PANJAB UNIVERSITY CHANDIGARH

**(Established under the Panjab University Act VII of 1947-
Enacted by the Government of India)**

PROSPECTUS

PULEET-2016

Date & Time of Test: 10th JULY 2016 (SUNDAY)
10:00 a.m. to 11:30 a.m.

PULEET FEE:
General Category Rs. 2750/-
SC/ST/Blind Category Rs. 1375/-

PANJAB UNIVERSITY ANTHEM

तमसो मा ज्योतिर्गमय:
तमसो मा ज्योतिर्गमय:
तमसो मा ज्योतिर्गमय:
तमसो मा ज्योतिर्गमय:
पंजाब विश्वविद्यालय
तेरी शान-ओ-शौक़त सदा रहे
मन में तेरा आदर मान
और मोहब्बत सदा रहे
पंजाब विश्वविद्यालय
तेरी शान-ओ-शौक़त सदा रहे
तू है अपना भविष्य विधाता
पंख बिना परवाज़ सिखाता
जीवन पुस्त□ रोज़ पढ़ा □र
सही गलत □ी समझ बढ़ाता
जीवन पुस्त□ रोज़ पढ़ा □र
सही गलत □ी समझ बढ़ाता
तेरी जय □ा शंख बजायें
रौशन तारे बन जायें
वखरी तेरी शोहरत
तेरी शोहरत सदा सदा रहे
पंजाब विश्वविद्यालय
तेरी शान-ओ-शौक़त सदा रहे
पंजाब विश्वविद्यालय
तेरी शान-ओ-शौक़त सदा रहे
तमसो मा ज्योतिर्गमय:
तमसो मा ज्योतिर्गमय:

Tamso ma jyotirgamaya:
Tamso ma jyotirgamaya:
Tamso ma jyotirgamaya:
Tamso ma jyotirgamaya:

Panjab vishaw vidyalaya
Teri shaan-o-shauqat sada rahe
Mann mein tera aadar maan
Aur mohabbat sada rahe
Panjab vishaw vidyalaya
Teri shaan-o-shauqat sada rahe
Tu hai apna bhavishya vidhata
Pankh bina parwaaz sikhata
Jeevan pustak roz padha kar
Sahi galat ki samajh badhata
Jeevan pustak roz padha kar
Sahi galat ki samajh badhata
Teri jai ka shankh bajayein
Roshan tare ban jaayein
Vakhari teri shohrat
Teri shohrat sada sada rahe
Panjab vishaw vidyalaya
Teri shaan-o-shauqat sada rahe
Panjab vishaw vidyalaya
Teri shaan-o-shauqat sada rahe

Tamso ma jyotirgamya:
Tamso ma jyotirgamaya:

CONTENTS

Number of Seats*: 24*(Available in Chandigarh College of Engineering & Technology (CCET), Sector 26, Chandigarh)*

Quota of UT:					
		Computer Science & Engineering	**Electronics & Communication Engineering**	**Civil Engineering**	**Mechanical Engineering**
Gen. Category	State Quota (UT Chd.)	**04**	**04**	**04**	**04**
	All India Quota	**01**	**01**	**01**	**01**
SC	State Quota (UT Chd.)	**01**	**01**	**01**	**01**

* In addition to above, any seats lying vacant in the second year (all branches) of Engineering Programs are also to be filled through Lateral Entry alongwith 24 Nos. additional seats in four stream which are as under:-

Quota of UT:					
		Computer Science & Engineering	**Electronics & Communication Engineering**	**Civil Engineering**	**Mechanical Engineering**
Gen. Category	Chd. Quota (UT Chd.)	**-**	**-**	**-**	**04**
	All India Quota	**-**	**-**	**-**	**-**
SC /ST	Chd. Quota (UT Chd.)	**-**	**05**	**03**	**01**
	All India Quota	**02**	**03**	**-**	**-**

Note: The above position of vacant seats is tentative. In case any other seat lying vacant due to surrender till the date of counselling, the same will also be filled in through PULEET alongwith 24 nos. additional seats in four streams.

Number of Seats*: 33 (A*vailable in Panjab University Swami Sarvanand Giri Regional Centre, Hoshiarpur)*

	ECE	**CSE**	**Mechanical Engineering**	**IT**
General	**05**	**08**	**08**	**06**
SC	**02**	**Nil**	**01**	**Nil**
ST	**01**	**Nil**	**01**	**Nil**
Backward Class	**Nil**	**01**	**Nil**	**Nil**
TOTAL	**08**	**09**	**10**	**06**

* Number of seats available in all branches under different categories due to branch may change sliding allowed by the Panjab University.

