B.TECH LATERAL ENTRYENTRANCE EXAMINATION

Syllabus & Sample Questions

The Examination is Objective type with 120 Questions to be attempted in 2 Hrs. There are four options for each question. Use only blue/black ball point pen to darken the bubbles in the OMR Sheet. There will be negative mark for incorrect answers. Marking of more than one bubble against a question will be considered as an incorrect answer. Erasing, overwriting, partial marking etc may also be treated as incorrect answer. No deduction of mark will be made for unanswered questions. Possession & use of calculator, logarithm table, mobile phones or any similar electronics equipments are not permitted in the examination. The subjects includes English, Mathematics, Engineering Mechanics, IT and Computer Science, Civil Engineering, Mechanical Engineering, Electrical Engineering and Electronics & Communication Engineering

ENGLISH

SYLLABUS

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.

SAMPLE QUESTIONS

Answer questions 1-5 based on the given passage.

About four hundred years ago, many people believed that they lived on stationary earth, which itself is situated at the center of the universe. The world beyond the solar system was a mystery to all. The submicroscopic domain of atoms and molecules was completely unknown. Not even a single law of nature was accurately formulated. The Copernican theory of the solar system (the theory in which the sun occupies the central position) had been published but it had so many objections against it. There was scarcely any activity that could be called as science. Mathematics was just in its infancy.

1. Four hundred years ago, the popular belief was that ……..
   A) there was a world beyond the solar system
   B) the law of nature was not accurate
   C) the earth was fixed
   D) there was no technology

2. There was scarcely any activity called Science means ……
   A) Scientific knowledge was inadequate
   B) Copernican theory was objected
   C) They lived on stationary earth
   D) Law of nature was accurate

3. The opposite of *accurate* is
A) exact B) inaccurate
C) diaccurate D) unaccurate

4. Beyond means
A) on the farther side B) domain of atoms
C) at the center D) a mystery

5. Infancy is used in the sense of
A) childhood B)adolescence
C) inactivity D)beginning to develop

Choose the appropriate words

6. One should discharge _____ duty.
A) ones B) his C) their D) our

7. _____ you drive a car
A)Can B)Should C)Would D)May

8. Identify the wrong section
All the/furnitures/where/loaded
A)All the B)furnitures C)were D)loaded

9. The teacher / said that / the earth / was round.
A)The teacher B)said that C)the earth D)was round

10. Complete the proverb : Make hay while _____
A)The sun shines B)There is no rain
B)There is time D)There is hay

MATHEMATICS

SYLLABUS

Matrices:

Inverse of Matrix-Linear dependence and independence Vectors-Consistency and inconsistency of a system of linear equations-Rank of a matrix. Eigen Values and Eigen Vectors-Properties-Caylay-Hamilton Theories Diagonalisation-Quadartic forms-Reduction to canonical forms.

Differential Calculas:

Successive Differentiation-Leibnitz Theorem-Indeterminate forms-L' Hospital's Rule-Radius of curvature-center of curvature-Evolutes partial Differentiation-Homogeneous functions Euler's Theorem-Maxima and Minima of two variables.

Infinite Series:

Notions of Convergence and divergence-Comparison test-Ratio test-Cauchy's Root test-Test for alternating series-absolute convergence.

Fourier Series:

Even functions ,Odd functions , periodic functions-Dirichelet's condition-Euler's formula . Functions with period 2π and $2l$. Half range sine and cosine series .Laplace transforms –properties-Inverse Transforms.

SAMPLE QUESTIONS

1. If A and B are two square matrices of the same order , then $(A+B)^2$ is
   A) $A^2-AB+BA+B^2$ B) $A^2+AB+BA+B^2$
   C) $A^2-AB-BA+B^2$ D) $A^2+AB-BA+B^2$

2. If $\begin{matrix} 2 & -1 & 4 \\ x & 0 & 1 \\ 1 & 2 & 0 \end{matrix}$ is a singular matrix then x is
   A) 5/4 B) -5/8 C) 8/5 D) 5/8

