M 23001

Reg. No. : .....

Name : .....

Combined I and II Semester B.Tech. Degree (Reg./Sup./Imp. – Including Part Time) Examination, April 2013

(2007 Admn. Onwards)

PT2K6/2K6 EN 101 : ENGG. MATHEMATICS – I

Time: 3 Hours Max. Marks : 100

I. a) Solve $y' = e^{2x-y} + x^3e^{-y}$.

b) Solve $e^y dx + (xe^y + 2y)\, dy = 0$

c) Find Laplace transformation of sinkt.

d) Find inverse Laplace transform of $\frac{s+1}{(s^2+2s+2)^2}$

e) Find $\frac{\partial^3 u}{\partial x \partial y \partial z}$ if $u = e^{x^2+y^2+z^2}$.

f) If $\nabla f = (y^2 - 2xyz^3)i + (3 + 2xy - x^2z^3)j + (6z^3 - 3x^2y z^2)\hat{k}$, find f if $f(1, 0, 1) = 8$).

g) Find the Fourier series of $f(x) = x^2$ in $(-\pi, \pi)$

h) Obtain the half range Fourier sine series of $f(x) = x$ in $0 < x < 2$. **(8×5=40)**

II. a) Solve $(D-2)^3 y = e^{2x}$. **8**

b) Solve $(D^2 + 2D + 1)\, y = e^{-x} \log_e^x$ .any the method of variation of parameters. **7**

OR

a) Solve $(D^2 + 2)\, y = x^2\, e^{3x} + e^x \cos 2x$. **8**

b) Solve $x^2y'' - 3xy' + 5y = x^2 \sin(\log x)$. **7**

III. a) Prove that Laplace transform of a periodic functions f(t) with period T is qiven by $L\{f(t)\} = \frac{1}{1-e^{-Ts}} \int_0^T e^{-st} f(t)dt,\ s > 0$. **8**

P.T.O.

b) Using convolution theorem find the inverse Laplace transform of $\frac{1}{(s^2 + a^2)^2}$. 7

OR

a) If $L\{f(t)\} = F(s)$, then prove that $L\left\{\frac{f(t)}{t}\right\} = \int_s^\infty F(u)du$. 8

b) State and prove convolution theorem. 7

IV. a) State and prove Euler's theorem. 8

b) Find the constants a and b so that the surface $ax^2 - byz = (a + 2)x$ will be orthogonal to the surface $4x^2y + z^3 = 4$ at the point $(1, -1, 2)$. 7

OR

a) If $u = \ln(x^3 + y^3 - x^2y - xy^2)$ then show that $u_{xx} + 24_{xy} + u_{yy} = -4/(x + y)^2$. 8

b) Find the values of the constants a, b and c so that the directional derivative of $f = axy^2 + byz + cz^2x^3$ at $(1, 2, -1)$ has a maximum magnitude 64 in a direction parallel to z-axis. 7

V. a) Derive Euler's formulae. 8

b) Find the half range cosine series for $f(x) = \sin\left(\frac{m\pi x}{l}\right)$ in $(0, l)$. 7

OR

a) Obtain the Fourier series for the function 8

$f(x) = \pi x \quad , \quad 0 \le x \le 1$

$= \pi(2 - x) \quad , \quad 1 \le x \le 2$

Where $f(x + 2) = f(x)$

Deduce that $\frac{\pi^2}{8} = \sum_{n=1}^{\infty} \frac{1}{(2n-1)^2}$.

b) The following table gives the variations of a periodic current A over a period T. Show that there in a constant part of 0.75 amp in the current A and obtain the amplitude of the first harmonic. 7

t (time)	0	T/6	T/3	T/2	2T/3	5T/6	T
A (amp)	1.98	1.30	1.05	1.30	–0.88	–0.25	1.98

M 23002

Reg. No. : .....

Name : .....

