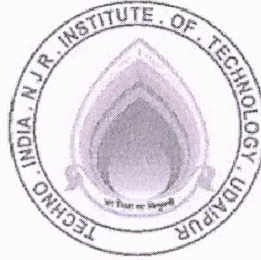# Techno India NJR Institute of Technology

Course File

Session 2021-22

Engineering Physics (1FY2-02/2FY2-02)

Vanija Joshi
(Assistant Professor)
Department of Basic Science

RAJASTHAN TECHNICAL UNIVERSITY, KOTA

I & II Semester
Common to all branches of UG Engineering & Technology

1FY2-02/ 2FY2-02: Engineering Physics

Credit: 4   Max. Marks: 200 (IA:40, ETE:160)
3L+1T+0P   End Term Exam: 3 Hours

SN	CONTENTS	Hours
1	**Wave Optics:** Newton's Rings, Michelson's Interferometer, Fraunhofer Diffraction from a Single Slit. Diffraction grating: Construction, theory and spectrum, Resolving power and Rayleigh criterion for limit of resolution, Resolving power of diffraction grating, X-Ray diffraction and Bragg's Law.	9
2	**Quantum Mechanics:** Introduction to quantum Mechanics, Wave-particle duality, Matter waves, Wave function and basic postulates, Time dependent and time independent Schrodinger's Wave Equation, Physical interpretation of wave function and its properties, Applications of the Schrodinger's Equation: Particle in one dimensional and three dimensional boxes.	6
3	**Coherence and Optical Fibers:** Spatial and temporal coherence: Coherence length; Coherence time and 'Q' factor for light, Visibility as a measure of Coherence and spectral purity, Optical fiber as optical wave guide, Numerical aperture; Maximum angle of acceptance and applications of optical fiber.	4
4	**Laser:** Einstein's Theory of laser action; Einstein's coefficients; Properties of Laser beam, Amplification of light by population inversion, Components of laser, Construction and working of He-Ne and semiconductor lasers, Applications of Lasers in Science, engineering and medicine.	6
5	**Material Science & Semiconductor Physics:** Bonding in solids: covalent and metallic bonding, Energy bands in solids: Classification of solids as Insulators, Semiconductors and Conductors, Intrinsic and extrinsic semiconductors, Fermi dirac distribution function and Fermi energy, Conductivity in semiconductors, Hall Effect: Theory, Hall Coefficient and applications.	7
6	**Introduction to Electromagnetism:** Divergence and curl of electrostatic field, Laplace's and Poisson's equations for electrostatic potential, Bio-Savart law, Divergence and curl of static magnetic field, Faraday's law, Displacement current and magnetic field arising from time dependent electric field, Maxwell's equations, Flow of energy and Poynting vector.	8

For Techno India NJR Institute of Technology

पंकज पोरवाल

Dr. Pankaj Kumar Porwal
(Principal)

Course Overview:

Student will learn fundamentals of physics and how it forms the basis of all engineering and science from this 47-hour course. In this course, student will study the fundamental concepts and application of different physical phenomenon and their theory.

Course Outcomes:

CO. NO.	Cognitive Level	Course Outcome
1	Application	Apply and operate on the concept of interference and diffraction to explain various wave optical phenomena
2	Knowledge	To describe the concept of quantum mechanics and apply the knowledge to 1D and 3D potential box problem
3	Analysis	Application of coherence in the source of light and basics of optical fiber: employment of working principle and construction of lasers: demonstration of optical waveguides
4	Synthesis	Application of physics of semiconductors material and their classifications
5	Synthesis	Breakdown of electromagnetism with the help of Maxwell's equations and formulate the electromagnetic energy transformation theorem

Prerequisites:
- Basic mathematics
- Understanding of basic high-school physics
- Able to solve 2nd and 3rd order differential equations
- Aware with the concepts of atomic structure

	II SEM														
	Engineering Physics Year of study: 2020-21														
Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO12FY202.1	2	1	0	0	1	0	0	0	0	0	0	1	0	0	0
CO12FY202.2	2	2	1	0	1	0	0	0	0	0	0	1	0	0	0
CO12FY202.3	2	1	0	0	1	0	0	0	0	0	0	1	0	0	0
CO12FY202.4	2	1	1	0	1	1	0	0	0	0	0	1	0	0	0
CO12FY202.5	2	2	1	0	1	0	0	0	0	0	0	1	0	0	0
C12FY202 (AVG)	2.00	1.40	0.60	0.00	1.00	0.20	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00

