From

Professor Dibyendu Bhattacharyya, *Ph.D.*   **Ref. No.**KU/DODL/101/21
Director   **Date: 27.10.2021**

NOTIFICATION
For M.A./M.Sc. Semester: IV Internal Assignment – 2021 (DODL)
With Rules and General Guild lines of Internal Assignment

Semester based Postgraduate M.A/M.Sc. Programme under CBCS (DODL)

This is for information to the students of **M.A/M.Sc. Semester-IV under Directorate of Open & Distance Learning (DODL)** that as per the revised syllabus prescribed under the CBCS mode, are hereby instructed to write and submit **Internal Assignments** from each paper on or before **11/11/2021**. Assignment submission related prescribed rules and general guidelines are stated below:

1) The given Assignments will carry 20% weightage of the total marks in each paper. The students are advised to carefully abide by all the instructions given in their Assignment Questions.

2) The students of the University of Kalyani (Main Campus) are directed to submit the assignments, prepared only in **PDF format or document Cloud**(paper-wise separately),to the official e-mail id(s) (provided below) of their respective departments.*****

3) The students should write and submit the answer script from their respective residences. They are strictly advised to write the Assignments in their own words. Moreover, the Assignments have to be hand-written.

4) The students have to use A4 size blank sheets to write the Assignments. They must mention their **Subject, Semester, Enrolment Number in the very first page of the Assignments for each paper**. Secondly, they need to write the individual Enrolment Numbers as well as the Page Numbers in all the pages.

5) The **"Subject"** of the e-mail will be the **Enrolment Number and the Name of the Subject** (For example, KU/MA/ENG/0001/19 -- ENGLISH). The **"name"** of the individual PDF(s) will be the paper codes.

6) **The last date of submission is 11/11/2021.** The students should send their Assignments only in the provided e-mail id(s) and **any other kind of submission will be summarily rejected**.

7) **Any student (of any subject) of the academic session 2018-2020, who have not appeared or submitted their third semester internal assessment till now, are allowed to submit their IV semester internal assignments in the email ids (provided below) of their respective subject.**
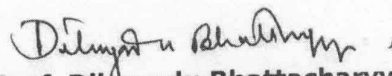
(Prof Dibyendu Bhattacharyya)
Director

The list of the subject-wise official E-mail Addresses, where only the **MAIN CAMPUS** students of semester -IV will submit their Internal Assignments, are given below:

Subject	Enrolment Number	E-Mail Address
Bengali	KU/MA/BEN/001/19-KU/MA/BEN/0235/19 and also any backlog student of academic session 2018-2020	bengali3dodl@klyuniv.ac.in
	KU/MA/BEN/00236/19-KU/MA/BEN/0470/19 and also any backlog student of academic session 2018-2020	bengali2dodl@klyuniv.ac.in
English	KU/MA/ENG/001/19-KU/MA/ENG/0077/19	english1dodl@klyuniv.ac.in
	KU/MA/ENG/0078/19-KU/MA/ENG/0153/19 and also any backlog student of academic session 2018-2020	english2dodl@klyuniv.ac.in
History	All Students of M.A in History (IV Sem) Main Campus and also any backlog student of academic session 2018-2020	history2dodl@klyuniv.ac.in
Education	KU/MA/EDN/0001/19 - KU/MA/EDN/0118/19	education1dodl@klyuniv.ac.in
	KU/MA/EDN/0119/19 - KU/MA/EDN/0236/19 and also any backlog student of academic session 2018-2020	education2dodl@klyuniv.ac.in
Zoology	All Students of M.Sc in Zoology and also any backlog student of academic session 2018-2020	zoosem4kudodl@gmail.com

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Botany	All Students of M.Sc in Botany and also any backlog student of academic session 2018-2020	botsem4 kudodl @gmail.com
Mathematics	All Students of M.Sc in Mathematics and also any backlog student of academic session 2018-2020	mathematics1dodl@klyuniv.ac.in
M.A. in Geography	All Students of M.A in Geography and also any backlog student of M.A. in geography of academic session 2018-2020	geo1sem3kudodl@gmail.com
M.Sc. in Geography	All Students of M.Sc in Geography and also any backlog student of M.Sc. in geography of academic session 2018-2020	geo2sem3kudodl@gmail.com

Note: The students of the various Study Centres under DODL, KU, will submit the same Assignments to their study centres as per their instructions. They are also advised to contact the respective authorities in charge for any further queries.