Combined I and II Semester B.Tech. Degree (Reg./Sup./Imp. – Including Part Time) Examination, April 2013
(2007 Admn. Onwards)
PT2K6 / 2K6 EN 102 : ENGG. PHYSICS

Time : 3 Hours Max. Marks : 100

Instructions : *i) Answer **all** questions.*
*ii) **Assume** suitable data that are **not** given.*

I. a) Show that colours exhibited by reflected and transmitted systems are complementary.

b) Distinguish between Fresnel's and Fraunhoffer diffraction with suitable examples.

c) Discuss the term stimulated emission in Laser.

d) What is holography ? How holography is different from photography ?

e) Explain temperature dependence of conductivity of conductors.

f) Compare and contrast Quantum and Classical free e^- theory.

g) What is Hall effect ? Obtain the expression for Hall field.

h) Discuss Josephson effect. **(8×5=40)**

II. a) i) Explain how a quarter wave plate is used for detection of circularly and elliptically polarised light. **10**

ii) The diameter of 10^{th} dark ring in a Newton's ring system viewed normally by reflected light of wavelength 5.9×10^{-5} cm is 0.5 cm. Calculate the thickness of airfilm and the radius of curvature of the lens. **5**

OR

b) i) Explain the formation of Newton's rings and obtain the expression for diameter of dark and bright rings in the case of reflected light. **10**

ii) How many orders will be visible if the wavelength of the incident radiation is 5000 Å and the number of lines on the grating is 2620 in one inch. **5**

P.T.O.

III. a) i) By assuming Schrodinger wave equation obtain the solutions for a particle in a box of infinite height. **10**

ii) In a measurement that involved an uncertainty of 0.003% the speed of an e^- was found to be 800 m/s. Calculate the corresponding uncertainty involved in determining its position. **5**

OR

b) i) Set up time independent Schrodingers' wave equation and explain expectation values. **10**

ii) Write a note on ESR. **5**

IV. a) i) With principle and energy level diagram explain the construction and working of Ruby laser. **10**

ii) Calculate the energy difference in eV between the two energy levels of the Ne atoms of the He-Ne gas laser, the transitions between which results in the emission of light of wavelength 632.8 n^m. **5**

OR

b) i) What are X-rays ? Explain any ND testing method of testing using X-rays. **10**

ii) An X-ray machine has an accelerating potential of 25,000 V. Find the shortest wavelength of X-ray spectrum. Also calculate the energy of the photon. **5**

V. a) i) Obtain the relation between thermal and electrical conductivities. Explain the terms thermal and drift velocities. **10**

ii) Discuss effect of temperature on resistivity of a semiconductor. **5**

OR

b) i) Explain donor type and accepter type impurities in semiconductors. **10**

ii) Write a note on BCS theory of superconductivity. **5**

M 23003

Reg. No. : .....

Name : .....

Combined Ist and IInd Semester B.Tech. Degree (Reg./Sup./Imp. – Including Part Time) Examination, April 2013
(2007 Admn. Onwards)
PT2K6/2K6 EN 103 : ENGINEERING CHEMISTRY

Time : 3 Hours Max. Marks : 100

Instructions *: 1) Answer* ***all*** *questions.*
2) Draw ***neat*** *sketches* ***wherever*** *necessary.*

I. a) What is compounding of resin and plastics ? Explain any four additives added during compounding. **5**

b) Describe the synthesis and applications of the following polymers : **5**
1) Polyurethane 2) Nylon 6,6

c) Derive the Nernst equation for electrode potential. **5**

d) Explain the construction and working of lead-acid battery. **5**

e) Explain the experimental method of determination of pH using glass electrode. **5**

f) Differentiate between electroplating and electroless plating. **5**

g) Define reformation of a fuel. Explain different types of reformation with reactions. **5**

h) Write the control measures of water pollution. **5**

II. a) i) Explain the free radical mechanism of addition polymerization taking ethylene as an example. **6**

ii) Discuss the functions of a lubricant. **4**

iii) Define cloud and pour point of an oil. Explain the determination of pour point. **5**

OR

P.T.O.

b) i) Discuss any four structure-property relationship of polymers. **8**

ii) Write short notes on fluid-film (hydrodynamic) lubrication. **7**

III. a) i) Define EMF of a cell. Explain the construction, working of calomel electrode. **5**

ii) What are fuel cells ? Explain the construction working and applications of H_2-O_2 fuel cell. **6**

iii) Derive an expression for Henderson-Hasselbatch equation for acidic buffer. **4**

