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AUTOMATED RANDOMIZED QUESTION PAPER CREATION SYSTEM

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Abstract : The traditional method of producing examination papers in academic institutions is usually manual, time-consuming and repetitive making it prone to corruption and unfairness. This project aims to develop a Randomized Question Paper Generator that automates the workflow of question submission, approval, and exam paper generation, thereby enhancing the efficiency, reliability, and fairness of the question paper creation process in academic institutions. The system uses Prisma as its MySQL backend and Next.js on the frontend all working in an agile way. Teachers enter questions tagged with Bloom's Taxonomy levels into the system which are then vetted and approved by HOD's (Head of Department). The Exam Cell sets exam parameters such as dates and modules using a dynamic academic calendar. For uniqueness and adherence to curriculum requirements randomised question papers are generated from a pool of approved questions. This has been achieved through reduced manual workload for faculty members & administrative staff, decreased errors when preparing assessment materials & unique question papers have been created for each evaluation.

IndexTerms - Academic Assessment, Question Bank, Approval Workflow, Dynamic Scheduling, Faculty and HOD Collaboration, Automated Question Paper Generation, Randomized Questions.

I. INTRODUCTION

The Random Question Paper Generator is designed to automate the process of creating randomized question papers for a variety of educational applications. In response to the growing demand for individualized and varied assessment methods, this project aims to provide educators, trainers, and students with a versatile tool that creates unique question papers tailored to their specific needs. This project's main goal is to make question paper creation more efficient while maintaining fairness and randomness in the question selection process. This generator can generate question papers with a broad range of subjects, topics, and difficulty levels by using algorithms and user-defined parameters. The dynamic scheduling feature, including a centralized academic calendar, allows exam cells to efficiently manage exam dates and ensure that all logistical aspects of exam preparation are handled seamlessly. This includes setting the exam type (e.g., mid-term, final, assignment), selecting the appropriate module, and scheduling the date and time for the exam.

Furthermore, the Random Question Paper Generator promotes academic integrity by reducing the likelihood of question reuse and making it easier to create plagiarism-free assessments. It promotes critical thinking and problem-solving skills through a randomized selection process that presents students with new challenges in each examination.This project represents efficiency, precision and simplicity. The generated question papers abide by set limitations such as time constraints, question formats and topic distribution to ensure that educational standards and assessment guidelines are met. The system also allows for easy integration with existing learning management systems, making it a seamless addition to any educational institution's assessment workflow. Furthermore, the generator's ability to produce question papers with varying levels of difficulty and complexity ensures that students are challenged and engaged throughout the assessment process, promoting a deeper understanding of the subject matter and developing critical thinking and problem-solving skills.

II. EXISTING WORK

Question papers are currently generated by manual processes in which teachers select questions from a variety of sources, including online resources, past exam questions, and textbooks. After that, these inquiries are combined into question papers according to predetermined standards like topic, subject, and degree of difficulty. Before giving the questions to the students for assessment, teachers can format and arrange them using word processing software or other specialized tools.

Although there is some flexibility and control over the question paper content with this manual approach, there are a number of drawbacks. It can be labor- and time-intensive, particularly for teachers who have to prepare several test questions for various classes or subjects. Furthermore, a lack of standardization in the process could result in discrepancies in the structure and there may be a lack of standardization in the process, which could result in variations in the format and level of difficulty of the questions on various assessments.

All things considered, the current method of creating question papers is labor-intensive, manual, prone to errors, and fraught with difficulties in upholding the integrity of assessments and question banks. Automated tools, such as the Random Question Paper Generator, are becoming more and more necessary as educational institutions look for more standardized, efficient, and customizable assessment solutions. These tools can improve the process and assess assessments' fairness and quality.

- In the existing system, fully manual paper generation leading to slow workflows.
- The manual nature of the process places a significant workload on faculty and exam cell.
- Faculty needs to enter blooms level manually.

2.1 Disadvantages

The existing system for generating question papers manually has several disadvantages:

1. Time-consuming and labor-intensive: Manual selection and compilation of questions require significant time and effort from educators, especially when creating multiple question papers for different classes or subjects.

2. Limited customization: Educators may face challenges in customizing question papers to meet specific learning objectives or cater to individual student needs, as the manual process may not easily accommodate diverse requirements.

3. Difficulty in maintaining question banks: Keeping question banks updated with relevant and diverse content can be challenging, leading to stagnant or outdated question pools that do not adequately reflect curriculum changes or evolving educational standards.