Note: The above position of vacant seats is tentative. In case any other seat lying vacant due to surrender till the date of counselling, the same will also be filled in through PULEET alongwith 33 nos. additional seats in four streams.

Important Notes: Candidates seeking admission against reserved seats meant for Scheduled Castes/ Schedules Tribes/Backward Class are required to submit a Certificate regarding their category duly issued by the Deputy

Commissioner/SDM/Tehsildar of the concerned State. The admission of candidate against reserved seat meant for SC/ST/BC will be provisional subject to verification of his/her certificate from the issuing authority. If at any time after enquiry it is proved that the student has got the benefit by misrepresentation of facts or submitting false documents, his/her candidature shall be deemed to have been cancelled.

Important Dates and Information for PULEET-2016

1	Date of Availability of PULEET Prospectus and Application Form on the website of P.U., Chandigarh	11-05-2016 (Wednesday)
2	Last date for submission of information on the website to generate the Bank Challan	21-06-2016 (Tuesday)
3	Last date for deposit of fee in any branch of State Bank of India (SBI) using website generated challan	24-06-2016 (Friday) upto 4:00 p.m.
4	Last date for uploading of photograph, signature with rest of the information on the website	27-06-2016 (Monday)
5	**No correction will be entertained / made regarding photograph, signature and any other information { for completed forms only} after 29-06-2016, 5:00 p.m.**	29-06-2016 (Wednesday)
6	Final date by which Roll No. will be available online Roll No. and Centre of Examination will be generated and Roll No. slip required to be downloaded from the website by the candidate using their own Login and Password (provided while generating Bank Challan). <u>There will be no physical communication for this purpose.</u>	05-07-2016 (Tuesday)
7	Date for holding Entrance Test	10-07-2016 (Sunday)
8	Tentative date during which the result may be declared by the University (The result would be posted on the Panjab University website and the same could be downloaded. No separate result cards will be issued to the candidates by the office.)	20-07-2016 (Wednesday)
9	Centre for Entrance Test	CHANDIGARH
10	Scheme of Test	The Test will be of one & a half hour and it will consist of 75 multiple-choice questions of one mark each.
11	Time of Entrance Test	10.00 a.m. to 11.30 a.m.
12	Qualifying marks for the Entrance Test	20% for General Category & 15% for SC/ST/BC Category
13	Negative Marking	There will be negative marking for wrong answers. (1/4 mark will be deducted)

Centre of Examination: PANJAB UNIVERSITY, CHANDIGARH

IMPORTANT NOTES

1. This is a prospectus for **Entrance Test only**. The candidates have to apply for **admission** for the course on a separate application form.

2. The candidates passed/**appearing** in the qualifying examination for the Course can apply for the Entrance Test.

3. The admission of a candidate for the **Entrance Test** shall be provisional and shall stand cancelled if he/she fails to satisfy the requisite eligibility conditions by the date fixed for the purpose by the University.

4. **The number of seats are mentioned at Page 3.**

5. Candidates securing equal marks shall be bracketed together. Their **inter-se** merit will be determined by the Institution in accordance with the following criteria:

   (i) A candidate getting higher percentage of marks in the qualifying examination shall rank higher in order of merit.
   (ii) That if the marks in qualifying examination are also the same then the candidates obtaining more marks in the immediate lower examination, shall rank higher in order of merit.
   (iii) That if two or more candidates secure equal marks in (i) & (ii) above, candidate senior in age shall rank higher in the order of merit.

6. The final merit for admission shall be computed by the University for Admission in the course(s).

NOTE: The candidates who have passed/appeared in the examination of Mahila Gram Vidyapith, Allahabad are ineligible to appear in the Entrance Test as this Institution has been derecognised by the Panjab University, Chandigarh.

Eligibility Conditions, Scheme of Tests and Merit Lists

Eligibility Conditions

The lateral entry from Diploma to 2nd year of 4-year B.E. degree level would be open only to 3 year Diploma holders in Engineering who have completed Matriculation Examination with Physics and Mathematics. In addition, the candidate must have obtained 60% (55% for S.C./ST./PH) marks in the aggregate in the Diploma Course as required by AICTE.

Admission would be made on the basis of merit obtained in the Entrance Examination to be conducted by the Panjab University, Chandigarh**.**

Scheme of Test

The duration of the Entrance Test will be one hour and thirty minutes and it will consist of 75 multiple-choice questions of one mark each. The syllabus will be based broadly on the course contents as provided in the Prospectus. There will be negative marking for wrong answers (1/4 marks will be deducted).