(Prof. Dibyendu Bhattacharyya)
Director, DODL
University of Kalyani

Director
Directorate of Open & Distance Learning
University of Kalyani

কল্যাণী বিশ্ববিদ্যালয়

মুক্ত ও দূরবর্তী শিক্ষা অধিকরণ

২০২১

স্নাতকোত্তর চতুর্থ সেমেস্টার

বিষয় : বাংলা (Assignment)

<u>প্রতিটি পত্র থেকে দুটি করে প্রশ্নের উত্তর দাও</u>   <u>প্রতি পত্রের পূর্ণমান-২০</u>

পঞ্চম পত্র

নিম্নলিখিত প্রশ্নের উত্তর দাও:

১. সূত্র ব্যাখ্যা করো: 'কাব্যং গ্রাহ্যম্ অলংকারাৎ' ও 'সৌন্দর্যম্ অলঙ্কারঃ'।   ১০

<div align="center">অথবা</div>

অবনীন্দ্রনাথের শিল্পভাবনার পরিচয় দাও।   ১০

২। প্লেটোর নান্দনিক শিল্পদৃষ্টির পরিচয় দাও।   ১০

<div align="center">অথবা</div>

জাঁ-পল-সার্ত্র এর সাহিত্যচিন্তায় নান্দনিক দৃষ্টিভঙ্গি বিশ্লেষণ করো।   ১০

ষষ্ঠ পত্র

নিম্নলিখিত প্রশ্নের উত্তর দাও:

১। 'মেঘদূত' কাব্যের নদীগুলি কেবল প্রকৃতির সম্পদ মাত্র নয়, বিরহিনী নায়িকা'।– প্রকৃতি –নদী ও নারী এই কাব্যে কীভাবে অভিন্নতা লাভ করেছে তা 'পূর্বমেঘ' অবলম্বনে উপস্থাপন করো ।   ১০

অথবা

সৌন্দর্যরসবোধের দিক থেকে মেঘদূত কাব্যের পূর্বমেঘ ও উত্তরমেঘ- এর মধ্যে একটি তৌল বিশ্লেষণ উপস্থাপন করো ।   ১০

২। 'অভিজ্ঞানশকুন্তলম্' নাটকের চতুর্থ অঙ্কে বর্ণিত দুর্বাসার অভিশাপ অংশের নাট্যগুরুত্ব আলোচনা করো ।   ১০

অথবা

অ্যারিস্টটল ট্র্যাজেডির কী সংজ্ঞা দিয়েছেন লেখো এবং সংজ্ঞাটি ব্যাখ্যা করে ট্র্যাজেডির সাধারণ লক্ষণগুলি নিয়ে আলোচনা করো ।   ১০

বিশেষ পত্র : নাট্যসাহিত্য
সপ্তম পত্র

নিম্নলিখিত প্রশ্নের উত্তর দাও:

১। নাট্যজগতে বাংলার বিদেশি রঙ্গালয়ের বিবরণ দাও।   ১০
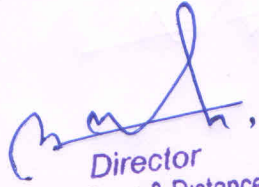
অথবা

বাংলা থার্ড থিয়েটার সম্পর্কে সংক্ষিপ্ত প্রবন্ধ রচনা করো।   ১০

২। নাটকে সংঘর্ষ এবং কৌতূহল কতটা গুরুত্বপূর্ণ বলে তুমি মনে করো।   ১০

অথবা

রূপক ও সাংকেতিক নাটক বলতে কী বোঝো? যেকোনো একটি নাটকের উদাহরণ দিয়ে বুঝিয়ে দাও।   ১০

অষ্টম পত্র

নিম্নলিখিত প্রশ্নের উত্তর দাও:

১। বাংলা নাট্যশালার ইতিহাসে 'বেঙ্গল থিয়েটার' সম্পর্কে আলোচনা করো ।   ১০

অথবা

আধুনিক নাট্য প্রযোজনায় রূপসজ্জা সম্পর্কে আলোকপাত করো ।   ১০

২। বাংলা নাট্যমঞ্চে শিশিরকুমার ভাদুড়ীর অবদান আলোচনা করো ।   ১০

অথবা

বাংলা নাটকের উপর লোকনাট্যের প্রভাব আলোচনা করো ।   ১০

বিশেষ পত্র : রবীন্দ্রসাহিত্য
সপ্তম পত্র

নিম্নলিখিত প্রশ্নের উত্তর দাও:

১। ভারতী পত্রিকা ও রবীন্দ্রনাথ এ বিষয়ে সংক্ষিপ্ত নিবন্ধ রচনা করো।   ১০

অথবা

রবীন্দ্রসাহিত্যে 'সবুজপত্র পর্ব' এর ভূমিকা লেখো।   ১০

২। রবীন্দ্রদর্শনের পটভূমি আলোচনা করো।   ১০

অথবা

রবীন্দ্রজীবনে ঔপনিষদিক দর্শনের প্রভাব আলোচনা করো ।   ১০

নিম্নলিখিত প্রশ্নের উত্তর দাও:

১। রবীন্দ্রনাথের সময়পর্বে বাংলা নাটকের ইতিবৃত্ত সম্পর্কে সংক্ষেপে আলোচনা করো ।   ১০

অথবা

বহুরূপীর নাট্যপ্রযোজনা সম্পর্কে আলোকপাত করো ।   ১০

২। শান্তিনিকেতনে ব্রহ্মচর্যাশ্রম বিষয়ে একটি সংক্ষিপ্ত রূপরেখা রচনা করো ।   ১০

অথবা

রবীন্দ্রসাহিত্যে 'রামায়ণ'-এর অনুসরণ বিষয়ে সংক্ষিপ্ত আলোচনা করো ।   ১০

বিশেষ পত্র : ভাষাবিজ্ঞান

সপ্তম পত্র

নিম্নলিখিত প্রশ্নের উত্তর দাও:

১। ভারতে তুলনামূলক ভাষাতত্ত্ব চর্চার পরিচয় দাও।   ১০

অথবা

গঠনমূলক ভাষাতত্ত্ব বলতে কী বোঝ ?   ১০

২। পাণিনি পরবর্তীযুগে ভাষাতত্ত্বচর্চার বিকাশ সম্পর্কে আলোচনা করো।   ১০

অথবা

বাংলা অন্বয়তত্ত্বে চমস্কির ভূমিকা বিশ্লেষণ করো।   ১০

অষ্টম পত্র

নিম্নলিখিত প্রশ্নের উত্তর দাও:

১। সত্যজিৎ রায়ের গোয়েন্দা গল্পের গঠন বৈশিষ্ট্য আলোচনা করো ।   ১০

অথবা

ভাষাচর্চায় সংবাদপত্রের ভাষা সম্পর্কে একটি প্রবন্ধ রচনা করো ।   ১০

২। ভাষাচর্চায় পরিভাষা সম্পর্কে সংক্ষেপে আলোচনা করো ।   ১০

অথবা

শব্দার্থতত্ত্বের স্বরূপ আলোচনা করে শব্দের অর্থ পরিবর্তনের কারণগুলি লেখ ।   ১০

UNIVERSITY OF KALYANI
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M.A. in ENGLISH
SEMESTER: IV
INTERNAL ASSESSMENT – 2021

CORE COURSE - 10: TWENTIETH CENTURY: FICTIONAL AND NON-FICTIONAL PROSE

Full Marks: 20

Attempt any ONE question from each group (10x2=20)

Group – A

1. a) Two central symbols of William Golding's novel *Lord of the Flies* are – Piggy's glasses and the conch shell. Examine the significance of both these symbols in terms of how they are crucial for the development of the narrative as well as what they embody to the readers.

Or,

1. b) The stories included in Joyce's *Dubliners* confirm the "limited opportunities available to Irish women in the first half of the twentieth century." In the light of this statement, crtically analyze the stories which portray the multifarious experiences of women in the decaying cityscape.

Group – B

2. a) "India had not worked its magic on me. It remained the land of my childhood, an area of darkness." Why did Naipaul possess such a pessimistic attitude towards the country of his origin? Discuss with reference to the essays from *Literary Occasions* prescribed in your syllabus.