3. Adjoint of a matrix $\begin{matrix} 1 & 2 & 1 \\ 3 & 2 & 2 \\ 1 & 1 & 2 \end{matrix}$ is

   A) $\begin{matrix} 2 & -4 & 1 \\ -3 & 1 & 1 \\ 2 & 1 & -4 \end{matrix}$ B) $\begin{matrix} 2 & -3 & 2 \\ -4 & 1 & 1 \\ 1 & 1 & -4 \end{matrix}$

   C) $\begin{matrix} 2 & 1 \\ 1 & 0 \end{matrix}$ D) $\begin{matrix} 2 & 2 & 1 \\ 1 & 2 & 2 \\ 1 & 3 & 1 \end{matrix}$

4. Inverse of a matrix $\begin{matrix} 2 & 3 \\ 2 & 5 \end{matrix}$ is

   A) $\begin{matrix} -2 & 3 \\ 2 & -5 \end{matrix}$ B) $\begin{matrix} 5 & 2 \\ 3 & 2 \end{matrix}$

   C) $\begin{matrix} 5 & -3 \\ -2 & 2 \end{matrix}$ D) $\begin{matrix} 2 & -3 \\ -2 & 5 \end{matrix}$

5. Rank of a matrix $\begin{matrix} 1 & 0 & 1 \\ 0 & 2 & 2 \\ 2 & 3 & 4 \end{matrix}$ is

   A) 2 B) 0 C) 3 D) 1

6. The equation AX=B is consistent if rank of the coefficient matrix and augmented matrix are

   A) equal B) not equal

C) 1 D) none of these

7. The characteristic equation of a matrix $\begin{matrix} 5 & 4 \\ 1 & 2 \end{matrix}$ is

A) $\lambda^2+7\lambda+6=0$ B) $\lambda^2+6\lambda+6=0$
C) $\lambda^2-7\lambda+6=0$ D) $\lambda^2+6\lambda+7=0$

8. The second derivative of $b\sin^3\theta$ with respect to a $\cos^3\theta$ is

A) $b\cos ec\theta/3a^2\sec^4\theta$ B) $b\cos ec\theta\sec^4\theta/3a^2$
C) $b\sec^4\theta/3a^2$ D) $b\sec^4\theta/3a^2\cos ec\theta$

9. The n^{th} derivative of xsinx with respect to x is

A) xcosx
B) B) $x\sin x(x+(n\pi)/2)+\sin(x+(n-1)\pi/2)$
C) $x\sin(x+n\pi/2)+n\sin(x+(n-1)\pi/2)$
D) $x\cos n\pi/2$

10. lim x2-3x/x2-9 is
x->3

A) 3 B) 6 C) 1/3 D) ½

11. Radius curvature of the parabola $y^2 = 4ax$ at $(at^2,2at)$ is
A) $2a(1+t^2)^{3/2}$ B) $a(1+t)^{3/2}$
C) $2(1+t^2)^{3/2}/t$ D) $2a(1+t^2)^{3/2}/t^2$

12. The maximum value of the function $2+2x+2y-x^2-y^2$ is
A) 2 B) 1 C) 3 D) 4

13. The partial derivative of $ax^2+2hxy+by^2$ is

A) 2ax+2by B) 2ax+2hy
C) ax^2+2hx D) 2hx+2by

14. If f(x,y) is a homogeneous function of degree n,possessing continuous partial derivative of first order then
A) $x\ df/dx + y\ df/dy = nf$ B) $x\ d^2\ f/d^2x+d^2f/d^2y = n^2f^2$
C) $x\ df/dx + y\ df/dx = f$ D) $d^2f/dx^2 + d^2f/dy^2 = nf$