Course Coverage Module Wise:

Lecture plan based on Unit 1

Lecture Sl. No.	Topic
1	Student is able to grasp basic nature of waves and their optical behaviour.
2	Student becomes familiar with Interference and different types of Interferometers.
3	Student should be able to identify different patterns of Diffraction.
4	Student becomes familiar with Diffraction grating and application .
5	Student is able to grasp concept of Rayleigh criterion.
6	Student should be able to identify different parts of Spectrum.
7	Student becomes familiar with Resolving power of optical devices .
8	Student should be able to understand X-Ray diffraction and bragg's law.

Lecture plan based on Unit 2

Lecture Sl. No.	Topic
9	Introduction to Quantum Mechanics.
10	Student is able to grasp concept of Wave Particle duality.
11	Student becomes familiar with the concepts of Matter waves and basic postulates .
12	Student is able to grasp concept of Wave functions .
13	Student becomes familiar with Properties of Wave functions.
14	Student is able to grasp concept of Schrodinger's wave equation.
15	Student becomes familiar with Applications of Schrodinger's wave equation.

Lecture plan based on Unit 3

Lecture Sl. No.	Topic
16	Student is able to grasp concept of Spatial coherence.
17	Student becomes familiar with Temporal coherence.
18	Q factor.
19	Student is able to grasp concept of Visibility.
20	Student becomes familiar with Optical Waveguides.
21	Student is able to grasp concept of Optical fibers.
22	Student becomes familiar with Numerical Aperture.
23	Student is able to grasp concept of Angle of Acceptance.
24	Student becomes familiar with Applications of Optical fibers.

Lecture plan based on Unit 4

Lecture Sl. No.	Topic
25	Student becomes familiar with basic Laser Action.
26	Student is able to grasp concept of Einstein's theory of laser action.
27	Student becomes familiar with Einstein's coefficients.
28	Student is able to grasp concept of Properties of Laser beam.
29	Student becomes familiar with Population inversion.
30	Student is able to identify Components of Lasers.
31	Student is able to grasp concept of Laser construction.
32	Student becomes familiar with He-Ne laser.
33	Student becomes familiar with Semiconductor Lasers
34	Applications of lasers.

Lecture plan based on Unit 5

Lecture Sl. No.	Topic
35	Student is able to grasp concept of Bondings in material, energy bands and classification of solids.
36	Student becomes familiar with Intrinsic and Extrinsic semiconductors.
37	Student is able to grasp concept of Fermi Dirac distribution function.
38	Fermi Energy.
39	Student is able to grasp concept of Conductivity and factors affecting it.
40	Hall- effect.
41	Student is able to grasp concept of Hall-coefficient.
42	Applications of Semiconductors.

Lecture plan based on Unit 6

Lecture Sl. No.	Topic
43	Student becomes familiar with Divergence and curl of electrostatic field.
44	Student is able to grasp concept of Electrostatic potential.
45	Student is able to grasp concept of Laplace's equation.
46	Student is able to grasp concept of Poisson's equation.
47	Student becomes familiar with Biot-Savart law.
48	Student is able to grasp concept of Displacement current.
49	Student becomes familiar with Time-dependent Electric field.
50	Student understands Maxwell's Equations and their vast applications.
51	Poynting vector.

TEXT/REFERENCE BOOKS

- Essentials of Engineering Physics (RTU), 2nd edition,A S Vasudeva, S. Chand Publishing.
- Engineering Physics, 2nd Edition, Hitendra K Malik, A K Singh, McGraw-Hill Education Publications.

- Optical Physics, 4th Edition, By Ariel Lipson, Stephen G. Lipson, Henry Lipson, Cambridge University Press.