4. Risk of question reuse: The manual system increases the risk of inadvertently reusing questions from previous assessments, compromising the integrity of assessments and undermining academic honesty.

5. Subjectivity in question selection: The manual selection process may introduce subjective biases in the choice of questions, potentially affecting the fairness and validity of assessments.

6. Dependency on educator expertise: The effectiveness of the existing system heavily relies on the expertise and resources available to educators, which may vary among individuals and institutions, leading to disparities in assessment quality.

III. PROPOSED WORK

With its automated and customizable approach, the proposed Random Question Paper Generator addresses the shortcomings of the current manual system, marking a revolutionary leap forward in the field of assessment creation. This sophisticated software solution uses cutting-edge algorithms and intuitive user interfaces to simplify the process of creating question papers for educators.

Teachers can enter specific parameters like subject areas, question types, and difficulty levels through the system's customization options. This enables educators to create customized assessments that meet the needs of students and a variety of learning objectives. The Random Question Paper Generator uses randomization strategies to guarantee that every question paper it generates is distinct, reducing the possibility of questions being reused and fostering academic honesty and fairness in evaluations.

The technology provides educators with access to a wealth of knowledge and makes it easier to incorporate produced question papers into course materials and evaluations by maintaining an extensive question library and connecting with learning management systems. The suggested solution, with its scalability, performance optimization, and strong security features, is a big step toward improving the effectiveness, uniformity, and caliber of assessment generation in learning environments.

This project have three users: Faculty, HOD, and Examcell.

• Faculty can login the system and can add questions to the desired modules. They have the ability to edit and delete the specified question. Later the questions are sent to HOD for approval.

• HOD can login the system and can check the pending questions and can approve or reject. Approved questions are sent to Examcell for further process and rejected questions are sent to Teachers with a remark.

• Examcell can login with system and can see academic calendar and are responsible to generate a random question paper of desired subject by specifying date, time, module, question limit. They are responsible for handling the database like adding faculty, giving user logins, assigning subjects.

3.1 Advantages

The Random Question Paper Generator offers several advantages over traditional manual methods of question paper creation:

1. Time Efficiency: By automating the process of generating question papers, the system significantly reduces the time and effort required by educators.

2. Customization: The system provides educators with a wide range of customization options, including parameters such as subject areas, question types, difficulty levels, and weighting criteria.

3. Fairness and Academic Integrity: This minimizes the risk of question reuse and promotes fairness and academic integrity in assessments, as students cannot predict the content of the exam beforehand.

4. Diverse Question Bank Management: The system manages a comprehensive repository of questions across different subjects and topics.

5. Scalability and Performance Optimization: With scalability and performance optimization strategies in place, the system can efficiently handle large volumes of data and user requests.

6. Enhanced Security: Robust security measures are implemented to protect sensitive user data and ensure confidentiality. This provides educators with peace of mind knowing that their assessment materials are secure and protected from unauthorized access or misuse.

3.2 System Architecture

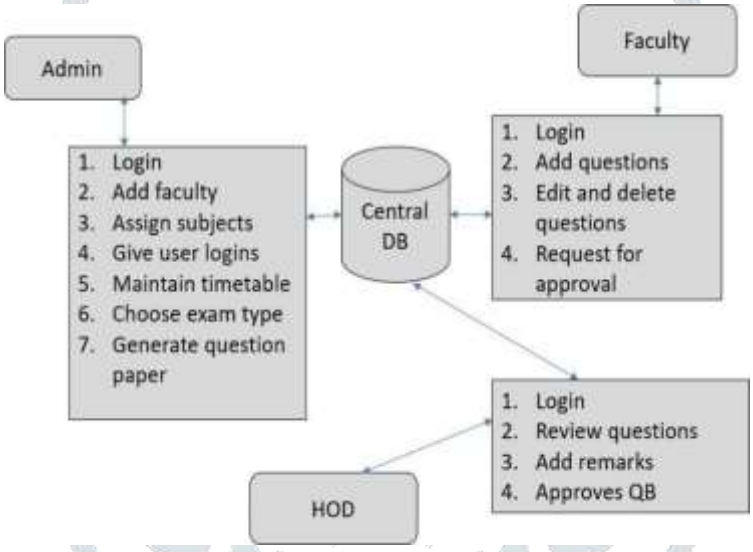


Fig 1: system architecture

The diagram presents the architecture of an academic question paper management system, illustrating the interactions between three primary user roles: Admin, Faculty, and Head of Department (HOD), all interfacing with a Central Database (DB).
Central Database (DB): The Central DB serves as the core repository where all data and information are stored and managed. It interacts with all three user modules (Admin, Faculty, and HOD) to ensure seamless data flow and integrity across the system.