15. The series 1-1+1-1+---------- is

A) convergent B) divergent
C) oscillatory D) none of these

16. The series $\epsilon\ 1/n^p$ is convergent if p is
A) greater than 1 B)equal to 1
C)less than 1 D) equal to zero

17. An absolutely converging series is

A) divergent B) conditionally convergent
C) convergent D) oscillatory

18. $Cosx/x^2-x$ is

A)Periodic function B) even function
C) odd function D) none of these

19. $1+1/2^2+1/3^2+1/4^2$ + ---------- is

A) $\pi^2/6$ B)$2\pi^2/3$ C)$\pi/6$ D) $\pi/8$

20. Tke laplace transform of e^{at} is

A)$1/(s+a)$ B) $s/(s^2+a^2)$ C) $1/(s-a)$ D) $a/(s^2+a^2)$

ENGINEERING MECHANICS

SYLLABUS

Units-Dimensions-Vector & scalar quantities-laws of mechanics –Elements of vector algebra-Principals of statics –freebody diagram –composition & resolution of & equilibrant –concurrent forces –tringular forces –Lami's theorems – center of gravity – Moment of inertia – Coplannar forces –Friction.

Plane trusses – Different types of support – Reaction at supports – Methods of sections – funicular polygen – Maxwells diagram – couples in space – Equilibrium of general system of force in space.

Kinematics of a particle – simple relative motion –definition of particle –velocity and acceleration – transaction and rotation – rectangular and cylindrical coordinates – particle dynamics –central force motion.

Principles of dynamics – motion of a particle acted by a constant force as a function of time- Force proportional to displacement –free vibrations –D' Alemberts principle – Momentum and impulse – work and energy –Ideal system –Conservation of energy – impact – curvilinear motion – Projectiles –Rotation –Torsional vibration –Simple and compound pendulam –Collision of bodies.

SAMPLE QUESTIONS

1. The force acting on a point on the surface of a rigid body may be considered to act
   A) at the gravity of a body
   B) on the periphery of the body

C) on any point on the action of the force
D) at any point on the surface normal to the line of action of the force

2. If the resultant of two forces P and Q acting at an angle θ makes an angleα with p ,then tan α equals

A) (Psinθ) / (P-Q cosθ) B)(Qsinθ) / (P+Q cosθ)
C)(Psinθ) / (P+Qtanθ) D)(Qsinθ) / (Q+Psinθ)

3. A point subjected to a number of forces will be in equilibrium , if
   A) sum of resolved parts in any two directions at high angels ,are both zero
   B) algebraic sum of the force is zero
   C) two resolved part in any two directions at right angles are zero
   D)algebraic sum of moments of the forces about the point is zero

4. The forces which meet at one point and have their lines of action in different planes are called
   A) coplanar non-concurrent fotce
   B) B) non coplanar concurrent force
   C) non coplanar non-concurrent force
   D) intersecting forces

5. The center of gravity of a quadrant of a circle lies along its central radius is a distance of
   A) 0.2R B) 0.3R C)0.4R D)0.6R

6. The C.G. of a right circular cone ties on its axis of symmetry ata a height of
   A) h/2 B) h/3 C) h/4 D)h/6

7. The unite of inertia of mass , are
   A) kg/m B) kg/m^2 C) m^4 D) m^3

8. Moment of inertia of a squre of side b about an axis through its center of gravity , is

A)$b^3/4$ B) $b^4/12$ C) $b^4/3$ D) $b^4/8$

9. The moment of inertia of a thin spherical shell , is
   A) $Mr^2/2$ B) Mr^2 C) $2/3Mr^2$ D) $2/5Mr^2$

10. The angle of function is :
    A) The ratio of the function and the normal reaction
    B) The force of friction when the body is motion
    C) The angle between the normal reaction and the resultant of narmal reaction and limiting friction
    D) The force of friction at which the body is just about to move

11. The following is not a law of static friction :
    A) The force pf friction always acts in a direction opposite to that in which the body tends to move
    B) The force is friction is dependent upon the area of contact

C) The force of friction depends upon the roughness of the surface
D)The magnitude of the limiting friction bears a constant ratio to the normal reaction between two surfaces

12. Which one of the following statement is true
    A) The tangent of the angle of friction is equal to the coefficient of friction
    B) Thee angle of repose is equal to the angle of friction
    C) The tangent of the angle of repose is equal to the coefficient of friction
    D) All the above

13. Equation of motion of point in a straight line is
    A) $v=u + ft$ B) $S=ut+1/2ft^2$
    C)$2fs=v^2-u^2$ D)all the above

