 2025 (For December TEE)

Note:

1. **For any question worth 5 marks the word limit is 200 words, for a 10 mark question it is 300 words.**

2. **All questions are compulsory. All questions carry equal marks.**

Q.1	What do you understand by the term 'non-verbal communication'? What are its advantages?	10
Q.2	Write a short note on Macro functions of communication	10
Q.3	How do you differentiate between Group Discussions at Interviews and Group Discussions in General?	10
Q.4	What are "homonyms" and "homophones"? Explain with suitable examples.	10
Q.5	What are some of the meeting etiquettes which one must follow while attending a meeting? Also suggest ways to end a meeting	10
Q.6	A construction company is planning to cut down several trees in your locality to build 10 new flats. As the President of your Residential Association write a formal letter to the editor of your local newspaper highlighting this issue.	10
Q.7	You are attending an international Conference in your city. You have just met a 10 participant from the U.S.A. Write a dialogue in 10 turns where both of you get introduced to each other and discuss your expectations from the conference.	10
Q.8	Write an essay on Barriers to communication.	10
Q.9	A group of five students have been given the topic "Environment Pollution and ways to curb it" for group discussion. Attempt a group discussion for a set of three students.	10
Q.10	You have been invited to speak in a webinar for high school students on the topic: 10 "Contribution of Youth in Nation building" Write your speech in around 300 words.	10