Postal

നമ്പർ. ACB2/3/18/ഡി.ടി.ഇ

പ്രേഷകൻ

🔳 സാങ്കേതിക വിദ്യാഭ്യാസ ഡയറക്ടർ

സ്വീകർത്താവ്

കണ്ട്രോളർ,സാങ്കേതിക പരീക്ഷാ കൊണ്ട്രോളരുടെ കാര്യാലയം,കൈമനം,

തിരുവനന്തപുരം

സർ

വിഷയം:- വിദ്യാഭ്യാസം-സാങ്കേതികം-ലാറ്ററൽ എൻട്രി പ്രവേശന പരീക്ഷയ്ക്കുള്ള സിലബസ്

അയക്കുന്നത് സംബന്ധിച്ച്.

സൂചന:- 1. നമ്പർകെ ടി യു/എഎസ്എസ്റ്റി1 (അക്കാഡെമിക്)/1416/2018

തീയതി02.04.2018 . 2.താങ്കളുടെ കത്ത് നമ്പർ ടി.എക്സ്‌-7/1470/18 സി.ടി.ഇ

തീയതി 03.04.2018.

മേൽസൂചന ഒന്ന് പ്രകാരം 2018-19 വർഷത്തെ ലാറ്ററൽ എൻട്രി പ്രവേശന പരീക്ഷയ്ക്കുള്ള

സിലബസ് കേരള ടെക്നിക്കൽ യൂണിവേഴ്സിറ്റി യിൽ നിന്നും   അംഗീകരിച്ച് ലഭിച്ചിട്ടുണ്ട്. ഇത് പരീക്ഷാ

നടത്തിപ്പിനായ് ഇതോടൊപ്പം താങ്കൾക്ക് അയച്ചു തരുന്നു

വിശ്വസ്തതയോടെ

9/4/18   fov   ഡോ. കെ.പി ഇന്ദിരാദേവി

സാങ്കേതിക വിദ്യാഭ്യാസ ഡയറക്ടർ (ഇൻ

ചാർജ്)

സാങ്കേതിക വിദ്യാഭ്യാസ ഡയറക്ടർക്ക

വേണ്ടി

B.TECH LATERAL ENTRY ENTRANCE EXAMINATION
Syllabus

MATHEMATICS (20 X 3 = 60 Marks)

CALCULUS : Single Variable Calculus and Infinite series Basic ideas of infinite series and convergence - .Geometric series- Harmonic series-Convergence tests-comparison, ratio, root tests (without proof). Alternating series- Leibnitz Test- Absolute convergence, Maclaurins series-Taylor series - radius of convergence. Partial derivatives and its applications Partial derivatives Partial derivatives of functions of more than two variables – higher order partial derivatives - differentiability, differentials and local linearity - The chain rule – Maxima and Minima of functions of two variables - extreme value theorem (without proof)-relative extrema .Calculus of vector valued functions Introduction to vector valued functions parametric curves in 3-space Limits and continuity – derivatives – tangent lines – derivative of dot and cross product definite integrals of vector valued functions unit tangent-normal- velocity-acceleration and speed– Normal and tangential components of acceleration. Directional derivatives and gradients-tangent planes and normal vectors. Multiple integrals Double integrals- Evaluation of double integrals – Double integrals in non-rectangular coordinates- reversing the order of integration- Area calculated as a double integral- Triple integrals(Cartesian co ordinates only)- volume calculated as a triple integral- (applications of results only). Topics in vector calculus -Vector and scalar fields- Gradient fields – conservative fields and potential functions – divergence and curl the ∇ operator – the Laplacian ∇^2 , Line integrals - work as a line integralindependence of path-conservative vector field. Topics in vector calculus (continued) -Green's Theorem (without proof- only for simply connected region in plane), surface integrals – Divergence Theorem (without proof for evaluating surface integrals) , Stokes' Theorem.