Interaction Flow

- Admin Interaction: Admins interact with the Central DB to manage faculty, subjects, user logins, timetables, and exam types, culminating in the generation of question papers.
- Faculty Interaction: Faculty members input, edit, and delete questions in the Central DB and submit these for HOD approval.
- HOD Interaction: HODs review, provide feedback, and approve questions in the Central DB, ensuring the quality and appropriateness of the question bank.

Overall, this architecture enables efficient and organized management of the question paper creation process, ensuring collaboration between different roles while maintaining a central repository for all relevant data.

3.3 Modules

1. Admin Module:

The Admin module has the following functionalities:
Login: Admins log into the system to access their functions.
Add Faculty: Admins can add new faculty members to the system.
Assign Subjects: Admins assign subjects to the respective faculty members.
Give User Logins: Admins provide login credentials to users.
Maintain Timetable: Admins manage and maintain the academic timetable.
Choose Exam Type: Admins select the type of exam to be conducted.
Generate Question Paper: Admins generate the final question papers for the exams.

2. Faculty Module:
The Faculty module includes the following tasks:
Login: Faculty members log into the system to perform their duties.
Add Questions: Faculty members can add questions to the question bank.
Edit and Delete Questions: Faculty members have the ability to edit and delete existing questions.
Request for Approval: Faculty members send requests to the HOD for approval of the questions.

3. HOD Module:
The HOD module encompasses these activities:
Login: HODs log into the system to review and manage question approvals.
Review Questions: HODs review the questions submitted by the faculty.
Add Remarks: HODs can add remarks or feedback on the submitted questions.
Approves QB (Question Bank): HODs approve the questions to be included in the final question bank.

IV. Experimental Results

The outcome of the project focusing on the generation of exam question papers for assignments and midterms entails the establishment of a streamlined and efficient process.

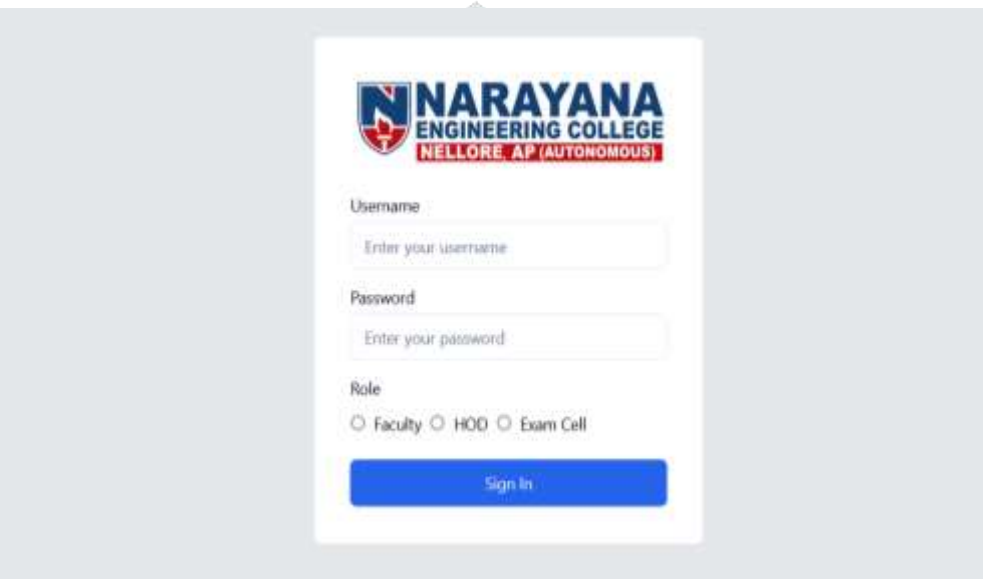


Fig 2 : Login page

The login form on the page has three User roles include faculty, HOD (Head of Department), and Exam Cell.