Or,

2. b) In his essay, "The New Empire within Britain," Salman Rushdie wrote,, "Mrs. Thatcher stole the birthright of every one of us, black and white, and our children and grandchildren forever." Explore the historical context of this statement in light of the Nationality Act of 1981 and critically analyze Rushdie's resolute opposition to that.

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M.A. in ENGLISH
SEMESTER: IV
INTERNAL ASSESSMENT – 2021

CORE COURSE - 11: TWENTIETH CENTURY LITERARY CRITICISM

Full Marks: 20

Attempt any ONE question from each group (10x2=20)

Group – A

1. a) Ferdinand De Saussure's structural linguistics was first appropriated for the study of literature in Russia at the beginning of the twentieth century. Two groups of critics began working towards what became known as "Russian Formalism". Write a short note on the development and activity of these two literary circles.

Or,

1. b) Define 'Negritude' and discuss the contribution of any *TWO* postcolonial critics who advocated the necessity of a nationalist/nativist discourse in overcoming the cultural and psychological damages of colonialism.

Group – B

2. a) The reader's activities should be "the center of attention, where they are regarded not as leading to meaning but as having meaning."Taking a cue from Stanley Fish's statement, critically evaluate the role of the reader in producing meaning.

Or,

2. b) Roland Barthes, in his *The Structural Analysis of Narrative* and *S/Z* developed a critical model of narrative by arguing that the structure of every narrative is interwoven with five codes. Analyze those five codes.

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M.A. in ENGLISH
SEMESTER: IV
INTERNAL ASSESSMENT – 2021

OPTIONAL COURSE - 4: WOMEN'S WRITING: LITERATURE AND THEORY

Full Marks: 20

Attempt any ONE question from each group (10x2=20)

Group – A

1. a) Anna's four notebooks act together as a coherent structural device to provide the narrative with its artistic unity. Critics have opined the "Yellow Notebook" of Anna to be an extension of her creative self as it explores the parallel universe of Ella, the protagonist of her draft novel, *The Shadow of the Third.* Critically assess the view.

Or,

1. b) "Towards the end of the eighteenth century a change came about which, if I were rewriting history, I should describe more fully and think of greater importance than the Crusades or the Wars of the Roses. The middle-class woman began to write." In the light of Virginia Woolf's remark, make a critical estimate of Mary Wollstonecraft's *A Vindication of the Rights of Woman* in laying the foundation of feminism as a movement.

Group – B

2. a) It is widely accepted that the philosophical ideas put forward in Mary Astell's *A Serious Proposal* were essentially drawn from Rene Descartes. How would you estimate her suggestions and standpoints reflecting the clear influence of Cartesian rationalism?

Or,

2. b) There has been considerable debate among the critics regarding the political nature of Virginia Woolf's argument in *A Room of One's Own* - whether it can be called a 'feminist' text, or a proto-feminist rendering of a writer in search of a history of "women's writing" in early twentieth-century England. What would be your standpoint if you are asked to write a critical review of the text?

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Paper: EC-13

Full Marks-20

Write One question from Each Group:

Group-A 10x 1= 10

1) What is Christopher Columbus best known for contributing to American history?

Or

2) Why America described as a two-party system?

Group-B   10x 1= 10

3) What are the nature and purposes of constitution? What are the three main characteristics of the US Constitution? **Or**

4) Why did America win the War of Independence?

Paper: EC-14

Full Marks-20

Write One question from Each Group:

Group-A 10x 1= 10

1) Discuss the historical value of the writings of Ziauddin Barani.
Or
2) What was the impact of Sufism in India?

Group-B   10x 1= 10

3) Discuss the development of Farsi literature in Medieval India?
Or
4) Evaluate the 'Rajput policy' of the Mughals.

Paper: EC-15

Full Marks-20

Write One question from Each Group:

Group-A   10x 1= 10

1) How would you explain preventive and curative medicine?

Or

2) What are the contributions of Sushruta and Charaka in the field of medical science?

Group-B   10x 1= 10

3) How important is to study the 'History of Medicine' as a student of social science?
Or
4) Compare the distinctive features of Indian and western medicine.

Paper: EC-16

Full Marks-20

Write One question from Each Group:

Group-A   10x 1= 10

1) Give a brief idea of South East Asia according to your understanding.

Or

2) Describe the rule of King Rama IV & V of Siam.

