B.TECH. DEGREE EXAMINATION, JUNE 2014

I B.Tech.

ENGLISH

(Common to All Branches)

Time : 3 hours   Max. Marks: 60

Answer ONE Question from each section
All Questions carry equal marks
* * *

SECTION - I

1. (a) What techniques did the astrologer use to surprise his customers?   6 Marks

   (b) Is the Prince really happy? What made the Swallow stay back with the Happy   6 Marks
   Prince even after his friends left for Egypt?

(Or)

2. (a) How does soil erosion happen and what are its main causes and measures to   6 Marks
   check soil erosion?

   (b) What lesson did young Washington learn during his stagecoach travels?   6 Marks

SECTION - II

3. (a) Write a letter to the sales manager of Science Tech Publications in Hyderabad   5 Marks
   asking for their catalogue and enquiring about the possibility of being their
   distributor.

   (b) Write a short dialogue for the following situation :   7 Marks
   Gita finds her brother Manoj, slipping in his studies. She advises him on how he
   could pull himself up again.

(Or)

4. (a) Write a letter to your friend about an exciting holiday.   5 Marks

   (b) Imagine that you are promoting a product in the market. Prepare a presentation   7 Marks
   to present in your class.

SECTION - III

5. (a) Write a technical report on the sound-pollution in your city. Make appropriate   8 Marks
   conclusions and recommendations.

   (b) Fill in the blanks with suitable articles / Prepositions.   4 Marks
   1. This is _____ historic occasion.
   2. There was _____ ugly scar on _____ face of _____ prisoner.
   3. The bag is _____ the top rack _____ the cupboard.
   4. Sheela spent a day _____ her aunt _____ Delhi.

(Or)

6. (a) Write a short technical report on a term project.   8 Marks

   (b) Fill in the blanks with suitable articles / Prepositions: 4 Marks
   1. He left _____ Chennai _____ train.
   2. We are sorry _____ having disturbed you.
   3. I have been waiting here _____ 6 o' clock for you.
   4. They live very close to _____ river Godavari.
   5. _____ Amazon is _____ longest river in _____ world.

SECTION - IV

7. Correct the errors and rewrite any twelve of the following sentences: 12 Marks

1. He has returned from London last week.
2. She has sold all her furnitures.
3. He gave me three thousands rupees.
4. It has been raining since three hours.
5. Though he worked hard, but he failed.
6. The servant finished his work when I called him.
7. This girl is senior than me.
8. He is Kalidasa of India.
9. I am a student here, isn't it?
10. Where is the scissor?
11. The bowl of nuts are on the table.
12. Neither Sita or her mother can speak Tamil.
13. My cousin sister is a pilot.
14. The sun is rising in the East.
15. He is my oldest son.
16. The drama was such goo that the audience could not stop clapping.

SECTION – V

8. a) Read the following passage and answer the questions that follow: 7 Marks

Most bankers live in marble halls because they encourage deposits and discourage withdrawals. The golden rule of all banks is 'Encourage deposits and discourage withdrawals'. It is not easy to get loans from the bank. Banks never lend money for basic needs like paying the rent or for treatment of a child. Thus banks provide a false sense of security. If anyone asks for a loan, they look at him like Tarzan looking at an uppity ape in the jungle. They even advise them to borrow it from relatives.

1. What do the bankers discourage?
2. What is the golden rule of all banks?
3. Which is not easy to get from the banks?
4. Do the banks lend money to pay your house rent?
5. How do the bankers look at the customer who asks for a loan?
6. Do you borrow money from banks or from relatives, when there is a need?
7. Who is Tarzan?

b) Rewrite the following as directed: 5 Marks
1. The boy _____ (toss) feverishly on his bed. (Use the correct form of tense)
2. Can I have a _____ (piece/peace) of cake, please? (choose the correct option)
3. If you do not work, you will not be paid. (rewrite using *unless*)
4. I _____ your clothes just now. (iron)
5. The hotel was being renovated. (Begin the sentence with *they*)

B.TECH. DEGREE EXAMINATION, JUNE 2014

I B.Tech.