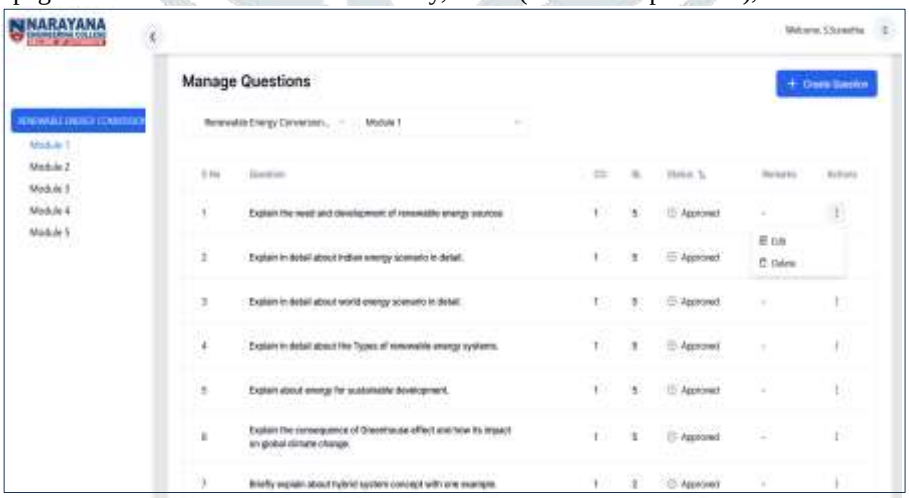


Fig 3: Faculty Page

A faculty webpage allows teachers to manage questions by selecting a module, adding, editing, or deleting them, and monitoring their status.

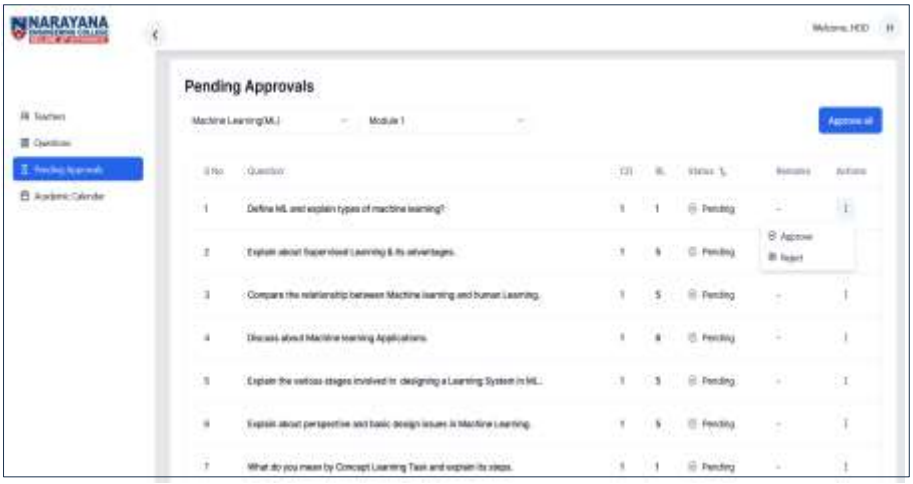


Fig 4: HOD Page

This page shows pending questions for the HOD to approve or reject. The HOD can approve all questions at once or leave remarks when rejecting a question.