DIFFERENTIAL EQUATIONS : Existence and uniqueness of solutions for initial value problems, Homogenous linear ODEs of second order. Homogenous linear ODEs with constant coefficients, Existence and Uniqueness of solutions Wronskian, Homogenous linear ODEs with constant Coefficients (Higher Order). The particular Integral (P.I.), Working rule for P.I. when $g(x)$ is X^m, To find P.I. when $g(x) = e^{ax}.V_1(x)$, Working rule for P.I. when $g(x) = x.V(x)$, Homogeneous Linear Equations, PI of Homogenous equations Legendde's Linead eduations Method of variation of parameters for finding PIs. Periodic functions ,Orthogonally of Sine and Cosine functions (Statement only), Fourier series and Euler's formulas Fourier cosine series and Fourier sine series (Fourier series of even and Odd functions) Half range expansions. Introduction to partial differential equations , formation of PDE, Solutions of first order PDE(Linear only) Lagrange's Method, Linear PDE with constant coefficients , Solutions of Linear Homogenous PDE with constant coefficients , Shorter method for finding PI when $g(x,y)=f(ax+by)$, Method of finding PI when $g(x,y) = x^m y^n$ method of find PI when $g(x,y)= e^{ax+by}$ $V(x,y)$. Method of separation of variables The wave Equation Vibrations of a stretched string Solutions of one dimensional wave equation using method of separation of variables and problems. The equation of Heat conduction One dimensional Heat transfer equation. Solutions of One Dimensional Heat transfer equation, A long insulated rod with ends at zero temperatures, A long insulated rod with ends at non zero temperatures.

Statistics: Fundamental concepts and laws of mechanics - Rigid body – Principle of transmissibility of forces.Coplanar force systems – Moment of aforce – Principle of moments .Resultant of force and couple system.Equilibrium of rigid body – Free body diagram – Conditions of equilibrium in two dimensions – Two force and three force members.

Types of supports – problems involving point loads and uniformly distributed loads only.Force systems in space – Degree of freedom – Free body diagram – Equations of equilibrium – Simple resultant and Equilibrium problems.

Properties of planar surfaces - Centroid and second moment of area(Derivations not required) – Parallel and perpendicular axis theorem – Centroid and Moment of Inertia of composite area. Polar Moment of Inertia – Radious of gyration - Mass moment of Inertia of cylinder and thin disc (No derivations required)Product of Inertia – Principle Moment Of Inertia(Conceptual level).Theorems of Pappus and Guldinus.

Friction – Characteristics of dry friction – Problems involving friction of ladder,wedges and connected bodies.Definition of work and virtual work – Principle of virtual work for a system of connection bodies – problems of determinate beams only.

Dynamics: Rectangular and Cylindrical co-ordinate system.Combined motion of rotation and translation – Concepts of instantaneous centre – Motion of connecting rod of piston and crank of areciprocating pump.Rectilinear translation – Newton's second law – D'Alembert's Principle – Application to connected bodies(Problems on motion of lift only).

Mechanical vibrations – free and forced vibrations – degree of freedom.Simple and harmonic motion – Spring-mass model – period – Stiffness – Freequency – Simple numerical problems of single degree of freedom.

computer organization:- Central processing unit , input device , output device , secondary storage device , machine language , assembly language and high level language

System software:- Assembler , loader ,linker , operating system , editors ,compilers , debuggers.

Computer programming (in C language):- Data types, type conversion ,simple and compound statements, usage of standard library, control structures ,functions , arrays. Pointers , structure, file handling.

Data base systems:- Relational Data Base Management System ,SQL.

Multimedia:- Multimedia hardware, sound cards, CD ROMs, full motion digital video.

Computer networks:- ISO/OSI protocols ,TCP/IP, Inter connecting network devices , Ethernet cards, cables, Connectors, hubs, switches, routers.

Internet:- Introduction to FTP,TELNET, Email , web browsers and web servers.