Group-B   10x 1= 10

3) What was the impact of French rule in Indo-China?

Or

4) How can you explain the unification of Vietnam in 1973?

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DIRECTORATE OF OPEN AND DISTANCE LEARNING (DODL)
UNIVERSITY OF KALYANI
KALYANI, NADIA
2019-2021

M.A. in Education 4th Semester Assignment Questions
Attempt *Two* question from each paper
Each question carries 10 Marks

Comparative Education (EDC –10)

1. Analysis the different aims, objectives and importance of Comparative Education. **10**

Or

Describe briefly the Elementary education in United Kingdome (U.K.). **10**

2. Explain the distance education program in Australia and Compeer with that of Indian distance education system. **5+5=10**

Or

Analyses the higher education in England and Compeer with that of the Indian higher education system. **5+5=10**

Curriculum Development (EDC-11)

1. Critically discuss the concept of decentralization of administration and comment on how far the principles of decentralization are being operative in our education system. **10**
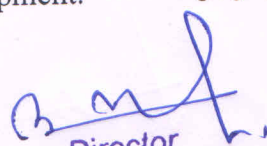
Or

Analyze the thrust areas of Tenth Five Year Plans with special reference to higher education. **10**

2. Critically describe the contingency model of leadership. **10**

Or

Compare Maslow's and Herzberg's theories of motivation. Explain which one of these two is more acceptable to education management for human resource development. **5+5=10**

Educational Technology (EDE-03)

1. Discuss with suitable examples and illustrations the merits and demerits of summative and formative approaches to evaluation in our student assessment praxis. **5+5=10**

Or

What are the advantages of using multimedia? Why it is so popular in modern teaching-learning process? **5+5=10**

2. Explain how educational technology can be utilized to meet the current challenges of education in India. **10**

Or

What are the different types of Teleconferencing existing today and state their advantages and limitations. **10**

Teacher Education (EDE–04)

1. Explain the different professional Ethics for Indian teachers. **10**
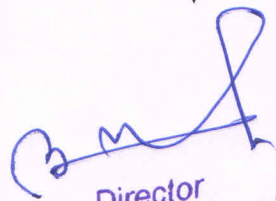
Or

What do you mean by faculty improvement program? State the different strategies of faculty improvement program. **2+8=10**

2. Analysis the different objectives and importance of teaching effectiveness. **5+5=10**

Or

Discuss the roles and responsibilities of a good teacher for the development of an ever-changing society? **10**

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Internal Assignment (Zoology) of Fourth Semester (2019-2021 session)

ZHT 411
(Animal Behaviour and Vector Biology)

Answer *any two* questions (10×2=20):

1. What is Hamilton's rule? Elaborate this rule with an example. Discuss the relationship between altruism and kin selection emphasising on natural selection.   1+2+7=10

2. Describe the life cycle of *Anopheles* sp. in details with proper diagram. What is signet ring stage?   (6+2)+2=10

3. How ticks and mites population can be controlled? Write down the systematic position of sand fly. Discuss the biology of Tabanid fly.   5+2+3=10

ZHT-412
(Molecular Biology and Biotechnology and Tools and Techniques)

Answer *any two* questions (10×2=20)

1. What is the role of Reverse Transcriptase enzyme and DNA Polymerase enzyme in Real Time PCR with suitable diagram? Define splicing. Describe different steps of PCR with suitable diagram.   4+1+5=10

2. How nuclear import occurs? Give suitable diagram. Describe structure of nuclear pore complex with suitable diagram.   4+2+4 =10

3. Write down different steps of Western blotting with suitable diagram. Differentiate Southern and Northern Blotting. Define and give example of alternative splicing?

    6+2+2=10

ZST-409

(Medical Embryology)

Answer *any one* question: (5x1=5)

1. Write down the causes of female infertility? How sperms are cryopreserved in sperm bank?   3+2= 5

2. Describe the procedure of Intra Cytoplasmic Sperm Injection (ICSI). How amniocentesis is performed?   3+2= 5

Page | 1

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ZST-412
(Parasite and Disease)

Answer *any one* question (5x1=5)

1. Name the causative agent of whirling disease. Describe the myxosporean stage of *Myxobolus cerebralis.*   1+4=5

2. Describe the second larval stage of *Camallanus* sp. Name the infective stage of *Proteocephalus* sp.   (3+1)+1=5

ZET-403
Cytogenetics and Molecular Biology

Answer any one question (10×1=10)