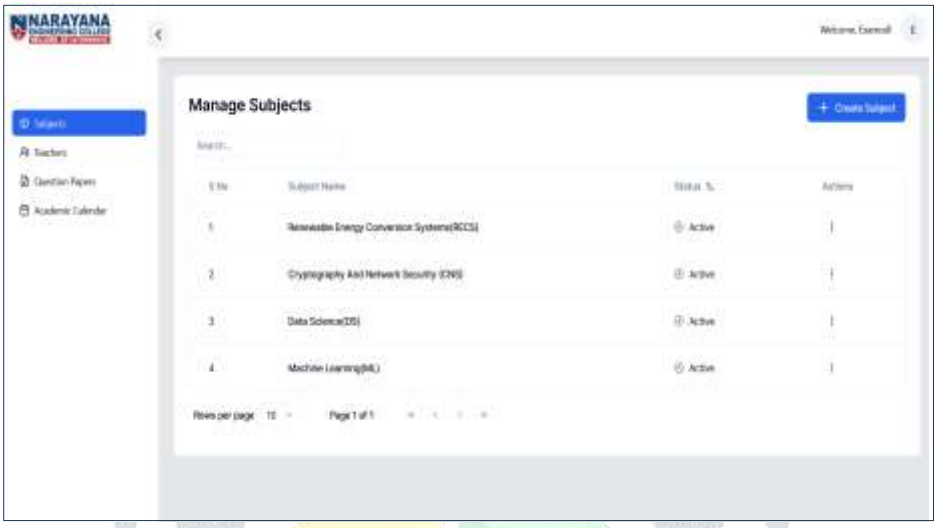


Fig 5: Manage Subjects

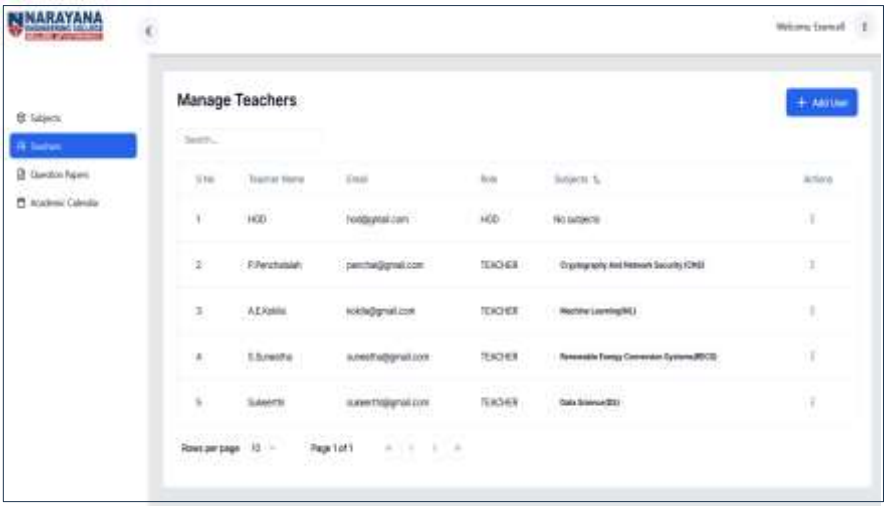


Fig 5: Manage Teachers

Examcell can manage subjects and teachers in their Examcell page. They can add subjects and assigns teachers and creates logins for teachers. The academic calendar shows assignments and midterms, with the option to assign specific exam dates for each subject.