14. A particle move along a straight line such that distance x traversed in t seconds is given by $x= t\ 2(t+1)$, the acceleration of a particle , will be
    A) $3t^3-2t$ B) $3t^3+2t$ C)6t-2 D)6t+2

15. Time of flight of a projectile on a horizontal plane , is
    A) $2u \sin \alpha /g$ B)$2u \cos \alpha /g$
    C) $2u \tan \alpha /g$ D) $2u \cot \alpha /g$

COMPUTER SCIENCE AND INFORMATION TECHNOLOGLY

SYLLABUS

1. computer organization:- Central processing unit , input device , output device , secondary storage device , machine language , assembly language and high level language
2. System software:- Assembler , loader ,linker , operating system , editors , ,compilers , debuggers.
3. 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.
4. Data base systems:- Relational Data Base Management System ,SQL.
5. Multimedia:- Multimedia hardware, sound cards, CD ROMs, full motion digital video.
6. Computer networks:- ISO/OSI protocols ,TCP/IP, Inter connecting network devices , Ethernet cards, cables, Connectors, hubs, switches, routers
7. Internet:- Introduction to FTP,TELNET, Email , web browsers and web servers.

SAMPLE QUESTIONS

1. The larger of the Ram of a computer , the faster is its speed , since it eliminates
   A)need for ROM B)need for external memory
   C) frequent disk I/O s D)need for a data –wide part

2. Which of the following is an example of a spooled device?
   A) a line printer used to print the o/p of a number of jobs
   B) A terminal used to enter input data to a running program
   C) A secondary storage device in a virtual memory system
   D) A graphical display device

3. UNIX operating system
   A) is multi-user B)is multi tasking
   C) can run on PCs and larger systems D)all the above

4. The errors pointed out by a compiler are
   A) Syntax errors B) Semantic errors
   C) Logical errors D) internal errors

5. Which of the following is not a multi user operating system
   A) MS-DOS B) Linux
   C) Windows 2000 D) Unix

6. How many times the following loop executed?

```
      X=500;
  While(x<=500)
{
 x=x-600;
if(x<0)break;
}
```

   A) 0 B) 1 C) 500 D) 100

7. The function sprintf() works like printf () but operates on

   A) data in a file B) stderr C)stdin D)string

8. An indexing operation
   A) sorts a file using a single key B) sorts a file using two keys
   C)establishes an index for a file D)both B and C above

9. Which of the following is a database administrator's function?

A) backing up the database B)performance monitoring
C) user coordination D) all the above

10. One of the following are not true for a sound card?
A) MIDI compatible B) Microphone input
C) Built in amplifier C) Built in Power Supply

11. What is the latest accomplishment of MPEG 2?
A) Improves the prediction of motion
B) Use multiple channels in a single stream of data
C) Has built in data recovery
D) MPEG 2 uses field oriented syntax

12. A hub in a network is?
A) A multiport signal repeater or concentrator
B) Multiplug like device to allow many computers to be connected
C) The server which serves every node
D) The central power supply

13. Which of the following performs modulation & demodulation?
A) Fiber optic B) Satellite C) Coaxial cable D) Modem

14. What is the established standard for transferring mail over internet?
A) SMTP B) TCP C) IP D) HTTP

15) One of the following cannot be configured in a web server?
A) server port B) log file name
C) server root D) IP address of proxy server

BASIC CIVIL ENGINEERING

SYLLABUS

Materials- cement-steel- aggregates- mortar preparation- concrete- grades of concrete-water-cement ratio-Workability-batching-Mixing-Compaction-Curing-Strengths in concrete-Timber-Defects of timber-Seasoning-Bricks-Varieties.

Selection of site of a building –Setting out- Excavation –Types of foundation-Bearing capacity masonry-Materials- Types –Stone Masonry-Brick masonry-Bond in Brick-Special bricks-Arches Cavity walls-Hollow block-Plastering-Painting.

Doors-Windows-Flooring-Preparation of bed- Laying floor finish-Various floor finish materials-Roofs –Different types- Roof covering materials- Precast and prestressed construction.