1. How coiling in snail is controlled by maternal inheritance? What is the difference between killer and non-killer strain of Mitochondria? Define infectious heredity.
4+4+2=10

2. How random distribution of mitochondria in different progeny cells cause disease? How HAT and HDAC interplay to convert a normal cell into a cancer cell? Name one imprinting disorder and one repeat instability disease.
4+4+2 =10

ZET-404
Cytogenetics and Molecular Biology

Answer any one question (10×1=10)

1. How comparative genomics can be applied in antibacterial drug designing? Explain with an example. How paralogs originate in genome? What are the characteristics of paralog genes?   4+2+2+2 =10

2. What is Founder effect? How it causes change in allele frequency? State Hardy-Weinberg equilibrium. What are its limitations. What are the assumptions of Hardy- Weinberg equilibrium?   1+2+2+3+2 =10

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ZET-403
(Cell and Developmental Biology)

Answer any one question (10×1=10):

1. What is isozyme? Describe its characters. Describe the structure of LDH. 2+3+5=10

2. What do you mean by carboxyhaemoglobin? Write short notes on fetal haemoglobin. Describe the ontogeny of crystalline in vertebrates.

   2+3+5=10

ZET-404
(Cell and Developmental Biology)

Answer any one question (10×1=10):

1. What do you mean by cell cycle regulation? Discuss the role of p^{53} and MPF in cell cycle regulation. 2+4+4=10

2. What is protooncogene? What do you mean by Burkitt's lymphoma? Write short notes on 'loss of contact inhibition'. 2+3+5=10

Directorate of Open and Distance Learning
University of Kalyani
Internal Assessment (2019-21)
Mathematics - Semester IV

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MATC 4.1

Answer any **one** of the following questions: 20 marks

1. (a) (Block I)
    i. (3 marks) If there is a trail from a vertex u to another vertex v of a graph G, then show that there is a path from u to v.
    ii. (1 marks) A tree with n vertices has $n - 1$ edges. Is the converse true? Justify.
    iii. (4 marks) Draw the Hasse diagram for D_{48} = set of all positive divisors of 48 with respect to the divisibility relation. Find the elements that have complements in D_{48}.
    iv. (2 marks) Simplify the Boolean expression $(xy' + x'y)'(x + y)$.

   (b) (Block II)
    i. (2 marks) Find the value of k such that the following function forms a probability density function.

$$f(x) = kx^2, \quad \frac{1}{4} \le x \le \frac{5}{4}$$
$$= 0, \quad \text{otherwise.}$$

    ii. (4 marks) Let T_n be a consistent estimator of a parameter θ. Show that $T_n + \dfrac{a}{\psi(n)}$ is also so, where a is a constant independent of n and ψ is an increasing function of n.
    iii. (4 marks) Consider the Markov chain with three states, $S = \{1, 2, 3\}$, that has the following transition matrix

$$\begin{bmatrix} \frac{1}{4} & \frac{1}{2} & \frac{1}{4} \\ \frac{1}{3} & 0 & \frac{2}{3} \\ \frac{1}{2} & 0 & \frac{1}{2} \end{bmatrix}.$$

       A. Draw the state transition diagram for this chain.
       B. Find $P(X_5 = 3 | X_3 = 2)$ and $P(X_4 = 1 | X_1 = 1)$.

2. (a) (Block I)
    i. (2 marks) Express the function in disjunctive normal form $f(x, y, z) = (x + y)(x + y')(x' + z)$.
    ii. (4 marks) Using K-maps, simplify the expression $x'y + yz' + yz + xy'z'$.
    iii. (4 marks) Construct a DFA that accepts all strings in 0's and 1's of length≤ 3. Can you construct an NFA for the same? Justify.