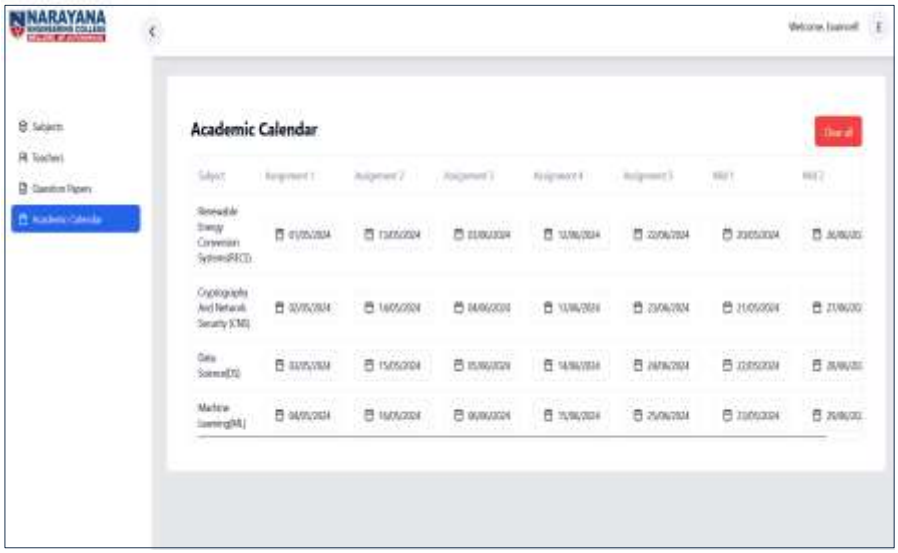


Fig 7: Academic Calendar

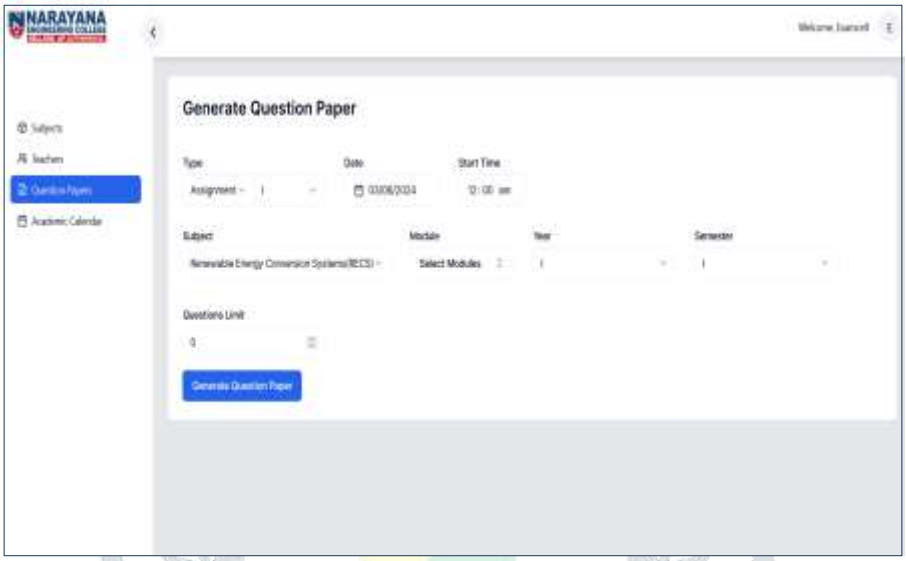
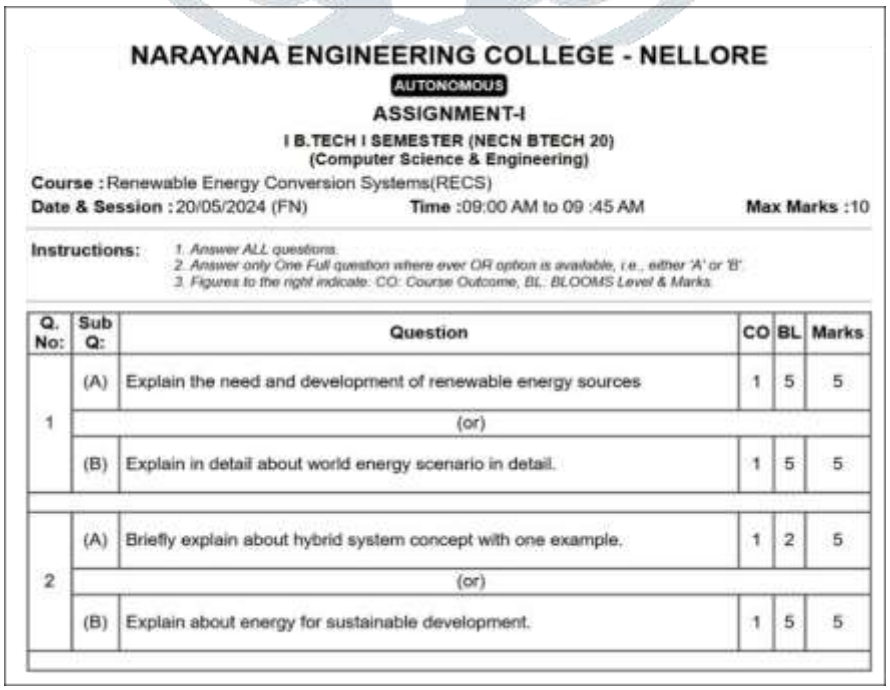


Fig 8: Examcell Page

The system also generates assignment and mid question papers based on selected parameters. Each question is assigned a corresponding mark of 10, ensuring uniformity and consistency across the paper. The sample generated assignment and mid question papers are:



NARAYANA ENGINEERING COLLEGE - NELLORE

AUTONOMOUS

ASSIGNMENT-I

I B.TECH I SEMESTER (NECN BTECH 20)
(Computer Science & Engineering)