CIVIL ENGINEERING   (15 X 3 = 45 Marks)

General introduction to Civil Engineering – Various disciplines of civil engineering, Relevance of Civil Engineering in the overall infrastructural development of the country.Introduction to types of building as per NBC,Selection of site for buildings Components of a residential buildings and their functions.Introduction to industrial buildings – Office/Factory/Software development office/Power house/Electronics Equipment Service Centre(any one related to the branch of study).Student have to visit one such buildings an d submit an assignment about feature of anyone of the listed building related to their branch(not included for exam).

Building Planning – Introduction to planning of residential buildings – site plan,orientation of buildings , open space requirement ,position of doors and windows,Size of Rooms ,Preparation of a scaled sketch of the plan of a single storeyed Residential building in a given site plan.Introduction to the various building Area terms – Computation of Plinth Area/Built up Area,Floor Area/Carpet Area – for a simple single storeyed building,Setting out of a Building.

Surveying Principles and Objectives of Surveying, Horizondal Measurement – Instruments used – tape, Types of tapes ,Ranging(Direct ranging only) – Instrument used for ranging.Levelling – Definitions, Principles, Instruments (brief Reduction of levels-problems on leveling(height of collimation only).modern surveying instruments-electronic distance meter, digital level, total station ,GPS (Brief Discussion only).

Building materials – Bricks,Cement Blocks – Properties and specifications.Cement – OPC,Properties,Grades;Other types of cement and its uses(in brief).Cement mortar – constituents,preparation.Concrete – PCC and RCC – grades.Steel Use of steel in building construction ,types and market forms.

Building construction – Foundations;Bearing capacity of soil(definition only);Functions of foundations,Types – Shallow and Deep(sketches only).Brick masonry – header and stretcher bond,English bonds – Elevation and plan(one brick thick walls only).Roofs – functions,types,roofing materials(brief discussion only).Floor – functions,types;flooring materials (brief discussion only).Decorative finishes – Plastering – Purpose,procedure.Paints and painting – Purpose,types,Preparation of surfaces for painting brief discussion only).

Basic infrastructure and services – Elevators,Escalators,Ramps,air conditioning,Sound proofing(Civil Engineering aspects only).Towers,Chimneys,Water tanks(brief discussion only).Concept of intelligent buildings.

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MECHANICAL ENGINEERING   (15 X 3 = 45 Marks)

Thermodynamics: Laws of Thermodynamics,Significance and Applications of thermodynamics,entropy,Ideal and real gas equations; Analysis of Carnot cycle,Otto cycle, Diesel Cycle; Efficiency of these cycles.

Energy Conversion Devices; Boiler, Steam turbines; Working Principle of two stroke and four stroke I.C Engines(SI and CI),Fuels, CRDI, MPFI, Hybrid Engines, Reciprocating pumps, centrifugal pumps and hydraulic turbines.(Elementary ideas only)

Refrigeration and air conditioning: Vapour compression refrigeration systems,Heat pump,COP,Study of household refrigerator ,Energy effiency rating,Psychometry, Psychometric Process,Window air conditioner,Split air conditioner. Refrigerants and their impact on environment.

Automobiles and Power Transmission Devices,Different types of automobiles, types of power units in automobiles; major components and their functions (brief discussion only); Belts and belt drives;Chain Drive;Rope drive; Gears and gear trains; Friction clutch(cone and single plate),brakes(types and application only).

Materials and Manufacturing Processes: Engineering materials ,Classifications, properties, Alloys and their Applications; Casting, Sheet metal forming, Sheet metal Cutting, Forging, Rolling, Extrusion; Metal joining processes – soldering, brazing and Welding; Powder metallurgy(Elementary ideas only).

Machine Tools(Basic elements,Working principle and types of operations), Lathe,Drilling Machine, Shaper,Planer,Slotter,Milling Machine,Grinding machine;Introduction to CNC machines.