Merit List

The University will publish merit list of the candidates for the above course on the basis of attainment of minimum of 20% marks (15% in the case of candidates belonging to Scheduled Castes/Schedules Tribes/ Backward Class) of maximum marks in the Entrance Test.

The admission shall be made on the basis of the Entrance Test and **Interview** on **1st August 2015**. The Merit list will be prepared according to the criteria mentioned above for each degree programme.

GENERAL RULES

1. THE RESULT OF THE ENTRANCE TEST SHALL, IPSO FACTO, NOT ENTITLE A CANDIDATE TO GET ADMISSION IN THE INSTITUTION. IT WILL BE THE RESPONSIBILITY OF THE CANDIDATE TO MAKE SURE ABOUT HIS/HER ELIGIBILITY AND FULFILMENT OF SUCH OTHER CONDITIONS AS MAY BE PRESCRIBED FOR ADMISSION IN THE RULES AND REGULATIONS OF UNIVERSITY/INSTITUTION. MERELY BECAUSE A CANDIDATE IS ALLOWED TO APPEAR IN THE ENTRANCE TEST DOES NOT MEAN THAT HE/SHE IS ELIGIBLE AND HIS/HER APPEARANCE THEREIN WILL NOT ESTOP OR DEBAR THE UNIVERSITY/INSTITUTION FROM SATISFYING ITSELF ABOUT HIS/HER ELIGIBILITY AT ANY SUBSEQUENT STAGE. NOTWITHSTANDING ANYTHING CONTAINED IN THIS PROSPECTUS, THE ELIGIBILITY CONDITIONS FOR ADMISION SHALL BE GOVERNED BY THE RESPECTIVE RULES/REGULATIONS AS ENSHRINED IN THE P.U. CALENDAR, VOLUMES I, II AND III (LATEST EDITIONS) AND/OR THE GENERAL GUIDELINES FOR ADMISSIONS/HANDBOOK OF INFORMATION ISSUED BY THE UNIVERSITY AND/OR DECISIONS OF THE UNIVERSITY SENATE/SYNDICATE. IN CASE OF ANY CONFLICT OR INCONSISTENCY BETWEEN THE PROSPECTUS ON THE ONE HAND AND THE AFORESAID PANJAB UNIVERSITY RULES AND REGULATIONS/GUIDELINES/ HANDBOOK OF INFORMATION/ DECISIONS OF SENATE/SYNDICATE, ON THE OTHER, THE LATTER SHALL PREVAIL.
2. The Entrance Test will be held at **Panjab University, CHANDIGARH** on the scheduled date.
3. **In no case, the cost of prospectus for the entrance test including the examination fee, once paid, shall be refunded.**
4. No application form will be received under any circumstances after the closing of the last date.
5. The medium of examination shall be **ENGLISH** only.
6. The candidate(s) shall be required to hand-over the Question Booklet and Answer Sheet to the Centre Superintendent. No Page/Part of the Question Booklet/Answer Sheet is to be removed/torn/taken out of the Examination Centre under any circumstances, failing which the candidate shall be disqualified from the entire test. **Candidates will not be allowed to leave the examination hall before the expiry of the time allotted to the test.**
7. **The use of calculator is not allowed** in any subject/paper.
8. The University will provide logarithmic tables. **Borrowing of log table or other material is not allowed.**
9. The candidates should bring their own stationery items such as Ball / Gel Pen. **Borrowing of material inside the examination hall is strictly prohibited**.

10. In case of Objective Type question papers, rough work should be done in the space provided for this purpose.

11. In case of Objective type question papers, there shall be **NEGATIVE MARKING FOR WRONG ANSWERS i.e. marks will be deducted for wrong answers.** For each correct answer one mark will be awarded and for a wrong answer ¼ mark will be deducted.

12. In case a candidate attempts more than one answer to a question, question will be scored zero.

13. **There shall be no re-evaluation/re-checking/re-assessment of answer sheets under any circumstances. Request for seeing the Question Booklet/answer-sheets/answer-books by the candidate shall not be entertained at all. The evaluation once done by the University shall be absolutely final.**

14. Candidate securing equal marks will be bracketed together. Their inter-se merit will be determined by the institution to which they are seeking admission.

15. The admission shall be based on the relative merit of the candidates as determined by the result of the Entrance Test being held in the year of admission.