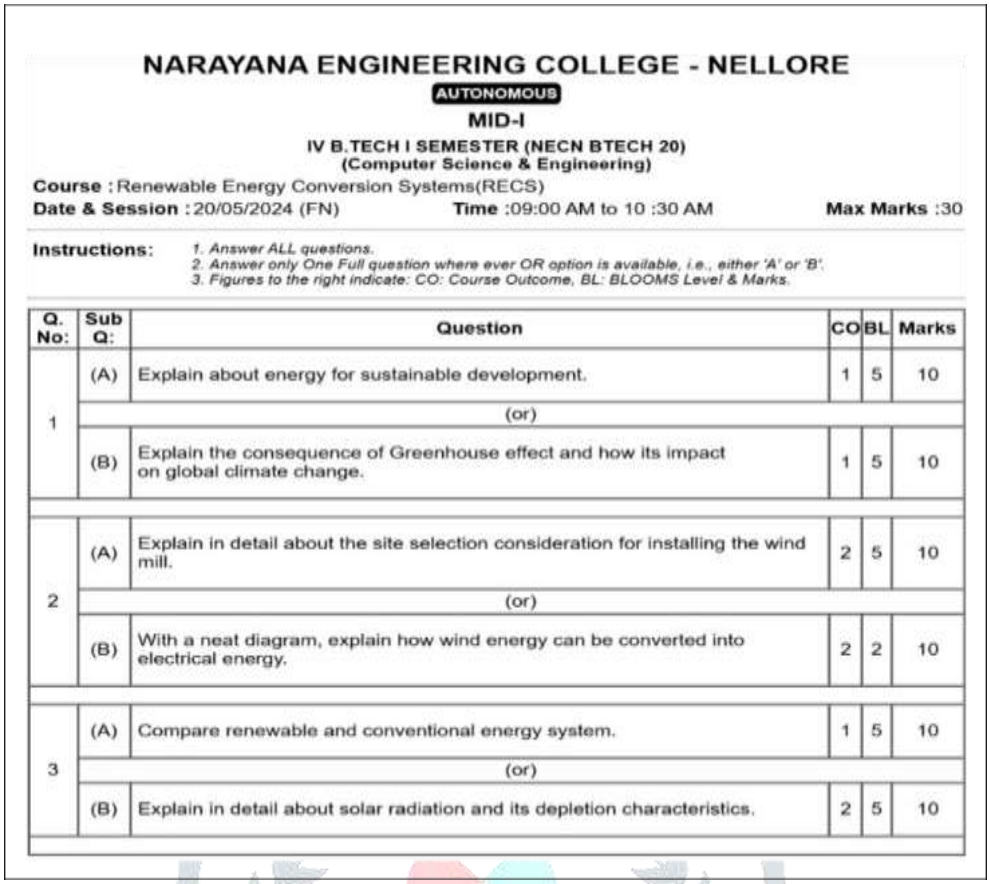
Course : Renewable Energy Conversion Systems(RECS)
Date & Session : 20/05/2024 (FN) **Time :** 09:00 AM to 09 :45 AM **Max Marks :** 10

Instructions:
1. Answer ALL questions.
2. Answer only One Full question where ever OR option is available, i.e., either 'A' or 'B'.
3. Figures to the right indicate: CO: Course Outcome, BL: BLOOMS Level & Marks.

Q. No:	Sub Q:	Question	CO	BL	Marks
1	(A)	Explain the need and development of renewable energy sources	1	5	5
		(or)			
	(B)	Explain in detail about world energy scenario in detail.	1	5	5
2	(A)	Briefly explain about hybrid system concept with one example.	1	2	5
		(or)			
	(B)	Explain about energy for sustainable development.	1	5	5

Fig 9: Assignment Question paper

Mid-exam options: Mid 1 or Mid 2. Mid 1 generates the paper from the first two or three modules, while Mid 2 generates it from three other selected modules. Each question in the generated paper carries 30 marks for mid exams.



NARAYANA ENGINEERING COLLEGE - NELLORE

AUTONOMOUS

MID-I

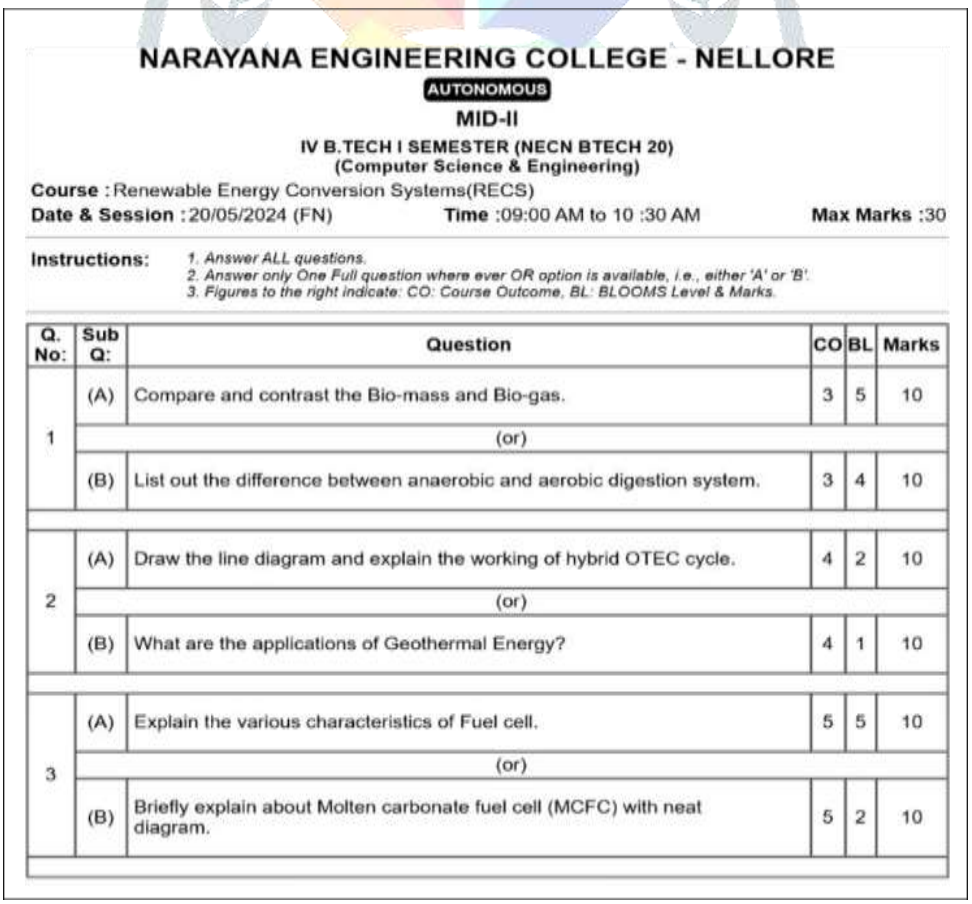
IV B.TECH I SEMESTER (NECN BTECH 20)
(Computer Science & Engineering)