   (b) (Block II)

1

i. (2 marks) Find the value of k such that the following function forms a probability mass function.

$$f(x) = k\left(\frac{1}{5}\right)^x, \quad x = 1, 2, 3, \ldots$$

ii. (4 marks) State Chebyshev's inequality. Hence deduce a sufficient condition for an estimator of θ to be consistent.

iii. (4 marks) Consider the Markov chain with three states, $S = \{1, 2, 3\}$, that has the following transition matrix

$$\begin{bmatrix} \frac{1}{2} & \frac{1}{4} & \frac{1}{4} \\ \frac{1}{3} & 0 & \frac{2}{3} \\ \frac{1}{2} & \frac{1}{2} & 0 \end{bmatrix}.$$

A. Draw the state transition diagram for this chain.

B. If $P(X_1 = 1) = P(X_1 = 2) = P(X_1 = 3) = \frac{1}{4}$, then find $P(X_1 = 2, X_2 = 1, X_3 = 3)$.

MATO 4.2 (Advanced Operations Research II)

Answer any **two** of the following questions: 20 marks

1. What do you mean by the Hazard rate? Find the continuous mean time to failure (MTTF) for constant hazard rate. Describe parallel configuration for a system reliability and briefly demonstrate how it can be used to improve the system reliability.

2. Briefly describe the origin and fundamental applications of the information theory. How can you use the theory of probability to measure information and point out the main characteristics of information measuring function in the context of probability theory.

3. Distinguish between a code and its extension. Let X be a random variable with range $S = \{x_1, x_2, x_3, x_4\}$, $D = \{0, 1\}$ be the code alphabet and $C : S \to D$ be a code defined by

$$x_1 \to 0, \quad x_2 \to 01, \quad x_3 \to 10, \quad x_4 \to 11.$$

Find the third extension of the above code. Check whether the third extension is uniquely decodable or not.

2

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MATO 4.3 (Mathematical Biology)

Answer any **two** of the following questions: 20 marks

1. Describe different types of individuals that are involved in an epidemic. Pose a mathematical model that describes the SIS epidemic model with constant infection rate β and removal rate γ and hence find the solution for both the susceptible and infected individuals. Further determine the long term behaviour of each individual.

2. Derive the basic equations for stochastic epidemic model with removal consisting of m susceptible and n infected individuals present in the system. Extend the model accounting both the immigration and emigration processes.

3. Derive fundamental genetic matrices by crossing different genotypes. Hence, show that the probability vector for the second generation becomes indistinguishable under panmixia in a population.

MATO 4.3 (Advanced Complex Analysis I)

Answer any **one** of the following questions: 20 marks

1. (a) (4 marks) State the maximum modulus principle. Use it to show that for any non constant function f, holomorphic on a bounded region G and continuous on $\overline{G}$, $\mathrm{Im} f(z)$ attains its maximum at some point on the boundary of G. Is the boundedness of G necessary for the validity of the statement? Justify your answer.

    (b) (5 marks) State and prove the generalised Schwarz lemma. Does Schwarz lemma hold for real-value functions? Justify your answer.

    (c) (5 marks) Define abscissa of convergence for a Dirichlet's series. Deduce a sufficient condition for the convergence of a Dirichlet's series.

    (d) (6 marks) Show that the order of any polynomial is always zero. Is the converse true? Justify your answer.

2. (a) (4 marks) Using the Euler product representation of the zeta function, establish the infinitude of the prime numbers. Find the order of $z \times \exp z^5$.

    (b) (4 marks) Show that $\sin \pi z = \pi z \prod_{n=1}^{\infty} \left(1 - \frac{z^2}{n^2} \right)$.

    (c) (5 marks) Show that the analytic continuation of a given function element along a given curve is unique.

3

(d) (7 marks) If f is analytic at z_0 and $f'(z_0) \neq 0$, then show that f is injective in some neighbourhood of z_0. State and prove the symmetry principle.

2021
GEOGRAPHY
Semester IV Assignment
Paper: GEO413T

The figures in the right hand margin indicate marks.
Candidates are required to give their answers in their own words as far as practicable.
Answer any two questions, selecting one from each group

Full Marks: 20

GROUP – GEO413T.1: REGIONAL PLANNING AND DEVELOPMENTAL ISSUES IN INDIA

1. What is Regional Planning? Briefly describe different types of Regions.

    2+8=10

OR

2. What do you mean by cumulative causation? Explain 'Growth pole theory'.

    2+8=10

GROUP – GEO413T.2: REGIONAL GEOGRAPHY OF WEST BENGAL

3. What is Human Development Index? Give an account of the pattern of Human Development Index and their constraints in West Bengal.   2+8=10