OR

b) i) What are concentration cells ? A cell was constructed by immersing two copper electrodes in 0.05 M and 0.15 M $CuSO_4$ solution respectively. Write the cell representation, cell reactions and calculate the emf of the cell. **6**

ii) Explain the construction and working of Ni – Cd battery. **5**

iii) Write short notes on buffer solutions. **4**

IV. a) i) Explain the following factors which affects the rate of corrosion.

1) Relative areas of anode and cathode.

2) Nature of the corrosion product. **5**

ii) What is cathodic protection ? Explain the sacrificial anode and impressed current methods. **6**

iii) Discuss the constituents of varnish. **4**

OR

b) i) Define corrosion. Explain the electrochemical theory of corrosion taking iron as an example. **7**

ii) Write notes on : **8**

1) Galvanizing 2) Tinning

V. a) i) Explain the experimental determination of calorific value of a gaseous fuel using Boy's calorimeter. **7**

ii) Define hard water. Explain the determination of hardness of water by complexometric method. **8**

OR

b) i) Define knocking. Explain the mechanism of knocking in I.C. engines. **6**

ii) Write short notes on sources and ill effects of SO_2 pollutant. **4**

iii) Explain the activated sludge method of domestic water treatment. **5**

M 23004

Reg. No. : .....

Name : .....

Combined I and II Semester B.Tech. Degree (Reg./Sup./Imp. – Including Part-Time) Examination, April 2013
(2007 Admn. Onwards)
PT 2K6/2K6 EN 104 : ENGINEERING MECHANICS

Time: 3 Hours Max. Marks: 100

Instructions : *1) Answer **all** questions.*
2) Missing data may be assumed.

1. a) Define force. What are its effects ?
   b) State and explain principle of transmissibility.
   c) Define and explain angle of friction, Angle of repore. with a help of figure.
   d) Mention the importance of centroid and MI in engineering field.
   e) With the help of neat figures mention different types of supports.
   f) Mention the various methods of analysing a pin jointed truss and briefly explain them.
   g) Define :
      a) Work
      b) Energy
      c) Power.
   h) State and explain D'Alembert's principle. **(8×5=40)**

2. a) Three coplanar forces acts from a point A. Determine angle α so that resultant of the three forces will be vertical. Also find resultant. **7**

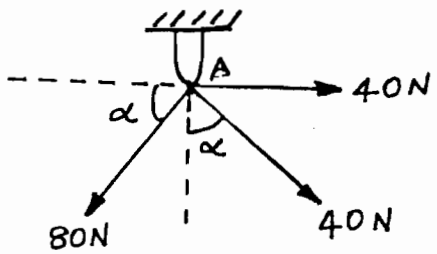

Figure 2 (a)

b) Determine the magnitude and y interrupt of the resultant of force system acting on the lamina as shown in figure 2b. **8**

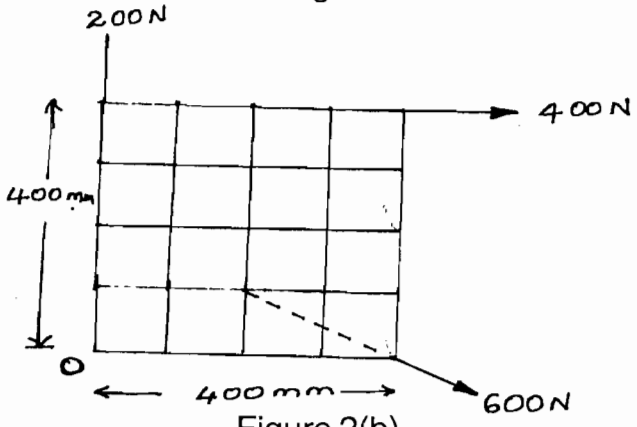

Figure 2(b)