ENGINEERING MATHEMATICS - I
(Common to All Branches)

Time : 3 hours   Max. Marks :60

Answer FIVE Questions, Choosing ONE Question from each section
All Questions carry equal marks
* * *

SECTION – I

1. a) Determine the rank of the matrix A=$\begin{bmatrix} 1 & 2 & 3 & 0 \\ 2 & 4 & 3 & 2 \\ 3 & 2 & 1 & 3 \\ 6 & 8 & 7 & 5 \end{bmatrix}$, by echelon form.

   b) Investigate the values of λ *and* μ so that the equations $2x+3y+5z=9, 7x+3y-2z=8$, $2x+3y+\lambda z=\mu$ have (i) no solution (ii) unique solution and (iii)an infinite number of solutions.

2. a) Find the eigen values and eigen vectors of the matrix   A = $\begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$

   b) Reduce the quadratic form $3x^2 + 5y^2 + 3z^2 - 2yz + 2zx - 2xy$ to the canonical form.

SECTION – II

3. a) Show that $\dfrac{x}{1+x^2} < \tan^{-1} x < x$, x>0, by lagrange's theorem.

   b) Verify Cauchy's mean value theorem for the functions $f(x)=\ln x$, $g(x) = \dfrac{1}{x}$ on $[1,e]$

4. a) Find the maximum and minimum values of $f(x,y) = xy + \dfrac{a^3}{x} + \dfrac{a^3}{y}$

   b) Find the minimum value of $x^2 + y^2 + z^2$, given that $ax+by+cz = p$

SECTION – III

5. a) Find the radius of curvature at (0,0) for $x^4 - y^4 + x^3 - y^3 + x^2 - y^2 + y = 0$

   b) Find the evolute of the curve $x = a(t - \sin t)$, $y = a(1 - \cos t)$

6. a) (i) Evaluate $\int_0^{\frac{\pi}{2}} \sqrt{\tan \theta}\, d\theta$

   (ii) Evaluate $\int_0^{\infty} \frac{x^c}{c^x}\, dx \quad (c>1)$

   b) Trace the curve $x^3 + y^3 = 3axy$

SECTION – IV

7. a) Evaluate $\int_0^1 \int_0^{\sqrt{1+x^2}} \frac{dy\, dx}{1 + x^2 + y^2}$

   b) Evaluate the integral by changing to polar co-ordinate $\int_0^{\infty} \int_0^{\infty} e^{-(x^2 + y^2)}\, dx\, dy$

8. a) Evaluate $\int_0^a \int_0^x \int_0^{x+y} e^{x+y+z}\, dz\, dy\, dx$

   b) Find the volume of the ellipsoid $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$

SECTION – V

9. a) Find div F and curl F, where F = grad $(x^3 + y^3 + z^3 - 3xyz)$

   b) Show that $\nabla r^n = nr^{n-2} R$, where $r = |R|$, R = xi+yj+zk

10. Verify Green's theorem for $\int_C [(xy + y^2)\, dx + x^2\, dy]$, where C is bounded by $y = x$ and $y = x^2$

B.TECH. DEGREE EXAMINATION, JUNE 2014

I B.Tech.

ENGINEERING MATHEMATICS - II
(Common to All Branches)

Time : 3 hours   Max. Marks :60

Answer FIVE Questions, Choosing ONE Question from each section
All Questions carry equal marks
* * *

SECTION - I

1   a) Solve $(D^2 + 4D + 20)y = 23sint - 15cost$.
     b) Solve $(D^2 + 9)y = tan3x$, by using the method of variation of parameters.

2   a) Solve $(D^3 + 2D^2 - D - 2)y = 1 - 4x^3$.

     b) Solve $x^2 \frac{d^2y}{dx^2} - 3x \frac{dy}{dx} - 5y = \sin(\log x)$

SECTION - II

3   a) Find $L\left\{ \int_0^t t^2 e^{-3t} \sin 2t \ dt \right\}$.

     b) Find $L\{t^2 e^{3t} \cos 3t\}$.

4   a) Find $L\{e^{-2t} u(t - 3)\}$.
     b) Evaluate $\int_0^\infty e^{-4t} \frac{(2 \, sint - 3 \, sinht)}{t} \, dt$, using Laplace transform.

SECTION - III

5   a) Find $L^{-1}\left\{ \log\left(1 + \frac{1}{s^2}\right) \right\}$ by using derivatives theorem.
     b) Solve $(D^2 + 4D + 20)y = e^{-2t} cost$,given that $y(0) = 1, y'(0) = 0$.