OR

4. Where do the handloom industries concentrated in Nadia district of West Bengal? Highlight the present status and development potential of handloom industries in Nadia District of West Bengal.   2+8=10

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Special Paper Theory (Environmental Geography)

The figures in the right hand margin indicate marks.
Candidates are required to give their answers in their own words as far as practicable.
Answer any two questions, selecting one from each group

Full Marks: 20

GROUP – GEO414T (EG).1: ENVIRONMENTAL ISSUES

1. What is Absolute Poverty? Briefly describe about the characteristics of Crime.

   2+8=10

OR

2. What is Food Scarcity? Discuss different reasons and effects of fresh water crisis.

   2+8=10

GROUP – GEO414T (EG).2: ENVIRONMENTAL MANAGEMENT

3. Distinguish between hazard and disaster. Highlight the essential attributes of hazards.

   2+8=10

OR

4. Define ecotourism. Highlight the principles of ecotourism.   2+8=10

SEMESTER – IV
BOTANY

Special Paper - Microbiology

ELECTIVE THEORY

Paper: BOET4.3 [Microbiology Course - I]   [20 Marks]

1. What is biofilm? Mentions different factors affecting biofilm formation. Briefly discuss about the applications of biofilm as medical devices.   (2+2+6)

Or

What is the role of 16SrDNA in bacterial taxonomy? Discuss about the advantage and disadvantage of this methods.   (6+4)

2. **Short Note**   (2X5)

a) Superbug
b) Regulation of Lytic and Lysogeny cycle
c) Biopesticides

Paper: BOET4.4 [Microbiology Course – II]   [20 Marks]

1. Discuss various steps of fermentative production of **Penicillin**. Name two antifoaming agents?   (8+2)

Or

Describe the general structure of immunoglobulin. Mention the roles of T-cells and B-cells in the immunological activity in human body.   (4+6)

2. **Short Note**   (2X5)

a) Feedback inhibition
b) Genomic construction of COVID19
c) ELISA

SOFT CORE THEORY   [10 Marks]

Paper: BOSCT4.2 [Immunology]

1. Illustrate the structural modification of major histocompatibility complex (MHC) and their role in in antigen presentation.   (4+6)

   Or

2. **Short Note**   (2X5)

   a) Clonal selection theory
   b) Monoclonal antibody
   c) Vaccine

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BOTANY

Special Paper - Genetics, Molecular Genetics, Biometry & Plant Breeding Course

Paper : BOET 4.1
Genetics & Molecular Genetics (Course-I)

Answer any two questions

1. What is nested PCR? How Real Time PCR can be used for studying gene expression? Enumerate the steps of Maxam Gilbert sequencing with suitable diagram. [2+3+5=10]

2. Define Ti plasmid and how it is used in transgenic plant development? Mention the genes associated with flower colour development and golden rice.How might chromosome acetylation affect gene regulation?[4+4+2 =10]

3. Differentiate normal cells and cancer cells? How MAP kinase pathway causes cancer. Give suitable diagram. What do you mean by Robertsonian translocation and how it is linked to cancer?   [2+6+2=10]

Paper: BOET 4.2
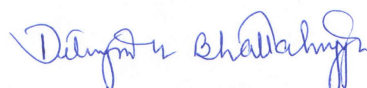### Plant Breeding & Biometry (Course II)

Answer any two questions

1. What is inbreeding depression and heterosis ? Describe different types of inbreeding depression. What are the characteristics of a molecular marker?   [4+3+3=10]

2. What is residual effect? Using four yield related traits and yield, set-up path diagram and equations. [2+8=10]

3. List the main features of gametophytic system of self incompatibility. Indicate the compatibility of following crosses: (i) $S_1S_2 \times S_1S_2$, (ii) $S_1S_2 \times S_1S_3$ and (iii) $S_1S_2 \times S_3S_4$. Can the genotype S_1S_2 be recovered from them? Give a schematic representation of molecular mechanism of self incompatibility in papaveraceae. [2+4+4=10]

Paper: BOSCT 4.1
Evolution

Answer any one question

1. Define coaservates? Describe the Miller and Urey experiment with suitable diagram. What condition makes earth unique? [2+6+2=10]
2. What is carbon dating method and how it is used in determination of age of fossil. Describe flora evolution in different periods of Mesozoic era.   [4+6=10]