16. Carrying of any communication equipment such as **mobile phone/pager/wireless etc.** in the examination hall is not permitted and will lead to disqualification. **Such equipment will be confiscated and not returned afterwards.**

17. Candidates should not carry eatables, drinks etc. into the test centre. Smoking inside the Centre is not permitted.

18. Any candidate who creates disturbance of any kind during examination or otherwise misbehaves in or around the examination hall or refuses to obey the Superintendent/Deputy Superintendent/Assistant Superintendent/any other official on examination duty or changes his/her seat with any other candidate or occupies any seat, other than the one allotted to him/her shall be expelled from the examination hall.(ñ**Expulsion**ò **for this purpose would mean cancellation of the Entire Entrance Test).** The Centre Superintendent/Observer/any other authorized University Officer/official shall be competent to expel a candidate from the examination centre.

19. If any answer sheet of a candidate shows or it is otherwise established that he/she has received or attempted to receive help from any source in any manner or has given help or attempted to give help to any other candidate in any manner, the relevant answer-sheet shall be cancelled. The cancellation of the answer-sheet shall mean cancellation of all answer-sheets of the Entrance Test. The decision of the Controller of Examinations, Panjab University, Chandigarh in this regard shall be final.

20. **If a candidate writes his/her name or puts any kind of identification mark or discloses his/her identity by any method whatsoever on the cover or anywhere else in the Question Booklet/Answer Sheet,**

the same shall be treated as cancelled. The cancellation of the answer-sheet shall mean cancellation of all his/her answer-sheets of the Entrance Test. The decision of the Controller of Examinations, Panjab University, Chandigarh in this regard shall be final.

21. Any person who impersonates a candidate shall be disqualified from appearing in any University examination for a period of five years including this examination, if that person is a student on the rolls of a recognized School or College or University. But if the person is not on the rolls of a recognized School or College or University, he/she shall be declared as a person not fit and proper to be admitted to any examination of the University for a period of five years and the case, if necessary, shall also be reported to the police for any further action in the matter. The candidate who is being impersonated shall also be disqualified for a period of five years from appearing in any examination of this University apart from any other action which the University may take against him, as deemed fit.

22. If it is found that a candidate has knowingly or willfully concealed or suppressed any information/fact which renders him/her ineligible to take the Entrance Test, his/her result of the Test as also admission to an Institution of the University, if granted, shall stand cancelled and he/she shall have no claim whatsoever against the Institution concerned and the case, if necessary shall be reported to the police.

23. If a dispute or controversy arises before, during or after the conduct of Entrance Test, the decision of the Controller of Examinations, Panjab University, Chandigarh in this regard shall be final.

24. The candidate shall be admitted to entrance test only on production of the admit card at the test centre. No candidate shall be allowed to take entrance test without admit card under any circumstances. The candidate must retain admit card till the admission process is over and must produce the same at the time of counseling.

25. The admit card will be issued to the candidate only provisionally, at the sole risk and responsibility of the candidate subject to final confirmation of their eligibility at the time of admission. It is further clarified that the candidates will be taking the entrance test at their sole risk and responsibility as far as their eligibility is concerned and the university shall, in no way, be responsible if they are found to be ineligible, later, leading to cancellation of their result or any other consequence(s) emanating from the same.

26. No candidate shall be allowed to leave the examination hall/room before the expiry of time allowed for the examination.

27. **"4-5 days after the test, the question papers and their keys will be put on the University website. The candidate can file their objections regarding discrepancies and accuracy of the key, in writing, within 48 hours of this announcement to Assistant Registrar, CET Cell, Panjab University, Chandigarh. The valid concerns thus expressed will be**

given due consideration while evaluation. If a candidate wishes to verify his/her result, he/she will be provided a photocopy of his/her answer sheet on payment of Rs. 10,000/- within 10 days after the declaration of the entrance test result and the office should process the whole procedure within three working days. In case, a discrepancy is found in the result of the candidate, the result would accordingly be revised and the fee deposited will be refunded".

28. **The candidate shall not be allowed to make any changes in the application form by way of any addition/deletion/alteration/amendments/change of any other particular etc. under any circumstances once they submit it in the University office.**

29. For urgent enquiries from 9.00 AM to 2.00 PM on working days, please contact:

PULEET Coordinator, University Institute of Engineering & Technology, Panjab University, Chandigarh-160014	0172-2541242, 0172- 2534997
A.R. (CET Cell)	0172-2534829

SYLLABUS FOR PULEET - 2016

I. GENERAL ENGINEERING

(a) Basic Electrical Engineering

1. **DC circuits:** Voltage and current sources, Kirchhoffs laws and network solution, network analysis by mesh and node analysis, superposition theorem, Theveninís theorem, Nortonís theorem, delta-star transformation and vice-versa, maximum- power transfer theorem, energy storage elements, step response of RL, RC and RLC circuits.

2. **Single Phase AC Fundamentals:** Alternating current systems, waveform terms and definitions, average and r.m.s. values of alternating, quantities, phasor notation, solution and phasor diagram of single phase ac circuits with sinusoidal source excitation.