6   a) Find $L^{-1}\left\{ \frac{s}{(s^2+9)^2} \right\}$ by using Convolution Theorem.
     b) Solve $y''(t) + 9y(t) = 6cos2t$ with $y(0) = 3, y'(0) = 1$.

7   a) Find Fourier series expansion of $f(x) = x^2$ from $x = (-\pi, \pi)$.

b)   Obtain Fourier series for the function f(x) given by

$$f(x) = \begin{cases} 1 + \dfrac{2x}{\pi}; & -\pi \leq x \leq 0 \\[3mm] 1 - \dfrac{2x}{\pi}; & 0 \leq x \leq \pi \end{cases}$$

and hence deduce that $\dfrac{1}{1^2} + \dfrac{1}{3^2} + \dfrac{1}{5^2} + \ldots = \dfrac{\pi^2}{8}$

8   a) Expand $f(x) = \cos ax$ in a Fourier series in $(0, 2\pi)$.

b) If f(x) = 0   ; $-\pi \leq x \leq 0$

$= \sin x$; $0 \leq x \leq \pi$

Obtain the Fourier series and deduce that

(i) $\dfrac{1}{1.3} + \dfrac{1}{3.5} + \dfrac{1}{5.7} + \ldots = \dfrac{1}{2}$ and

(ii) $\dfrac{1}{1.3} + \dfrac{1}{3.5} + \dfrac{1}{5.7} + \ldots = \dfrac{\pi}{4} - \dfrac{1}{2}$

SECTION - V

9   a) Find the Fourier transform of $f(x) = \begin{cases} a^2 - x^2, & if \ |x| < a \\ 0, & if \ |x| > a \end{cases}$

Hence evaluate $\displaystyle\int_0^\infty \dfrac{x\cos x - \sin x}{x^3} \cos\dfrac{x}{2}\, dx$

b) Show that the Fourier transform of $e^{-x^2/2}$ is $\sqrt{2\pi}.e^{-s^2/2}$ by finding the Fourier transform of $e^{-a^2x^2} \ (a > 0)$.

10   a) Find the Fourier sine and cosine transform of $e^{-ax} \ (a > 0)$ and deduce the integrals (i) $\displaystyle\int_0^\infty \dfrac{s\sin sx}{s^2 + a^2}\, ds$ (ii) $\displaystyle\int_0^\infty \dfrac{\cos sx}{s^2 + a^2}\, ds$

b) Find the Fourier sine transform of $e^{-|x|}$ and hence evaluate $\displaystyle\int_0^\infty \dfrac{x\sin x}{1 + x^2}\, dx$

B.TECH. DEGREE EXAMINATION, JUNE 2014
I B.Tech.
ENGINEERING PHYSICS
(Common to All Branches)

Time : 3Hrs   Max. Marks : 60

Answer FIVE Questions. Choosing ONE Question from each section
All Questions carry equal marks
* * *

SECTION - I

1. (a) What are Matter waves? Explain their properties.
   (b) Derive Schrodinger's time independent wave equation of an electron.

2. (a) Explain Fermi-Dirac distribution function along with its temperature dependence.
   (b) Classify the solids into conductors, semiconductors and insulators based on energy band structure.

SECTION – II

3. (a) Describe Hall Effect in a Semiconductor along with its applications
   (b) Describe Direct and Indirect bandgap Semiconductors.

4. (a) Explain the terms Magnetic field strength, Magnetic susceptibility, Magnetic permeability.
   (b) Describe the classification of magnetic materials.

SECTION – III

5. (a) Explain the terms.
   (i) Basis   (ii) Space lattice   (iii) Lattice parameters
   (b) Describe seven crystal systems with diagrams and examples.

6. (a) Explain various point defects in a crystal.
   (b) Explain the significance of Burger's vector.

SECTION - IV

7 (a) Describe the principle, construction and working of a semiconductor laser.
   (b) Calculate the wavelength of emitted radiation from Ga-As which has a bandgap of 1.46 eV.

8 (a) Describe the production of ultrasonic waves by piezo electric method.
   (b) What are the main uses of ultrasonic waves

SECTION – V

9 (a) Explain the principle of an optical fiber.
   (b) Define Acceptance angle and numerical aperture. Obtain an expression for numerical aperture of an optical fiber.