Methods of surveying- Chain –Compass-Plane table –Theodolite- Areal – Hydrographic – Measurement of distance –elementary idea of total station –Errors in chaining –Tape correction- Setting out right angles –Leveing- Types of levels- Reduction of level- Computation of area and volume –Trapezodial and simpson's rule.

SAMPLE QUESTIONS

1. The standard size of a masonry brick, is
   A) 18 cm x 8cm x 8cm B) 19cm x 9cm x 9cm
   B) 20cm x 10cm x 10cm D) 21cm x 11cm x 11cm

2. The portion of the brick without a triangular corner equal to half of the width and
   half the length, is called
   A) closer B) queen closer
   C) king closer D) squint brick

3. Good quality cement contains higher percentage of
   A) Tri calcium silicate B) Di calcium silicate
   C) Tricalcium aluminate D) Tetra calcium alumino ferrite

4. Veneering means
   A) carving out designs on timber planks
   B) chemically treating timber planks
   C) thick layer of superior wood glued to inferior wood
   D) thin layer of superior wood glued to inferior wood

5. Pick up the incorrect statement from the following
   A) The function of foundation is to distribute the load of super structureover a large bearing area
   B) No timbering is required for shallow trenches
   C) Shallow foundations can be constructed on made-up soil
   D) Black cotton soil is very good for foundation bed

6. Dampness causes
   A) efflorescence B) bleaching of paints
   C) crumbling of plaster D) growth of termites

7. The brick laid with its breadth parallel to the face of a wall, is kniwn as
   A) header B) stretcher
   C) closer D) none of these

8. The type of bond in a brick masonry containing alternate courses of stretchers and
   Headers, is called
   A) Flemish bond B) English bond
   C) Stretcher bond D) Header bond

9. The curvature of earth;s surface , is taken into account only if the extend of is more than
   A) 100sq km B) 160 sq km C) 200sq km D) 260 sq km

10. The main principle of surveying is to work
   A) from part to the whole
   B) from whole to the part
   C) from higher level to lower level
   D) from lower level to higher level

11. Correct distance obtained by an erroneous chain is:
   A) (Erroneous chain length x Observed distance) / Correct chain length
   B) (Correct chain length x Observed chain length) / Erroneous chain length
   C) (Correct chain length x Erroneous chain length) / Observed distance
   D) None of these

12. In chain surveying a tie line is primarily provided
   E) to check the accuracy of the survey
   F) to take offsets for detail survey
   G) to avoid long offsets from chain line
   H) to increase the number of chain lines

13. Determine the difference in elevation between two points on the surface of the earth, is known as
   A) Leveling B) simple leveling
   C) differential leveling D) longitudinal leveling

14. An imaginary line joining the points of equal elevation on the surface of the earth, represents
   A) contour surface B) contour gradient
   C)Contour line D) level line

15. The contour interval is kept inversely proportional to
   A) time and expense of field work
   B) steepness of the configuration of the area
   C) scale of the map
   D) all the above

MECHANICAL ENGINEERING

SYLLABUS

Thermodynamics:
Definitions and basic concepts- system, properties, state, process, cycle – heat and work –Thermodynamic equilibrium. Zeroth law of thermodynamics – concept oftemperature – temperature scales. First law of thermodynamics – concepts of internal energy and enthalpy. Second law of thermodynamics- Clausius and Kelvin – Plank statements- concept reversibility,availability and entropy. Thermodynamic processes- constant volume, constant pressure, isothermal, adiabatic, polytropic processes, throttling and free expansion, p-v and T-s diagrams- work done, heat exchanged,change in entropy, and change in internal energy during the above processes. Air cycles- Carnot, Otto and Diesel cycles- air standard efficiency.

Working and comparison of two stroke and four stroke petrol and diesel engines- various systems- air systems, fuel system, ignition system, governing system.

Steam Boilers and turbines:
Properties of steam- dryness fraction, enthalpy, entropy. Classification of boilers, Boiler mountings and accessories. Types of steam turbines- impulse and reaction type – parts of turbines, compounding of turbines.

Pumps:
Types – Centrifugal, reciprocating, gear and jet – applications- criteria for choice of pumps.