OR

c) Two smooth cylinders A and B rests on a smooth inclined plane and supported by a vertical lever CD as shown in figure 2(c). The lower end C of the lever is pinned, while upper end D is supported by a string DE. What is the force exerted by cylinder B on the lever CD ? Find also the reaction components at the pin C and also the tension in the string DE. **15**

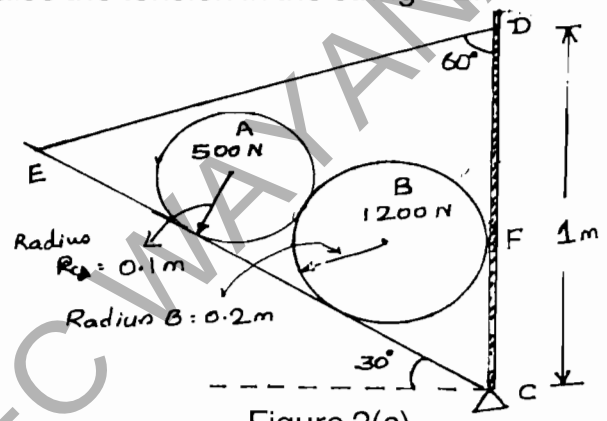

Figure 2(c)

3. a) Locate the centroid of a rectangle from first principal. **6**

b) The position of the machine Block, B is adjusted by moving wedge, A knowing that the coefficient of static friction is 0.35 between all the surfaces of contact determine force. P required to raise the block B neglect the weight of the wedge. (Figure 3(b)). **9**

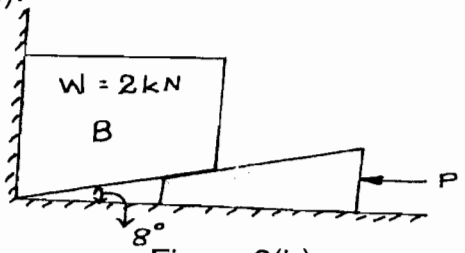

Figure 3(b)

OR

c) Determine the moment of inertia of a area as shown in figure 3(c) about the axes AB and PQ. **15**

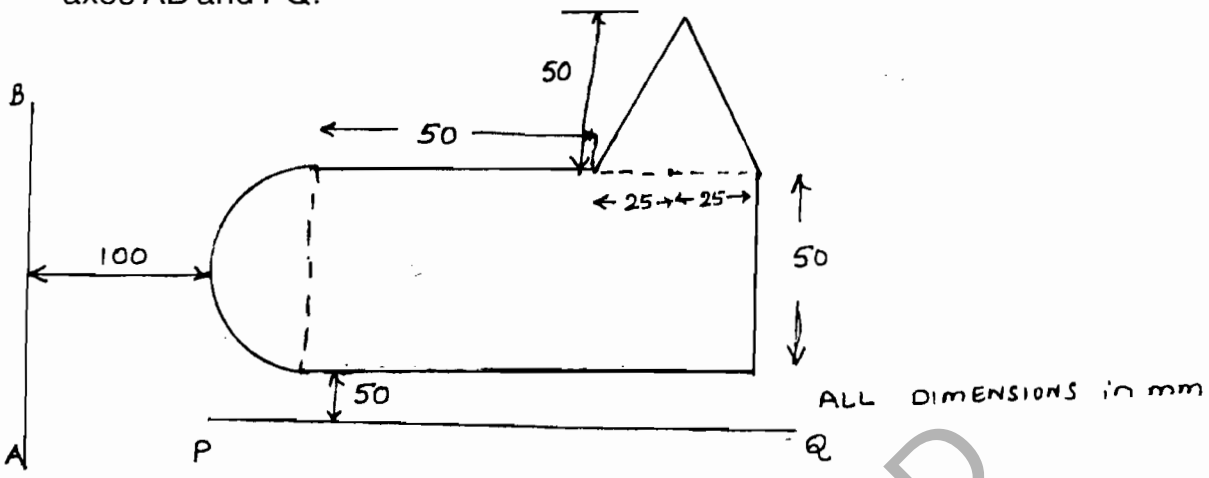

Figure 3(c)

4. a) For the beam with a loading as shown in figure 4(a), determine the reacts at the supports. **7**