3. **Three Phase AC Fundamentals:** Disadvantages of single phase system, three phase voltages and currents, voltages and currents in star and delta connected systems, power in a three phase system, solution of three phase balanced circuits, power and power factor measurement by two watt-meter method.

4. **Magnetic Circuit:** Introduction to magnetic circuit, magneto motive force and magnetic field strength, permeability of free space, relative permeability, reluctance, comparison of electric and magnetic circuits, *B/H* curve, magnetic circuits calculations, self and mutual inductance.

5. **Transformers:** Introduction, Basic Principle, EMF equation, approximate equivalent circuit, phasor diagram, losses, efficiency and condition for maximum efficiency, voltage regulation, open circuit and short circuit tests.

6. **Electric Machines:** Operating principle and application of DC machine as generator and motor, EMF and Torque equations, methods of excitation.
   Operating principle and applications of 3 phase squirrel cage and slip ring induction motors, equivalent circuit and torque speed characteristics (qualitative treatment)

   Operating principle of single phase induction motor (split Phase and capacitor motors), torque-speed characteristics (qualitative treatment)

Principle of operation and applications of variable reluctance, permanent magnet and hybrid stepper motors, speed torque characteristics (qualitative approach)

(b) <u>Basic Electronics</u>

1. **Semiconductor Diode:** PN-Junction, Junction Theory, V-I characteristics of a PN-Junction Diode, Ideal Diode, Use of Diode in Rectifiers: Half Wave Rectifiers, Full Wave Rectifiers, Zener Diode, Varacter Diode, Light Emitting Diodes.

2. **Bipolar Junction Transistor:** Introduction, Junction Transistor Structure, Operation, Transistor amplifying action, CB, CC and CE Configuration, characteristics, application of transistor as an amplifier.

3. **Field Effect Transistor:** Introduction, Types of FETôs, JFETôs, MOSFETôs, CMOS, characteristics, working, applications.

4. **Operational Amplifiers:** Block Diagram, Characteristics of an ideal OP-AMP, Application of OP-AMP as an Inverting amplifier, Phase Shifter, Scale Changer, Non-inverting amplifier, Adder or Summing amplifier, differential or difference amplifier, integrator.

5. **Oscillators:** Block Diagram of feedback circuit used as an oscillator, Barkhausen criterion, types of oscillators.

6. **Boolean Algebra and Logic Gates:** Binary and Hexadecimal number system, BCD and weighted codes, Binary arithmetic, Logic-positive and negative logic, basic and universal logic gates. Boolean algebra and postulates, reduction of Boolean expression.

7. **Flip Flops:** Concept of flip-flops, RS, D, JK and T types, triggered and clocked, master slave, Shift Register, concept of synchronous and asynchronous counters. Half and full adder, subtractor, Seven Segment display, Concept of Mux, deMux, decoder and encoder.

8. **Test and Measuring Instruments:** Block diagram, concept of digital electronic voltmeters, ammeter and wattmeter, CRO, Signal Generators, Sensors and Transducers and their classification. Working principle of resistive, capacitive, photosensitive and temperature transducers. Block diagram and working principle of analog and digital data acquisition system.

9. **Communication:** Basic Concepts, Modulation, Need for modulation, introduction to AM, FM, PM.

(c) Programming Fundamentals

1. **Introduction:** Computer Basic, Block Diagram of Computer, Memory Hierarchy, Types of RAM, Secondary Memory Introduction to Operating Systems, Programming Languages, Program Structure, Linux Shell Commands, Bourne Shell, C Shell, Korn Shell

2. **Basic Constructs of C:** Keywords, Identifiers, Variables, Symbolic Constants, Data Types and their storage, Operands, Arithmetic Operators, Relational Operators, Logical Operators, Bitwise Operators, Increment & Decrement Operators, Expressions, Conditional Expressions, Assignment Operators and Expressions, Type Conversions, Precedence and Order of Evaluation, External Variables and Scope of Variables. Basic Input Output, Formatted I/O.

3. **Program Control Flow:** Statements and Blocks, Conditional Statements, IF, ELSE-IF, Switch Case statements, Control Loops, For, While and Do-While, Go to and Labels.

4. **Arrays & Functions:** Pointers and Addresses, Arrays, Multi dimensional arrays, strings, pointer arrays, Functions, Function Prototyping, Scope of functions, Arguments, Call by value and call by references, static variables, recursion, C-Preprocessor and Macros, Command line arguments.
5. **Structures:** Structures, Array of Structures, pointer to structures, Typedef, Unions, Bit fields, passing structures as an argument to functions

6. **Input and Output:** Standard and Formatted Input and Output, File Access & its types, Line Input and Output, Types of Files, Binary & ASCII Files, Error handling, stderr and Exit functions

7. **Introduction to Object Oriented Programming:** Classes and Objects, Structures vs Classes, Abstraction, Encapsulation, Polymorphism, Inheritance.