Teaching and Learning resources:

Unit 1

https://drive.google.com/drive/folders/1pB4Lmd0WFj3Sdc566GW3shJd-D6NdsLD?usp=sharing

Unit 2

https://nptel.ac.in/courses/115/106/115106127/

Unit 3

https://nptel.ac.in/courses/115/108/115108127/

Unit 4

https://nptel.ac.in/courses/115/102/115102124/

Unit 5

https://nptel.ac.in/courses/115/102/115102124/

Unit 6

https://youtu.be/bwreHReBH2A

Assessment Methodology:

1. Online quiz on kahoot after every module completion.
2. Practical exam in lab where they have to perform experiments. (Once in a week)
3. Assignments one from each unit.
4. Midterm subjective paper where they have to write algorithms to perform different operations on different data structures as mentioned in the modules. (Twice during the semester)
5. Final paper at the end of the semester subjective.

VIVA VOICE QUESTIONS

1. What is the relationship between probability and wavefunction
2. If plank's constant h is greater than 6.625×10^{-34} Js
3. Define the matter waves and their properties
4. From quantum theory of observation and measurements, if a system is in a certain state for time Δt, the energy of the system in that state is uncertain by atleast??? Note = h(bar)=h'
5. What is hall coefficient? (Define in a single sentence)
6. What are the conditions that define Fermi energy level
7. What happens when the atoms with 3 valence electrons are doped with atoms of 4 valence electrons
8. What is the no. of electrons in conduction band of intrinsic semiconductor at 0K
9. What is the difference between intrinsic and extrinsic semiconductors based on charge carrier concentration (n_p = number of holes, n_e = number of electrons)
10. Explain photoelectric effect
11. Zero point energy is consequence of

ASSIGNMENT QUESTIONS

- Report physics of quantum computers

- Science fiction a detailed analysis report

- Write short note of requirement of quantum physics as a theory

- Come up with novel use of semiconductors

ENGINEERING PHYSICS QUESTION BANK

Unit 1

Analyse the different aspects between fraunhofer and fresnel diffraction.

Illustrate the difference between interference and diffraction using example of monochromatic light sources.

What is meant by interference of light? Obtain expression for interference in thin films in reflected light and hence condition for: (a) bright fringe (b) (b) dark fringe.

What do you mean coherent light source and non coherent light source?

Illustrate the complete working of Newton's Ring experiment in. Also determine expression for diameters of dark rings and bright rings.

Unit 2

What are the matter waves ?

Write down Schrödinger equation for a particle confined in a 3-D box. Obtain the wave function for a particle confined in this box

Interpret the density of energy states

Write down the examples of tunnel effect in detail with proper illustration.

Find out the expression for time dependent Schrödinger wave equation

Unit 3

Derive an expression for optical fibre acceptance angle.

What do you mean by spatial coherence? How it is related to the finite size of the source.

What is resolving power of optical instruments? Explain Rayleigh criterion for limit of resolution

What is plane transmission diffraction grating? Explain its theory and determine

- Intensity and position of principal maxima
- Position of minima
- Intensity and position of secondary maxima

Determine resolving power of a plane transmission diffraction grating

Unit 4

Explain in brief the terms Spontaneous Emission and Stimulated Emission.

Write at least 3 properties of Laser beam. The answer must be supported by examples and numerical values

Explain population inversion condition for laser action.

List six applications of LASERs in the field of Engineering and Medicine

Unit 5

Illustrate bonding in solids. Give difference between covalent and metallic bound.

Draw and discuss energy band diagram theory for insulator, semiconductor and conductor.

Give difference between Intrinsic and extrinsic semiconductors

Derive an expression for conductivity in semiconductor

Derive an expression for Hall coefficient and write down the application of Hall Effect

Unit 6

Solve for the expression for curl of magnetic field. And Electric field.

Demonstrate the expression for divergence of magnetic field. And Electric field.

State the Faradays laws for electromagnetic induction

Interpret the Maxwell equation for free space and time varying field.

Employ amperes law for magnetic field.