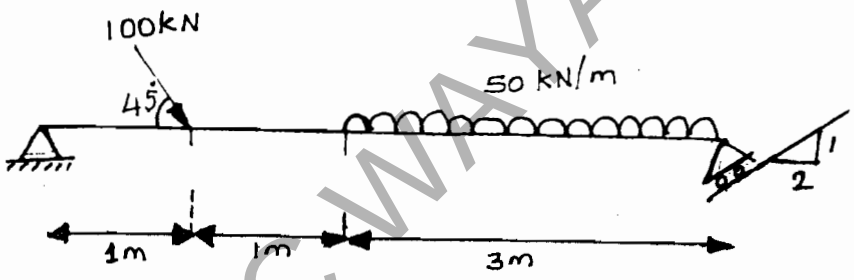

Figure 4(a)

b) Drawn the shear force and bending moment diagram for cantilever loaded as shown in figure 4(b). **8**

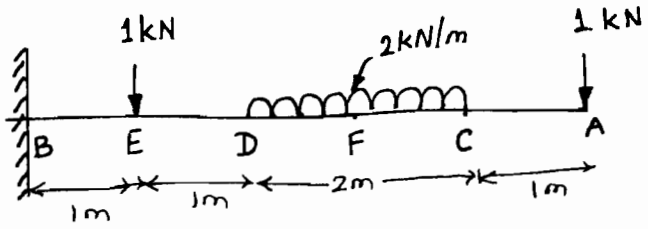

Figure 4(b)

OR

c) Determine the forces in all the membrane of the truss as shown in figure 4(c). **15**

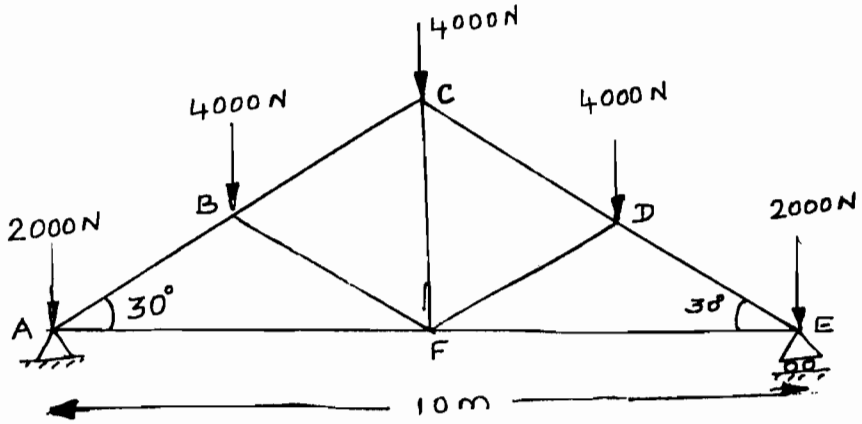

Figure 4(c)

5. a) A particle falling freely under the action of gravity passes two points 10mts. apart vertically in 0.2 second. From what height above the higher point did it start to fall ? Take g = 9.80 m/s^2. **7**

b) A stone dropped into a well is heard to strike the water after 4 seconds. Find the depth of the well, if the velocity of sound is 350 meter/sec. **8**

OR

c) Two light vehicles weighing W_1 = 1000N and W_2 = 500 N are connected by flexible cables but inextensible string passing round a pully and are free to roll on a inclined plane as shown in figure 5(c). If the vehicles are released from rest in the position shown. Find the interval of time required for them to exchange the positions. Rolling resistant and friction in the pulley may be neglected take g = 9.80 m/sec^2. **15**

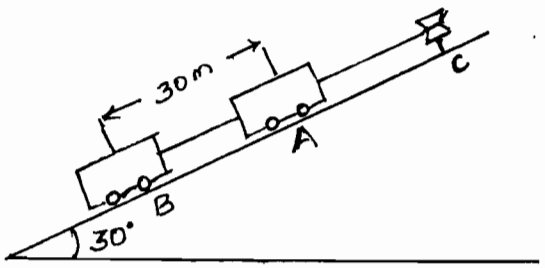

Figure 5(c)

M 23027

Reg. No. : .....