Refrigerations and Airconditioning:
Simple vapour compression and vapour absorption refrigeration syatems – Refrigerants. Psychrometry- definitions of terms, Air conditioning – parts of an A/C unit

Mechanical power transmission systems:
Belt drive-parts. Different types- rope drive, chain drive-types, gear drives – types – spur, helical, herring bone, bevel, spiral, skew, hypoid, worm and wheel, rack and pinion. Velocity ratio, comparison and fields of application. Gear trains- simple, compound and epicyclic.

Manufacturing processes:
Primary, secondary and tertiary production processes- moulding, sand casting, die casting, forging, punching, blanking, stanping, coining, rolling, extrusion, wire drawing, turning, boring, thread cutting, tapping, shaping, drilling, milling, reaming, grinding, broaching, honing, lapping, welding, soldering and brazing.

SAMPLE QUESTIONS

1. The law which forms the basis of temperature measurement
   A) First law of thermodynamics B) Zeroth law of thermodynamics
   C) Second law of thermodynamics D) Boyle's law

2. The maximum possible thermal efficiency of a heat engine working between 27^0C
   and 627^0 C is
   A) 100% B) 95.69% C) 66.67% D) 45%

3. For an irreversible process,
   A) Change in entropy < $\delta Q/T$ B) Change in entropy > $\delta Q/T$
   C) Change in entropy = $\delta Q/T$ D) Change in entropy = 0

4. Work done during isothermal process is given by
   A) $W = P_1V_1 \log (V_2/V_1)$ B) $W = P_1V_1 \log_e (V_2/V_1)$
   C) W=0 D) $W = (P_1V_1 - P_2V_2)/(\gamma - 1)$

5. A Diesel Cycle consists of the following processes
   A) Two constant volume and two adiabatic processes
   B) Two constant pressure and two adiabatic processes
   C) Two adiabatic, a constant volume and a constant pressure processes
   D) Two adiabatic and two isothermal processes

6.In a petrol engine, the unit which mixes fuel with air is called
   A) cylinder B) carburetor C) radiator D) crank shaft

7. During a throttling processes the ----------remains constant
   A) pressure B) temperature
   C) internal energy D) enthalpy

8. 1025 kg of wet steam contains 0.25 kg of water in suspension. Dryness fraction of the steam is
   A) 1.25 B) 0.80 C) 0.75 D) 0.25

9. The heat required to convert water at boiling point to dry steam at same temperature is
   A) specific heat B)latent heat of vapourisation
   C)sensible heat D) latent heat of fusion

10. One ton refrigeration refers to
    A) Total weight of the unit
    B) Heat removal rate equivalent to latent heat of fusion of 1 ton of ice at 0^0 C in 24 hours
    C) Heat removal rate equivalent to latent heat of fusion of 1 ton of ice at 0^0 C in 1 hour
    D) Heat removal rate equivalent to latent heat of fusion of 1 ton of ice at 0^0 C in 1 second

11. The top part of a two part moulding box is called
    A) cope B) drag C) runner D) gate

12. The forging process used for increasing the diameter of a bar by reducing its Length is termed as
    A) blanking B) bending
    C) upsetting D) roll forging

13. The maximum suction head in a centrifugal pump is
    A) unlimlted
    B) between 20 m and 100 m of water
    C) between 5 m and 10 m of water
    D) betweem 1 m and 5 m of water

14. When the axes of rotation of shafts intersect each other, the type of gears used are
    A) Bevel B) Spur
    C) Helical D) Worm and Wheel

15. The cross section of V – belt is
    A) triangular B) rectangular
    C) Trapezoidal D) circular

BASIC ELECTRICAL ENGINEERING

SYLLABUS

SI unit of current, voltage, power and energy – Ohm's law- temperature coefficient of resistance- Kirchoff's law- solution of series, parallel circuits- Star Delta transformation-magnetic circuits-flux-flux density- mmf-magnetizing force Reluctance- permeability- comparison of Electric and Magnetic circuits – Magnetic leakage-B.H. characteristics- solutions of series and parallel magnetic circuits- force experienced by a current carrying conductor in a magnetic field- Electromagnetic induction- Faraday;s laws- Lenz's Law- statically induced emf- Dynamically induced emf self and mutual induction- coefficient of coupling

Alternating current fundamentals- Generation of alternating currents- wave forms- frequency- period- average value and form factor . Phasor representation of alternating quantities rectangular and polar form- Analysis of simple ac circuits with resistance inductance and capacitance- concept of impedance and admittance- power and power factor in ac circuits- active and reactive components- solution of RL, RC, and RLC circuits- series, parallel and series parallel circuits- Resonance-Q factor- selectivity and bandwidth.