10 (a) Explain Type –I and Type –II super conductors.
   (b) Explain the BCS Theory of Superconductivity.

B.TECH. DEGREE EXAMINATION, JUNE 2014

I B.Tech.

ENGINEERING CHEMISTRY

(Common to All Branches)

Time : 3Hrs   Max. Marks : 60

Answer FIVE Questions, Choosing ONE Question from each section
All Questions carry equal marks
* * *

SECTION - I

1. (a) Explain the functioning of Hydrogen gas electrode.
   (b) Give the classification of fuel cells? Explain Hydrogen- oxygen fuel cell.

(Or)

2. (a) Discuss the factors affecting the corrosion.
   (b) Write a note on metallic coatings.

SECTION – II

3. (a) Explain the applications of electrical insulating materials.
   (b) Discuss the theories of lubrication.

(Or)

4. (a) What are the refractories? Explain the applications of refractories.
   (b) Explain the applications of lubrication.

SECTION – III

5. (a) Give the classification of fuels.
   (b) Write a note on metallurgical coke.

(Or)

6. (a) Explain the refining of petroleum.
   (b) Discuss the functioning of Bomb Calorimeter.

SECTION – IV

7. (a) How to estimate hardness of water by EDTA method.
   (b) Write short note on
      (i) Priming and foaming   (ii) Caustic embrittlement.

(Or)

8. (a) Discuss the Zeolite process of softening of hard water.
   (b) Calculate the amount of lime and soda required to soften 10,000 litres of water containing the following ions per litre (Mg^{2+} = 4.8 mg; Ca^{2+} = 16.0 mg; HCO_3^- = 73.2 mg).

SECTION – V

9. (a) Discuss the compounding of rubber.
   (b) Write the preparation and properties of
      (i) Thiokol   (ii) Silicon rubbers.

(Or)

10. (a) Differentiate between thermo plastics and thermosetting plastics.
    (b) Write the properties and applications of
       (i) Bakelite   (ii) Urea Formaldehyde

B.TECH. DEGREE EXAMINATION, JUNE 2014
I B.Tech.

C PROGRAMMING AND DATA STRUCTURES
(Common to All Branches)

Time : 3 Hrs

Max. Marks : 60

Answer FIVE Questions, Choosing ONE Question from each section
All Questions carry equal marks

* * *

SECTION - I

1. (a) Define algorithm? List the characteristics of an algorithm and write an algorithm to find the factorial of a given number.
   (b) Write a C program to implement following expression.
   $G = 1 + X + X^2 + \text{------------} X^n$

2. (a) What is meant by associativity? What is the associativity of the arithmetic operators?
   (b) Write a C program to print the list of prime numbers less than or equal to a given number.

SECTION – II

3. (a) What is an array? How to declare and initialize an array?
   (b) Write a C Program to implement transpose of a given matrix.

4. (a) Explain Call by value and Call by reference with an example.
   (b) Write a C program to find the GCD of two given numbers using Recursion.

SECTION – III

5. (a) Distinguish Structure and Union with example.
   (b) Explain array of structures and Self referential structures with an example.

6. (a) Define pointer? How to declare and initialize a pointer.
   (b) Write a C program using structures to read today's date and print tomorrow's date.

SECTION – IV

7. (a) Explain various operations on linked stacks and linked queues.
   (b) Evaluate the postfix expression A+B*C^D with A = 2, B = -1, C = 2 and D = 3 using postfix evaluation algorithm.

8. Write insertion and deletion algorithms for single linked list.

SECTION – V

9. Explain BreadthFisrstSearch and DepthFirstSearch with an example.

10. Explain quick sort algorithm. To sort the elements given below
    34, 26, 1, 45, 18, 78, 12, 89, 27.

B.TECH. DEGREE EXAMINATION, JUNE-2014

I B.Tech.

ENGINEERING GRAPHICS
(Common to CE & ME)

Time : 3 hours   Max. Marks : 60

Answer FIVE Questions, Choosing ONE Question from each section
All Questions carry equal marks
* * *

SECTION – I

1   Draw an ellipse using Concentric Circles method whose major axis is 100mm and minor Axis is 70mm.

2   Construct a cycloid, given the diameter of the generating circle as 50, draw tangent to the curve at a point on it, 40 from the line.