(

(

Roll No. _____   Total No. of Pages : 8

1E2003

1E2003

B. Tech. I Semester (Main/Back) Examination, Dec. - 2018
103 Engineering Physics - 1
Common to all Branch

Time : 3 Hours   Maximum Marks : 80
                                           Min. Passing Marks : 26

Instructions to Candidates :

Attempt any five questions, selecting one question from each unit. All Questions carry equal marks. (Schematic diagrams must be shown wherever necessary). Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Unit - I

1. a) With the help of a neat diagram show an experimental arrangement to produce Newton's rings by reflected light. Prove that in reflected light the diameter of dark rings is proportional to the square root of the natural numbers.   (4+4)

   b) Michelson interferometer experiment is performed with a source of light having two wavelengths 4882 A° and 4886 A°. Through what distance does mirror have to be moved between two positions that fringes disappear?   (8)

OR

1. a) Write short notes on the following: (4+4)

   i.   Interference filter

   ii. Anti reflection coating

   b) A convex surface of radius of curvature 1.0 m rests on a concave surface of radius curvature 2.0 m. If this system is used to observe Newton's rings under light of wavelength 600nm, find the difference in the squares of diameters in successive dark and bright rings.   (8)

Unit - II

2. a) Explain idea of circularly and elliptically polarized light in terms of electric vector associated with light. Describe Laurent's half shade polarimeter giving its theory, construction and use.   (4+4)

   b) What are quarter wave plates? Plane polarized light is incident on a quarter wave plates, discuss under which the plane polarized, circularly polarized light and elliptically polarized light are obtained.   (2+6)

1E2003/2018   (1)   [Contd....

OR

2. a) What is optical activity? Write the laws of optical active solution. (2+2)

b) Discuss double refraction in calcite crystal. How can a phase retardation plate be obtained from it? (2+2)

c) The refractive indices of right handed and left handed circularly polarized light of wavelength 7620 A° for quartz are 1.53914 and 1.53920 respectively. Calculate the rotation of the plane of polarization of light in degrees produced by a plate of 0.5 mm thickness. (8)

Unit - III

3. a) What is plane diffraction grating? Show that the intensity of light diffracted from a plane transmission grating is given by

$$I = I_o \left(\frac{Sin\alpha}{\alpha}\right)^2 \left(\frac{SinN\beta}{\beta}\right)^2$$ where the symbols have their usual meanings. (2+6)

b) A source emits 531.62 nm and 531.81 nm light, (4+4)

i. What minimum number of lines is required for a grating that resolves the two wavelengths in the first order spectrum.

ii. Determine the slit spacing for a grating 1.32 cm wide that has required minimum number of lines. http://www.rtuonline.com

OR

3. a) Explain Ray leight criterion for resolution and apply it to distinguish between resolving power and dispersive power of a grating. (2+2)

b) Out line the following for a plane transmission grating (2+2+2)

i. Maximum orders of spectra obtainable.

ii. Missing orders.

iii. Overlapping spectra.

c) The width of the slit is 0.012 mm. Monochromatic light is incident on it. The angular position of first bright line is 5.2° calculate the wavelength of incident light. (6)

Unit - IV

4. a) Based on the band theory of solids, distinguish between conductors, semiconductors and insulators. (8)

b) The x-ray analysis of a crystal is made with monochromatic x-ray. Two successive Bragg's reflection are obtained at angles of

    i. $13.5°$ and   ii. $20.5°$.

If the interplanner spacing of crystal is $2.57A°$, calculate the wavelength of x-rays.   (7)

OR

4. a) What is Hall effect? Give an elementary theory of Hall effect. Mention some important uses of Hall effect.   (2+4+4)

    b) Calculate the fermi energy for sodium. Given atomic weight 23.0 gm / mole and density of sodium 0.971 gm / cm³. (Assume one free electron / atom)   (6)

Unit - V

5. a) Define inertial frame of reference and derive Lorentz transformation. (2+6)

    b) Calculate the percentage contraction of rod moving with a velocity 0.8 times the velocity of light in a direction at $60°$ to its own length.   (8)

OR

5. a) Write down the postulates of special theory of relativity. Using Lorentz transformations, obtain the law of addition of velocities.   (2+6)

    b) Show that the relativistic kinetic energy is given by $(m-m_0) c^2$ and it approaches to non relativistic energy for $v << c$. (All symbols have their usual meanings)   (8)

❀❀❀❀❀❀❀

Total No of Pages: 4

1E2003

1E2003

1E2003

B. Tech. I - Sem. (Back) Exam., Dec. 2019

Common to all Branch

103 (O) Engineering Physics-I

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks: 26

Instructions to Candidates:

Attempts any five questions, selecting one question from each unit. All questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.

Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL. _____   2. NIL. _____

UNIT- I

Q.1 (a) Describe the construction and working of Michelson interferometer. How would you use it to measure the wavelength of monochromatic light? [5+5=10]

(b) When a thin film of a transparent material of refractive index 1.5 for wavelength 5890 A is inserted in one of the arms of a Michelson's interferometer, a shift of 65 circular fringes is observed. Calculate the thickness of the film. [6]

OR

Q.1 (a) Explain the formation of the Newton's rings in reflected light. Prove that the diameter of dark rings are proportional to the square root of the natural number. [5+5=10]

For Techno India NJR Institute of Technology

पंकज पोरवाल

Dr. Pankaj Kumar Porwal

(Principal)

(b) In Newton's ring experiment by reflected light the diameters of the 4th and 12th dark rings are 0.4cm and 0.7cm, respectively. Find the diameter of the 20th dark ring. What will be the order of dark ring which is formed where the thickness of air film is equal to wavelength of light used. [5+1=6]

UNIT- II

Q.2 (a) Using the concept of electric vector of electromagnetic wave, discuss plane, circularly and elliptically polarized light. [8]

OR

(b) What is Quarter wave plate? Explain how it is used to analyse - [2+3+3=8]

(i) Elliptically polarized light and

(ii) Circularly polarized light

Q.2 (a) What do you mean by optical rotation. Discuss how will you measure specific rotation of sugar solution using Laurent's half shade Polarimeter. [8]

OR

(b) A tube of sugar solution 20cm long is placed between crossed Nicols and illuminated with light of wavelength 6000 Å. If the optical rotation produced is $13°$ and the specific rotation is $65°(cm^{-1})$ $(g/cm^3)^{-1}$, determine the strength of the solution. [8]

UNIT- III

Q.3 (a) Discuss Fraunhofer's diffraction due to simple slit. Derive the expression for its intensity and show that the intensities of first and secondary maxima are respectively $\frac{1}{22}$ and $\frac{1}{61}$ of the intensity of central maxima. [8]

For Techno India NJR Institute of Technology

पंकज पोरवाल
Dr. Pankaj Kumar Porwa'
(Principal)

(b) Examine if two spectral lines of wavelength 5890Å and 5896Å, can be clearly resolved in the- [8]

    (i) First order and

    (ii) Second order by a diffraction grating 2cm wide and having 425 lines/cm.

OR

Q.3 (a) Give theory of plane transmission grating and show how will you determine wavelength of light. [8]

(b) Parallel light (5000 Å) is normally incident on a slit. The central maxima spreads out at 30° on both sides of the direction of the incident light. Calculate the width of slit. For what width of the slit, the central maxima would spread out to 90° from the direction of incident light? [6+2=8]

UNIT- IV

Q.4 (a) What do you mean by the term "bonding in solid" Explain covalent and metallic bonding. http://www.rtuonline.com [2+3+3=8]

(b) The Hall voltage for the metal sodium is 0.001mV measured at current I=100mA and magnetic field B=2 Tesla. The width of the specimen and conductivity of sample are 0.05mm and $2.09\times10^{7}\Omega^{-1}m^{-1}$, respectively. Calculate – [8]

    (i) The number of carriers per cubic meter in sodium and

    (ii) The mobility of electrons in sodium.

OR

Q.4 (a) Derive an expression for the conductivity of a semiconductor. [8]

(b) Write short notes on the following –

    (i) X-ray diffraction & Bragg's law [4]

    (ii) Hall effect [4]

For Techno India NJR Institute of Technology

पंकज पोरवाल
Dr. Pankaj Kumar Porwal
(Principal)

UNIT- V

Q.3 (a) Using principal of special theory of relativity, derive expression for relativistic variation of mass with velocity. [8]

(b) Show that addition of any velocity to the velocity of light merely reproduces the velocity of light [4]

(c) Show that massless particles can exist only if they move with the speed of light. [4]