Name : .....

Combined I and II Semester B.Tech. Degree (Reg./Sup./Imp. – Including Part Time) Examination, April 2013

(2007 Admn. Onwards)

PT2K6/2K6 EN 105 : ENGG. GRAPHICS (For EE/EC Branches)

Time : 3 Hours Max. Marks : 100

Instructions *: 1) Answer* ***all*** *questions.*
2) ***Use*** *first angle projection system.*

1. a) A point G is 40 mm behind VP and is situated in the third quadrant. Its shortest distance from the intersection of XY and X, Y is 45 mm. Draw its projection. **8**

   b) The front view of a line 90 mm long is inclined at 45° to the XY line, measures 65 mm. End A is 15 mm above XY line and is in VP. Draw the projections of the line and find its inclinations with HP and VP. **12**

   OR

   c) A pentagonal lamina having edge 20 mm is resting on HP with one of its edge. Draw its projection when perpendicular bisector of the resting edge is inclined at 30° to HP and 45° to VP. **20**

2. a) A pentagonal pyramid 35 mm side and axis 50 mm rests on HP on one of its slant edges. Draw the projections of the pyramid when the axis is inclined at 30° to VP. **20**

   OR

   b) A rectangular prism 40 mm × 25 mm and height 60 mm rests with one of its longer edges of the base on HP. The axis is inclined at 30° to HP and top view of the axis inclined at 45° to VP. Draw its projections. **20**

3. a) A square pyramid of 50 mm edges of base and height 70 mm rests on its base on HP with one of its base edges parallel to VP. It is cut by an inclined section plane in such a way that the true shape of section is a trapezium whose parallel sides measures 40 mm and 20 mm. Draw the front view, sectional top view, and true shape of the section. **20**

   OR

b) Fig. 1 shows the front view of a truncated hexagonal pyramid of 30 mm side of base and height 80 mm. Draw the development of the lateral surface of the truncated pyramid. **20**

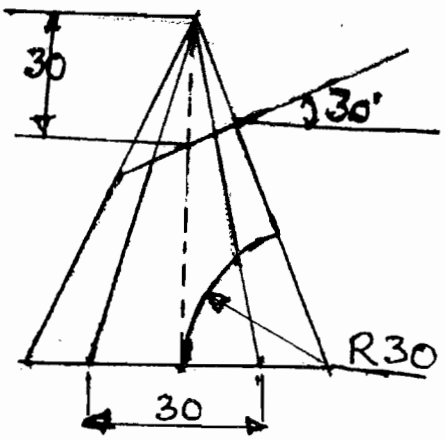

Fig. 1

4. a) Draw the isometric projection of a sphere of 60 mm diameter resting centrally on the top of a square prism of base 60 mm × 60 mm and height 20 mm. **20**

OR

b) Draw all the three views looking in the direction of arrows for the object shown in Fig. 2. **20**

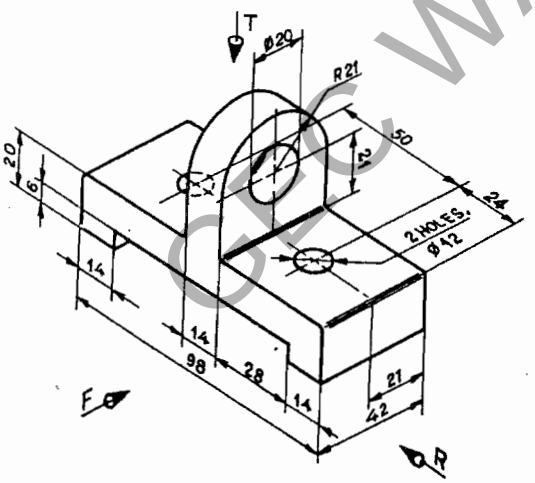

Fig. 2.

5. a) Draw three views of square headed bolt and a square nut of size M 20, bolt length 100 mm and thread length 60 mm. **20**

OR

b) Draw the front view with top half in section and top view of a knuckle joint to connect two shaft of diameter 20 mm each. **20**

M 23028

Reg. No. : .....