SECTION – II

3   A line AB 90mm length, is inclined at an angle of 30^0 to H.P and 45^0 to V.P the point A is 20mm above H.P and 25 mm in front of V.P Draw the projections of the line.

4   A line PQ of 75 long, has its end A at 15 above H.P. and 20 in front of V.P. its front view and top view measure 55 and 65 respectively. Draw the projections of the line and determine its inclinations with H.P. and V.P.

SECTION – III

5   A regular hexagonal plane of 35 side has a corner at 25 from V.P. and 55 from H.P. its surface is inclined at 45^0 to V.P. and perpendicular to H.P. Draw the Projections of the plane.

6   Draw the projections of a pentagonal prism of base 30 side and axis 70 long, when it is resting on one of its rectangular faces on H.P. the axis of the solid is inclined at 45^0 to V.P.
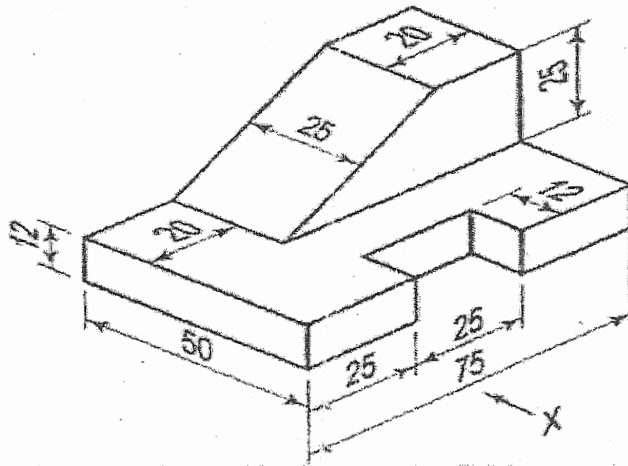
SECTION – IV

7   A cone with base 50mm diameter and axis is 70mm long, is resting on its base on H.P. it is cut by a section plane parallel to H.P. and passing through the mid point of the axis. Draw the projections of the cut solid.

8   A hexagonal prism of side of base 25mm and axis 70mm long, is resting on a corner of its base on H.P. with the longer edge containing that corner, inclined to H.P. at 30^0, it is cut by a section plane parallel to H.P and passing through the mid - point of the axis . Draw the front and sectional top views of the prism

SECTION – V

9   Draw the Isometric view of a pentagonal prism, with side of base 30mm and its axis 70mm long. The prism is resting on its base on H.P., with an edge of the base parallel to V.P.

10   For the fig Shown below Draw the Front View , Top View and Left side View

B.TECH. DEGREE EXAMINATION,   JUNE 2014

I B.Tech.

BASIC ELECTRICAL SCIENCES
(Common to EEE, ECE & CSE)

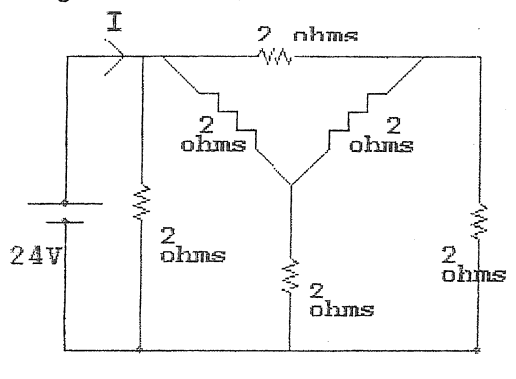Time : 3 hours   Max. Marks : 60

*Answer FIVE Questions, Choosing ONE Question from each section*
All Questions carry equal marks
* * *

SECTION - I

1 (a) Using star delta conversion find the current I in the circuit as shown in figure

   (b) A bridge network ABCD is arranged as follows:
        Resistance between terminals AB, BC, CD, DA and BD are 10 ohms, 30 ohms, 15 ohms, 20 ohms and 40 ohms respectively. A 4V battery is connected with negligible internal resistance between terminals A and C. Determine the current through each element in the network using network reduction techniques.

2 (a) Define cut set and tie set.
   (b) The number of turns in a coil is 20. When a current of 2A flows in this coil, the flux in the coils is 0.3 mwb. When this current is reduced to zero in 2 milli seconds, the voltage induced in an adjacent coil is 63.75V. If K = 0.85, find self inductances of the two coils, mutual inductance and number of turns in the second coil.