(d) Fundamentals of Mechanical Engineering

1. **Laws Of Thermodynamics:** First law of thermodynamics, Steady flow energy equation and its applications (nozzle, throttling device, turbine, compressor, heat exchanger). Limitations of first law, statements of second law by Max-planck and Clausis, equivalence between the two statements. Reversible and irreversible processes, Carnotôs theorem. Energy analysis of a heat engine, refrigerator and heat pump.

2. **Steam and Its Formation:** P-V, P-T, T-S, H-S diagrams of water. Dryness fraction and its measurement by calorimeter. Uses of steam tables and mollier chart (H-S chart)

3. **Power Cycles:** Carnot and Rankine steam power cycles. Effect of mean temperature of heat addition on Ranking cycle efficiency. Otto, Diesel and Dual combustion cycles for reciprocating I.C. engines.

4. **Kinematics Of Fluid Flow:** Types of flow, acceleration in fluid flow, stream lines, stream tubes, irrotational flow, stream function, velocity potential, flow nets.

5. **Fluid Dynamics:** Equation of continuity, Eulerôs Equation, Bernoulliôs equation, simple applications to one dimensional flow problems.

6. **Flow Measurement:** Pilot tube, Venturimeter, Orificemeter, Notches (Rectangular & Triangular) and weirs, Rotameter.

7. **Simple Stress and Strains:** Concept of stress and strain. Stress and strains in bars subjected to tension and compression, stress-strain diagrams, mechanical properties, factor of safety, Extension of Uniform bar under its own weight, stress produced in compound bars (two or three) due to axial loads.

8. **Bending moment (B.M.) and Shear force (S.F.)**: Diagrams for cantilevers, simply supported beams with or without overhang and calculation of maximum B.M. and S.F. and the point of contra flexture under the following loads. Concentrated loads, Uniformly distributed loads over whole span or part of span, combination of concentrated loads (two or three) and uniformly distributed loads.

9. **Bending and Torsion:** Stress in beams due to bending, proof of formulae M/I = f/y = E/R and its application to beams of rectangular and circular section. Application of torsion equation to hollow and solid circular shaft.

(e) **<u>Fundamentals of Civil Engineering</u>**

1. **Construction Material and Building Construction**: rock, Bricks & Tiles, Cement, Lime Timber and paints, Excavation of foundation, Brick Masonry, Stone Mesonry, Wall, Mortal & Concrete, Damp-proofing, Doors-windows, Roof, Floors, Stairs and Building planning.

2. **Hydraulics :** Fluids and Properties of fluids, Hydrostatic Pressure, fluid flow and measurement through pipe and open channel

3. **Concrete and Structures:** Concrete and Properties of Concrete, Formwork, ordinary and special concrete, Concrete Operation. Stress & strain, Bending Moment & Shear Force, Slope and Deflection, Columns and trusses.

4. **Reinforced Concrete Structures:** Reinforcement, Theory of RCC Beams, Bonds in RCC Beams, Singly & Doubly RCC Beams, RCC Slabs, Reinforced Brick Works and Columns.

5. **Steel Structure:** Structural Steel Section and Connections, Tension, Compression and Beam Members.

6. **Surveying:** Chain & Compass Surveying, Leveling using Dumping and IOP Level.

7. **Irrigation Engineering**: Rainfall and Run off, Crops water requirement, Irrigation and types of irrigation, Canal Works, Water logging and Drainage, Dams.

8. **Transportation Engineering:** Road Geometrics, Highway Surveying, Road Material and Pavement, Road Drainage and Maintenance.

9. **Soil Mechanics:** Physical Properties of soil and Soil classification, Water flow through soil and Soil Deformation, Strength Characteristics of soil and soil Compaction, Bearing Capacity and Site Exploration

10. **Estimation and Costing** : Estimation and Types of estimation, Analysis of Rates, Irrigation Work Estimation, Road Work Estimation and Valuation.

II. PHYSICS

(a) MECHANICS

Linear kinematics and its equations of motion, projectile motion, circular motion.

Newtonôs laws of motion, principle of conservation of momentum applications to linear and planar motion, concept of friction and its laws, motion on smooth and rough inclined planes, simple and complex Atwoodôs machines.

Concept of work, energy and power, work-energy principle, principle of conservation of energy.