Course : Renewable Energy Conversion Systems(RECS)
Date & Session : 20/05/2024 (FN) **Time** : 09:00 AM to 10 :30 AM **Max Marks** : 30

Instructions:
1. Answer ALL questions.
2. Answer only One Full question where ever OR option is available, i.e., either 'A' or 'B'.
3. Figures to the right indicate: CO: Course Outcome, BL: BLOOMS Level & Marks.

Q. No:	Sub Q:	Question	CO	BL	Marks
1	(A)	Explain about energy for sustainable development.	1	5	10
		(or)			
	(B)	Explain the consequence of Greenhouse effect and how its impact on global climate change.	1	5	10
2	(A)	Explain in detail about the site selection consideration for installing the wind mill.	2	5	10
		(or)			
	(B)	With a neat diagram, explain how wind energy can be converted into electrical energy.	2	2	10
3	(A)	Compare renewable and conventional energy system.	1	5	10
		(or)			
	(B)	Explain in detail about solar radiation and its depletion characteristics.	2	5	10

Fig 10: Mid-1 Question paper



NARAYANA ENGINEERING COLLEGE - NELLORE

AUTONOMOUS

MID-II

IV B.TECH I SEMESTER (NECN BTECH 20)
(Computer Science & Engineering)

Course : Renewable Energy Conversion Systems(RECS)
Date & Session : 20/05/2024 (FN) **Time** : 09:00 AM to 10 :30 AM **Max Marks** : 30

Instructions:
1. Answer ALL questions.
2. Answer only One Full question where ever OR option is available, i.e., either 'A' or 'B'.
3. Figures to the right indicate: CO: Course Outcome, BL: BLOOMS Level & Marks.

Q. No:	Sub Q:	Question	CO	BL	Marks
1	(A)	Compare and contrast the Bio-mass and Bio-gas.	3	5	10
		(or)			
	(B)	List out the difference between anaerobic and aerobic digestion system.	3	4	10
2	(A)	Draw the line diagram and explain the working of hybrid OTEC cycle.	4	2	10
		(or)			
	(B)	What are the applications of Geothermal Energy?	4	1	10
3	(A)	Explain the various characteristics of Fuel cell.	5	5	10
		(or)			
	(B)	Briefly explain about Molten carbonate fuel cell (MCFC) with neat diagram.	5	2	10

Fig 11: Mid-2 Question paper

Like this, Examcell (Admin) can generate question papers for Mids and Assignments by selecting the parameters such as modules, date and subject.

V. CONCLUSION

The Automated Randomized Question Paper Creation System transforms academic exam management by automating tasks like question creation, setup, and organization. This streamlines workflows, reduces workload, and improves the efficiency and precision of the exam process. By automating manual tasks, the system saves time and resources, enabling educators to prioritize teaching and mentoring students over administrative duties.

The system also introduces Head of Department (HOD) approvals, ensuring that only vetted questions are included in exams. This maintains the integrity and quality of assessments, minimizing the chance of errors or inconsistencies. The system has undergone extensive testing and feedback processes, confirming its reliability and positive impact.

In conclusion, the Automated Randomized Question Paper Creation System represents a significant advancement in academic exam management. By automating tasks, introducing oversight mechanisms, and ensuring reliability, the system not only enhances the efficiency and precision of exam processes but also contributes to the overall quality and integrity of academic assessments. As technology continues to evolve, the system stands as a testament to the potential of automation and innovation in improving educational practices and outcomes.

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