SECTION – II

3 (a) For the trapezoidal waveform shown in the figure.determine.
        (i) Form factor.
        (ii) Peak factor.
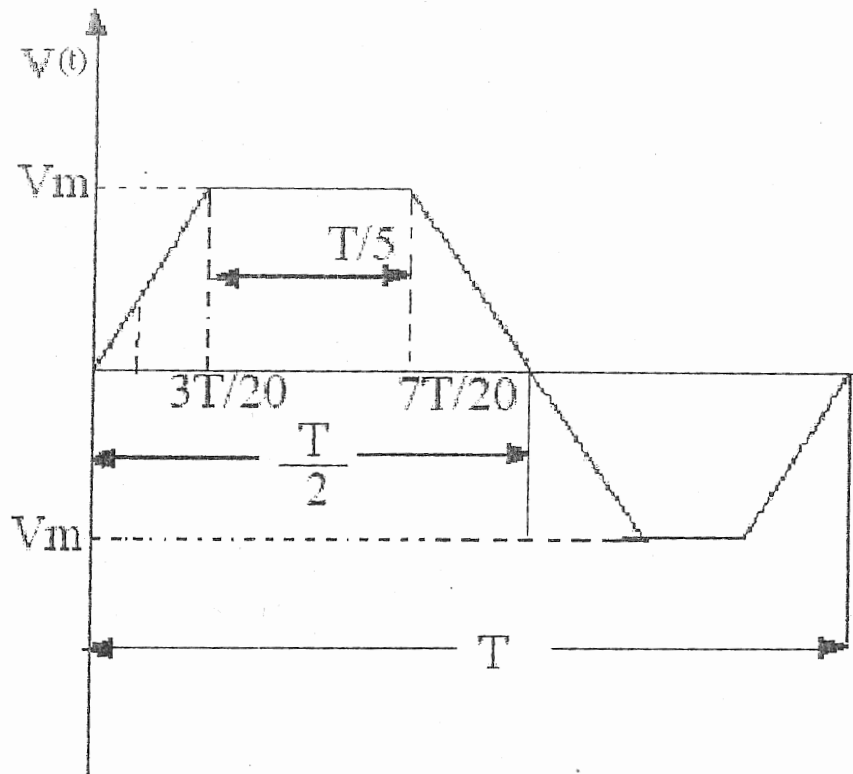
(b) In an electrical circuit R_1 L and C are connected in Parallel.

R = 10Ω, L = 0.1 H and C = 100 μF. The circuit is energized with supply at 230v, 50Hz calculate .

a) Impedance
b) Current taken from supply
c) Power factor of the circuit

4 Explain the behaviour of AC through
(a) Pure R
(b) Pure L
(c) Pure C circuits
For each case, derive the instantaneous value of V and I, Impedance, Average power, Power factor, Instantaneous power and the relevant phasors.

SECTION – III

5 (a) Derive the expression for RL series circuit excited by sinusoidal source. Draw the phasor diagram

(b) A coil of power factor 0.9 is in series with a 120 μF capacitor. When connected to a 50 Hz supply, the potential difference across the coil is equal to the potential difference across the capacitor. Find the resistance and inductance of the coil.

6 (a) (a) Show that for a series resonant circuit $f_1 f_2 = f_r^2$
where f_1 and f_2 are half power frequencies and f_r is the resonance frequency

(b) A Constant voltage at a frequency of 1 MHz is applied to an inductor in series with a variable capacitor when the capacitor is set to 500 pF, the current has the maximum value, while it is reduced to one half when the capacitance is 600 pF find (i) the resistance (ii) the inductance (iii) the Q factor of the inductor.

SECTION - IV

7 (a) Explain the working of PN junction diode under (i) Forward bias and (ii) reverse bias conditions

(b) Derive the expression for diffusion capacitance of a P-N junction diode.

8   Write a short notes on any three of the following.
      (a) Photo diode   (b) Photo transistor   (c) LED vs LCD
      (d) Zener diode   (e) Tunnel diode

SECTION - V

9   (a)   Explain the operation of NPN and PNP transistors

    (b)   Compare all the transistor configurations in terms of input, output impedances, voltage gain and frequency.

10 (a)   Explain the drain characteristics of JFET
     (b)   Explain how JFET can be used as a voltage variable resistance