ELECTRICAL ENGINEERING

Elementary concepts of electric circuits: Kirchhoff's laws, constant voltage and current sources-Problems.Formation of network equations by mesh current and node voltage methods-matrix representation-solution of network equations by matrix methods-problems   star-delta conversion(resistive networks only-derivation is not needed)-problems

Magnetic Circuits: MMF, field strength, flux density, reluctance(definition only)-comparison between electric and magnetic circuits. Energy stored in magnetic circuits, magnetic circuits with air gap-Numerical problems on series magnetic circuits Electromagnetic Induction: Faraday's laws, lenz's laws- statically induced and dynamically induced emfs-self inductance and mutual inductance, coefficient of coupling (derivation not needed)

Alternating Current fundamentals: Generation of alternating voltages-waveforms, frequency, period, average , RMS values and form factor of periodic waveform(pure sinusoidal)- Numerical Problems.
AC Circuits: Phasor representation of alternating quantities- rectangular and polar representation Analysis of simple. AC circuits: concept of impedance, power and power factor in ac circuits-active, reactive and apparent power solution of RL,RC and RLC series circuits-Numerical problems.Three phase systems: Generation of three phase voltagesadvantages of three phase systems, star and delta connection (balanced only), relation between line and phase voltages, line and phase currents three phase power measurement by two wattmeter method (derivation is not required) - Numerical problems.

Generation of power: Block schematic representation of generating stations- hydroelectric power plants.Block schematic representation of Thermal and nuclear power plants Renewable energy sources: solar, wind, tidal and geothermal (Block diagram and working only- No Problems) Power transmission: Typical electrical power transmission scheme-need for high voltage transmission (Derivation is not needed, No Problems).Power Distribution: substation equipments, primary and secondary transmission and distribution systems- feeder, service mains.

Electric Machines: DC Generator and Motor-Constructionworking principle- Back EMF Types of motor-shunt, series, compound (short and long)- principle of operation of dc motor, applications numerical problems (voltage -current relations only).Transformer: Construction of single phase and three phase Transformers (core type only)-EMF equation and related numerical problems Losses and efficiency of transformer for full load –numerical problems (no equivalent circuit).

AC Motors: Three phase induction motor-squirrel cage and slipring induction motor Working principle-synchronous speed, slip and related numerical problems. (no equivalent circuit) AC Motors: Construction, principles of operation of single phase induction motor (no equivalent circuit) Starting methods in single phase induction motors -split phaseand capacitor start.

ELECTRONICS ENGINEERING   (15 X 3 = 45 Marks)

Evolution of Electronics, Impact of Electronics in industry and in society. Resistors, Capacitors: types, specifications. Standard values, marking, colour coding. Inductors and Transformers: types, specifications. Principle of working. Electro mechanical components: relays and contactors.

PN Junction diode: Intrinsic and extrinsic semiconductors, Principle of operation, V-I characteristics, principle of working of Zener diode, Photo diode, LED and Solar cell. Bipolar Junction Transistors: PNP and NPN structures, Principle of operation, input and output characteristics of common emitter configuration (npn only).

Rectifiers and power supplies: Block diagram description of a dc power supply ,Half wave and full wave (including bridge) rectifier, capacitor filter, working of simple zener voltage regulator. Amplifiers and Oscillators: Circuit diagram and working of common emitter amplifier, Block diagram of Public Address system, concepts of feedback, working principles of oscillators, circuit diagram & working of RC phase shift oscillator.

Analogue Integrated circuits: Functional block diagram of operational amplifier, ideal operational amplifier, inverting and non-inverting Amplifier. Digital ICs: Logic Gates. Electronic Instrumentation: Principle and block diagram of digital multimeter, digital storage oscilloscope, and function generator.

Radio communication: principle of AM & FM, frequency bands used for various communication systems, block diagram of super heterodyne receiver. Satellite communication: concept of geostationary Satellite system.

Mobile communication: basic principles of cellular communications, concepts of cells, frequency reuse. Optical communication: block diagram of the optical communication system, principle of light
transmission through fiber, advantages of optical communication systems. Entertainment Electronics Technology: Basic principles and block diagram of cable TV, CCTV, DTH system.

For English, out of the 10 marks to be awarded, 5 marks will be for questions based
on a given passage and remaining 5 marks for basic Grammar and General English of
+2 Standard.