Electrical Drives- Principles of operation of ac and dc motors –mechanical characteristics and application of dc series, shunt and compound motors-single phase and three phase induction motors – synchronous motors-Transformer-Principle of operation-emf equation- Ideal transformer- constructional detals- losser and efficiency- Use of power, distribution and instrument transformers.

Different methods of wiring for LT installations. Schematic layout of LT switch boards- Earthing of installation – necessity of earthing- plate and pipe earthing – Protective fuses, MCBs, ELCB- Tariffs- Types of LT and HT consumers.

Characteristics of different types of lamps- vapour lamps- incandescent lamps- energy efficient lamps- control accessories of vapour lamps.
Storage batteries- Lead acid and Nickel Cadmium batteries – construction- characteristics- charging and discharging- spesification – maintenance.

Methods of bulk generation of electric power , Block schematic layout of generating station – hydro electric, thermal, nuclear, stations- Non conventional energy sources- solar, tidal, wind- Economics of generation-load factor- diversity factor –diversity factor – plant factor.

Bulk transmission of electric power –typical power transmission scheme-need for high transmission voltage- substation- substation equipment, primary and secondary transmission and distribution systems- effect of power factor ,transmission voltages in Kerala.

SAMPLE QUESTIONS

1. Highest Transmission Voltage in Kerala is
   A) 66Kv B) 400Kv C) 220Kv D) 1000Kv

2. The light source with light quality nearest to natural sunlight
   A) Mercury vapour lamp B) Sodium vapour lamp
   C) Fluorescent lamp D) Incandescent lamp

3. The electric motor which provides the highest starting torque
   A) DC series motor B) DC shunt motor
   C) 3Q induction motor D) Single phase induction motor

4. The resistance R of a conductor is inversely proportional to

A) Resistivity B) Length
C) Temperature C) Area of section

5. The equivalent resistance of resistors in parallel is always

A) Higher than the highest of component resistors
B) Less than the lowest of component resistors
C) In between the lowest and the highest of component resistors
D) Equal to the sum of the component resistors

6.A resistor R1 dissipates power P when connected to a certain generator with voltage V. If a resistance R2 is put in series with R1 the power dissipation by R1

A) Decreases
B) Increases
C) Remains the same
D) Any of the above depending upon the value of R1 and R2

7. Two free parallel wires carrying currents in the opposite directions

A) Attract each other
B) Repel each other
C) Do not affect each other
D) Get rotated to be perpendicular to each other

8. An induced emf is produced when a magnet is plunged into a coil. The strength of the induced emf is independent of

A) The strength of the magnet
B) Number of turns of coil
C) The resistivity of the wire of the coil
D) The speed with which the magnet is moved

9. In a step up transformer the number of turns in

A) Primary are less
B) Primary are more
C) Primary and secondary are equal
D) Primary are infinite

10. The core of a Transformer is laminated to reduce energy loss due to

A) Eddy current
B) Hysteresis
C) Resistance in cording
D) None of these

11. The frequency of AC mains in India is

A) 30Hz
B) 50Hz
C) 60Hz
D) 100Hz

12. In a circuit containing capacitance only
    A. Current lags behind emf through $\pi/2$
    B. Current leads behind by $\pi/2$
    C. Both are in phase
    D. Current leads emf by π

13. The power factor is unity for
    A. pure inductor B. pure capacitor
    C. pure resistor D. either an inductor or an capacitor

14.In a balanced 3 phase circuit the current in the neutral conductor is
    A. equal to phase current B. equal to line current
    C.$\sqrt{2}$ times line current D. zero

15.ELCB gives protection against
    A.over voltage B.over current
    C.leakage current to ground D.under voltage

ELECTRONICS AND COMMUNICATION

SYLLABUS

1.Passive components: Resistors – types, color coding, power rating ,Capacitors – types , color coding, Voltage rating, Inductor and Transformers: types

2.Semiconductors: Crystalline structure – Intrinsic And Extrinsic semiconductors , PN junctions , Electrical characteristics.