Rotational motion, equations of rotational kinematics, moment of inertia and radius of gyration of a rotating body; torque and angular momentum; work, power and energy in rotational motion, conservation of angular momentum.

Simple harmonic motion and its characteristics, energetics of simple harmonic motion, idea of damped and forced oscillations, resonance and its applications.
Wave motion and its characteristics, theory of sound propagation, velocity of sound and factors influencing the velocity of sound, Doppler effect in sound, superposition of sound in space (stationary waves) and time (beats), vibrations of air columns and stretched strings.

(b) OPTICS

Geometrical optics, reflection and refraction of light, reflections by spherical mirrors, refraction through lenses, spherical and chromatic aberrations, dispersion and deviation of light through prism, optical microscopes and telescopes.

Wave nature of light; interference, Youngôs double slit experiment, Lloydôs mirror and Fresnelôs biprism techniques for producing interference pattern, interference through thin film, colouring of thin films; diffraction of light through a single slit, Rayleighôs criteria of resolution, resolving power of optical instruments ; concept of polarization, methods of producing polarized light, analysis of polarized light, Doppler effect in light.

Laser, its principle, characteristics and applications.

(c) HEAT

Thermometry, idea of specific heat and heat capacity, latent heats of fusion and vaporization, variation of specific heats of solids, liquids and gases with temperature, concept of degree of freedom, law of equipartition of energy.

Modes of heat transfer (conduction, convection and radiation); linear, surface and volume expansion of matter on heating.

(d) ELECTRODYNAMICS

Electric field and electric potential, electric dipole and its field, Gaussô law and its applications; concept of capacitance, energy stored in a capacitor, effect of introducing dielectric and conducting slabs between plates of a capacitor, dielectric constant of material.

Current electricity, Kirchoffôs laws and applications, thermal and chemical effects of current, slide wire bridge, potentiometer, ammeter and voltmeter.

Magnetic effects of current, Biot-Savert law and its applications, Lorentz force, moving coil galvanometers ; laws of electromagnetic induction, eddy currents and its applications, self and mutual inductance.

(e) MODERN PHYSICS

Black body radiation distribution, photoelectric effect, idea of x-ray production, wave-matter duality and de-Broglie waves, position-momentum uncertainty principle.

Crystalline and amorphous solids, basic idea of crystal structures (simple cubic, body- centered cubic, face-centered cubic) and their characteristics, close packing morphologies, Schottkey and Frenkel defects in crystals.

Rutherford scattering experiment, Bohrôs model and hydrogen spectrum. Nucleus and its properties (mass, size, binding energy, magnetic and quadruple moments), nuclear forces and its properties, phenomenon of radioactivity and its laws, modes of radioactive decays (Ŭ, ɓ and ɔ), nuclear fission and fusion.

III MATHEMATICS

(a) Algebra:

Quadratic Equations, equations reducible to quadratic form, relation between roots and coefficients, Arithmetic Progression, Geometric Progression, Arithmetico-Geometric Progression, Harmonic Progression, Series of Natural Numbers.

(b) Matrices:

Concept of linear independence and dependence, Rank of a matrix: Row ï Echelon form, System of linear equations: Condition for consistency of system of linear equations, Inverse of a matrix.

(c) Trigonometry:

Trigonometric ratios and their relations, ratios of some standard angles, solution of trigonometric equations, sum and difference formulae, product formulae, multiple and sub-multiple angles, solution of triangles.

(d) Coordinate Geometry:

Cartesian coordinates, equations of straight line in various forms, intersection of two straight lines, angle between two lines, distance formula. Equation of circle in various forms, tangent and normal to circle.

(e) Differential Calculus of Functions of one variable:

Successive Differentiation, Leibnitz Theorem, Expansions of functions: Taylorôs and Maclaurinôs Series, Formulae for remainder term in Taylor and Maclaurin series, Angle of contingence, Curvature, Radius of curvature, Centre of curvature for curves in Cartesian form. Curvature at the origin: Newtonôs formulas.

(f) Differential Calculus of Functions of two variables:

Concept of limit and continuity of a function of two variables, Partial derivatives, total differential, differentiation of an implicit function, chain rule, change of variables, Jacobian, Taylorôs and Maclaurinôs series. Maxima and minima of a function of two variables: Lagrangeôs method of multipliers.

(g) Ordinary Differential Equations:

Review of geometrical meaning of the differential equation $y' = f(x, y)$, directional fields, Exact differential equations, Integrating factors.