OR

Q.5 (a) Deduce Einstein's mass-energy relation $E=mc^2$. Show that the total energy E and momentum p are related as $E^2 = p^2c^2 + m_0^2c^4$, where m_0 is the rest mass and c is speed of light. [6+4=10]

(b) The mean life time of muon at rest is 2.2×10^{-6} sec. Calculate the average distance it will travel in vacuum before decay, if its velocity is 0.9c. [6]

CSE II Semester Result - (2018-2022 Batch) EXAM-2019 Total 95 Students

S.No.	Roll. No.	Name	Engineering Physics		Engineering Physics Lab	
			Credit 80	Grade 20	Credit 20	Grade 30
1	18ETCCS001	AAYUSH DADHICH	4	B+	1	A++
2	18ETCCS002	ABHISHEK PANCHOLI	0	F	1	A+
3	18ETCCS003	ADITI JAIN	4	C+	1	A++
4	18ETCCS004	ADNAN PIPAWALA	4	A	1	A++
5	18ETCCS005	AKHILESH JOSHI	4	E+	1	A+
6	18ETCCS006	AKSHAY SHARMA	4	C	1	A++
7	18ETCCS007	ANAM QUAZI	4	D	1	A++
8	18ETCCS008	ANJALI MEWADA	4	C+	1	A++
9	18ETCCS009	ANN MARY THOMAS	4	E+	1	A++
10	18ETCCS010	APOORV PANWAR	4	E+	1	A++
11	18ETCCS011	ARYAN JAIN	0	F	1	A++
12	18ETCCS012	ASHA YADAV	4	D+	1	A++
13	18ETCCS014	AVI KUMAR TRIPATHI	0	F	1	D+
14	18ETCCS015	AYAN SHARMA	4	E	1	A
15	18ETCCS016	AYUSH GADIYA	4	E+	1	A++
16	18ETCCS017	BHAVIKA BHATNAGAR	4	C+	1	A++
17	18ETCCS018	BHAVYA KUMAWAT	4	E	1	A++
18	18ETCCS019	BHAVYA LOHAR	4	C+	1	A++
19	18ETCCS020	BHUMIKA SALVI	4	C	1	A++
20	18ETCCS021	CHAHAT JOSHI	4	E	1	B+
21	18ETCCS022	CHAHAT LODHA	4	E	1	A++
22	18ETCCS023	CHARUL MEHTA	4	C+	1	A++
23	18ETCCS024	CHIRAG JAIN	4	D+	1	A++
24	18ETCCS025	CHIRAG PALIWAL	0	F	1	A++
25	18ETCCS027	DARSHAN JAIN	4	B	1	A++
26	18ETCCS028	DHAIRYA KANTHALIA	4	B+	1	A++
27	18ETCCS029	DHRUV BHATI	0	F	1	A+
28	18ETCCS030	DHRUVIT POKHARNA	0	F	1	D+
29	18ETCCS031	EAKANSH JAIN	4	E+	1	A++
30	18ETCCS032	GARGI SHARMA	4	E	1	A++
31	18ETCCS033	GAZAL LODHA	4	D	1	A++
32	18ETCCS034	GAZALA PATWALA	4	B+	1	A++
33	18ETCCS035	GEETESH KASHYAP	4	E+	1	A++
34	18ETCCS036	HARDI JAIN	0	F	1	A++
35	18ETCCS038	HARSHIL TAUNK	4	E	1	A++
36	18ETCCS039	HARSHIT JAIN	0	F	1	A++
37	18ETCCS040	HARSHIT KASODNIYA	0	F	1	A++
38	18ETCCS041	HARSHIT PANERI	4	E	1	A++
39	18ETCCS042	HARSHITA MEHTA	4	C+	1	A++
40	18ETCCS043	HEEYA JOSHI	4	D+	1	A++
41	18ETCCS044	HEMANG SINGH BAYA	0	F	1	A++
42	18ETCCS045	HIMANSH SONI	4	D	1	A++
43	18ETCCS046	ISHIKA JAIN	0	F	1	A
44	18ETCCS047	JATIN MENARIA	4	D	1	A++
45	18ETCCS048	JAYESH KUGSIYA	0	F	1	A++