3.Diodes: Biasing , Rectifier Circuits.

4.Transistors: NPN and PNP transistors , current flow in a transistor – transistor configuration , FET, Zener diods, SCR . photodiods , phototransistors, LED.

5.Amplifiers: The CE, CB and CC amplifiers, Frequency response, and power amplifier – single ended power amplifier , push pull amplifier.

6.Oscillactor: Feedback principles, RC and LC Oscillators

7.Digital circuits: Logical states, Number codes, Gates and truth tables. TTl and CMOS logic identifiers, Function minimization, Muliplexer, Demultiplexer, Decoders ,Flip-Flops, RS, Jk, Master slave JK,D and T, Counters, Shift registers, AdCS.

8.Electronic communication: Modulation- AM, FM, Demodulation, Radio- receviers, Transmitters , Television Radar.

9.Elctrinic Instrumentation: Measurement of current ,voltage and power, cathode ray oscilloscope, Transducers – strain gauges, Thermocouples, thermistors, RTDS, LVDTs.

SAMPLE QUESTIONS

1. In a capacitor color code sequence, one among the following is correct.
   A. First band gives the temperature compensation
   B. Second band gives the second digit
   C. Third band gives the number of zeros that follow the digit
   D. Fourth band gives the tolerance

2. The addition of trivalent impurity to the semiconductor creates
   A. holes B. free electrons
   C. zener breakdown D. covalent bonds

3. In a PN junction, the width of the depletion layer is
   A. Directly proportional to the square root of the voltage across the layer
   B. Inversely proportional to the square root of the voltage across the layer
   C. Proportional to the voltage across the layer
   D. Inversely proportional to the voltage across the layer

4. What is the true for a center tapped full wave rectifier
   A. It is difficult to locate the center tap on the secondary winding
   B. The DC output is small as each diode utilizing only one half of the transformed secondary voltage
   C. The diode used must have high PIV
   D. It requires 4 diodes

5. What is not correct for common collector configuration
   A. Very high input resistance
   B. Low output resistance
   C. Voltage gain less than unity
   D. Used for audio frequency application

6. In a transistor with voltage divider bias, stabilization is provided by
   A. R_C B. R_E C. R1 D. R2

7. What is true for LC oscillators?
   A. LC oscillators cannot be used for very high frequencies.
   B. Frequency stability of LC oscillators is poorer than RC oscillators.
   C. Works based on principle of negative feedback.
   D. Supports miniaturization.

8. A simple flipflop
   A. is a 2 bit memory.
   B. Is a 1 bit memory.
   C. Is a 4 state device.
   D. Has nothing to do with memory.

9. Which of the following IC has only one input line?
   A. Multiplexer.
   B. Demultiplexer
   C. AND gate
   D. BCD to decimal decoder.

10. Superheterodyne principle provides selectivity at the following stage
   A. RF B. IF C. AF D. VHF

11. What is true for frequency modulation
   A. noisy reception.
   B. Low efficiency.
   C. Large operating range.
   D. Lack of audio quality.

12. In a CRO, a sinusoidal voltage is applied to vertical deflection plates only, what shall we get in the screen?
   A. a horizontal line.
   B. A vertical line.
   C. A sinusoidal pattern.
   D. A spot.

13. The signals sent by the TV transmitter to ensure the current scanning in the receiver are called
   A. syno B. chroma C. luminance D. video

14. The video voltage applied to the picture tube of a television receiver is fed in
   A. between grid and ground.
   B. to the yoke .
   C. to the anode.
   D. Between grid and cathode.

15. If the peak transmitted power in a radar system is increased by a factor of 16,the maximum range will be increased by a factor of
   A. 2 B. 4 C. 8 D. 16