(h) Integral Calculus:

Reduction formula for $\int \sin^n x\,dx$, $\int \cos^n x\,dx$, $\int \sin^m x \cos^n x\,dx$, $\int x^m (\log x)^n\,dx$, $\int x^n e^{ax}\,dx$, $\int x^n \sin mx\,dx$, $\int x^n \cos mx\,dx$, Areas of curves, Length of curves, Volume and surface areas of revolution, Double integrals, Change of order of integration, Areas enclosed by plane curves.

(i) Vector Differential Calculus:

Vectors and scalar functions and fields, derivatives. Curves, tangents, arc lengths, Curvature and torsion of a curve, Gradient

of a Scalar field, Directional Derivative, Divergence of a vector field, Curl of a vector field.

(j) Vector Integral Calculus: Line integrals, Line integrals independent of path, Greenôs theorem in the plane, Surface Integrals, Triple integrals, Gauss Divergence Theorem, Stokeôs Theorem.

IV ENVIRONMENT EDUCATION

Ecology and Ecosystems
Structure and functions of Ecosystems, producers, consumers & Decomposers, ecological succession, food chains, food webs & ecological pyramids.

Biodiversity and its conservation
Genetics, species, and ecosystem diversity, Biodiversity at global, National and Local levels, Threats to diversity.

Natural Resources
Air resources, composition, air quality management

Forest resources, deforestation, case studies, timber extractions, mining, dams and their effects on forests.

Water Resources: Use and over utilization of surface and water, floods, draught, water quality management.

Food Resources; World food problems, effects of modern Agriculture, water logging.

Energy Resources: Growing energy needs, renewable and non renewable energy sources.

Land Resources: Land degradation, soil erosion & desertification

Environmental Pollution
Air pollution, water pollution, thermal pollution, soil pollution, noise pollution, their causes, effects & control measures.

Pollution Case Studies, Role of an individual in prevention of pollution.

SAMPLE QUESTIONS FOR PULEET - 2015

1. The efficiency of a Carnot engine is dependent on:
(a) Specific heat of gas used
(b) Temperatures of source & sink
(c) Rapidity of compression and expansion of gas used
(d) All of the above

2. The ball of 100 g is in uniform circular motion of radius 4m and has a constant speed of 2 m/s. The centrifugal force acting on it will be
(a) 100 N
(b) 0.1 N
(c) 10 N
(d) None of these

3. The value of $\sin 10^o +$ $\sin 20^o + \sin 30^o +$é + $\sin 360^o$ is
(a) 1
(b) 0
(c) -1
(d) None of these

4. The system of linear equations AX=b where A is $m \times n$ matrix of coefficients, X is $n \times 1$ vector of unknowns, b is $m \times 1$ vector of unknowns is consistent if
(a) rank A = rank (A|b)
(b)rank A $\neq$ rank (A|b)
(c) rank A = 0
(d) rank A = n+m

5. If one root of a quadratic equation with real coefficients is $\frac{1}{3+4i}$, then the other root is
(a) 3-4i
(b) $\frac{3}{25}+\frac{4}{25}i$
(c) $\frac{3}{25}-\frac{4}{25}i$
(d) $\frac{4}{25}-\frac{3}{25}i$

6. Pitot tube is used to measure
(a) Discharge
(b) Velocity
(c) Temperature
(d) None of these

7. During _____ Throttling remains constant
(a) Heat
(b) Temperature
(c) Enthalpy
(d) Internal Energy

8. In a differential amplifier, CMRR can be improved by increasing
(a) Emitter Resistance
(b) Collector Resistance
(c) Power Supply Voltage
(d) Source Resistance

9. If an amplifier with a gain of -1000 had a gain change of 20% due to temperature. It was provided the feedback with feedback factor ƃ = -0.1, now the change in gain with feedback will be
(a) 10%
(b) 5%
(c) 0.2%
(d) 0.01%

10. 8085 microprocessor can address memory space of
(a) 256 B
(b) 128 KB
(c) 64 Kb
(d) 1 MB

11. Default ace types of member variable in classes is
(a) private
(b) public
(c) protected
(d) static

12. Which of the following operator has the highest precedence
(a) +
(b) /
(c) *
(d) ++

13. Which of the following statement is invalid
(a) x=y+++z;
(b) x+=y;
(c)++x++;
(d) a+b=c+d;

14. A series RLC circuit offer the impedance value at resonace that is
(a) maximum
(b) minimum
(c) infinite
(d) none of these

15. In Star connection for balanced load, the current flowing in neutral wire is
(a) minimum
(b) maximum
(c) zero
(d) none of above

16. In an SCR, the break over voltage V_{BO}
(a) increases with increase of positive gate current
(b) is independent of gate current
(c) decreases with increase of positive gate current
(d) none of above