46	18ETCCS050	KARTIK DAVE	0	F	1	A+
47	18ETCCS051	KAVISH LODHA	0	F	1	A
48	18ETCCS052	KHUSH MENARIA	0	F	0	F
49	18ETCCS053	KOMOLIKA AGARWAL	4	D	1	A++
50	18ETCCS054	KRATIK JAIN	4	D	1	A++
51	18ETCCS055	KRISHNA GOSWAMI	4	D+	1	A++
52	18ETCCS056	KRITHIK JAIN	4	B	1	A++
53	18ETCCS057	LAKHAN PRAJAPAT	4	B+	1	A++
54	18ETCCS058	LAXMI KUNWAR PANWAR	4	C	1	A++
55	18ETCCS059	MEHUL JOSHI	4	D	1	A++
56	18ETCCS060	MIHIR BHAWSAR	0	F	1	A++
57	18ETCCS061	MOHAMMED RAUF	0	F	1	A++
58	18ETCCS062	MOHIT CHOUDHARY	0	F	1	A+
59	18ETCCS063	MOHIT MENARIA	0	F	1	A+
60	18ETCCS064	MOHIT SADHWANI	4	C+	1	A++
61	18ETCCS065	MUSKAN PANJWANI	4	C+	1	A++
62	18ETCCS067	NIMIT RANKA	4	D	1	A++
63	18ETCCS068	NITIN BAGDI	4	E+	1	A++
64	18ETCCS069	PALASH SIYAL	0	F	1	A++
65	18ETCCS070	PAYAL PATEL	4	C+	1	A++
66	18ETCCS071	PIHU JAIN	4	C+	1	A++
67	18ETCCS072	PORWAL YASH LOKESH	4	D	1	A++
68	18ETCCS073	PRANJAL JAIN	4	D	1	A++
69	18ETCCS074	PRIYESH SONI	4	D+	1	A
70	18ETCCS075	RAHUL BADLANI	4	C+	1	A++
71	18ETCCS076	RAVINDRA PRATAP SINGH	4	E+	1	A++
72	18ETCCS077	SEJAL JAIN	4	D	1	A++
73	18ETCCS078	SHASHANK GORANA	4	D+	1	A+
74	18ETCCS079	SHIVANGI DHARMAWAT	4	A++	1	A++
75	18ETCCS080	SHREYANSH KUMAR	0	F	1	A++
76	18ETCCS081	SHUBHAM MAHESHWARI	4	E+	1	A++
77	18ETCCS082	SIDDHARTH JAIN	4	E+	1	A++
78	18ETCCS083	SRUSHTI CHOUDHRI	4	E	1	A++
79	18ETCCS084	SUHANI JAIN	4	C+	1	A++
80	18ETCCS085	SUMANT VYAS	4	E	1	A++
81	18ETCCS086	SURBHI SINGH	0	F	1	A+
82	18ETCCS087	SURYAVEER SINGH	4	E	1	A
83	18ETCCS088	TANMAY PRAJAPAT	4	D+	1	A++
84	18ETCCS089	TARUN TAILOR	4	E+	1	A++
85	18ETCCS090	TEJASVINI PRAKASH MEHTA	4	C	1	A++
86	18ETCCS091	THAKUR NUPUR GIRISH	4	E+	1	A++
87	18ETCCS092	TINA SONI	4	C+	1	A++
88	18ETCCS093	VAIBHAV SONI	0	F	1	A+
89	18ETCCS094	VIDUSHI DHAKAR	4	C+	1	A++
90	18ETCCS095	VIVEK SAHU	4	E	1	A++
91	18ETCCS096	VRATI BHANDARI	4	C	1	A++
92	18ETCCS097	WASIM AHMAD BHAT	0	F	1	A++
93	18ETCCS098	YASH JOSHI	0	F	1	A
94	18ETCCS099	YASRA FATEMA	4	E	1	A++
95	18ETCCS100	YOGYATA RATHORE	4	D	1	A++

Engineering Physics	PASS =70	PASS%= 74
TOTAL = 95	FAIL = 25	FAIL% = 26

For Techno India NJR Institute of Technology

पंकज पोरवाल

Dr. Pankaj Kumar Porwal

(Principal)