Name : .....

Combined I and II Semester B.Tech. Degree (Reg./Sup./Imp. – Including Part Time) Examination, April 2013
(2007 Admn. Onwards)
PT 2K6/2K6 EN 105 : ENGG. GRAPHICS
(For CS/AEI/IT Branches)

Time: 3 Hours Max. Marks : 100

Instructions : *1) Answer* ***all*** *questions.*
2) ***Use*** *first angle projection system.*

1. a) Draw the projections of a point lying 20 mm above HP and is first quadrant if it shortest distance from the line of intersection of HP and VP is 40 mm. Also find the distance of the point from VP. **8**

   b) The top view PQ of a straight line is 70 mm and makes an angle of 60° with XY line. The end Q is 10 mm infront of VP and 30 mm above HP. The difference between the distances of P and Q above HP is 45 mm. Draw the projections and determine tree length and tree inclinations with HP and VP. **12**

   OR

   c) A regular hexagonal plate of 30 mm sides has one corner touching VP and another opposite corner touching HP. The plate inclined at 60° to the HP and 30° to the VP. Draw the projections of the plate. **20**

2. a) A hexagonal pyramid 25 mm sides of base and 50 mm axis length rests on HP on one of its triangular faces and the axis appears to be inclined to VP at 45°. Draw the projection. **20**

   OR

   b) Draw the projections of a pentagonal prism 20 mm side of base and axis 40 mm long resting on a corner such that the two base edges passing through it make equal inclinations with HP and its base is inclined at 60° to HP and the axis appears to be inclined at 30° to the VP in the top view. **20**

3. a) A cone of base 60 mm diameter and axis 70 mm stands vertically with its base on HP. A section plane perpendicular to VP and parallel to one end generators of the cone passes at a distance of 15 mm fremit. Draw the sectional top view and tree shape of the section. Name the tree shape. **20**

   OR

b) A regular pentagonal prism of height 60 mm and base edge 30 mm rests with its base on HP. The vertical face closest to VP is parallel to it. Draw the development of the truncated pyramid with its truncated surface inclined at 60° to its axis and bisecting it. **20**

4. a) A hemisphere of diameter 40 mm is placed centrally on the top of a frustum of a hexagonal pyramid base 30 mm top face 20 mm side and height 40 mm long. The circular flat surface of hemisphere at the top. Draw the isometric projection of the solids. **20**

OR

b) Draw all the three views looking in the direction of arrows of the object shown in fig. 1. **20**

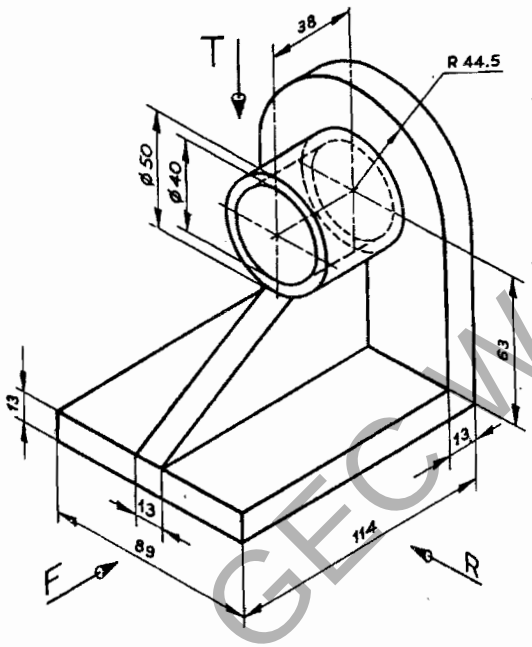

Fig. 1

5. a) Draw any two views of the following locking devices of a nut used on 20 mm diameter bolt.

i) Lock nut ii) Castle nut. **20**

OR

b) Draw the front view with top half in section and side view of a socket and spigot pipe joint to connect two pipe of 50 mm diameter each. **20**

M 23006

Reg. No. : .....

Name : .....

Combined I and II Semester B.Tech. Degree (Reg./Sup./Imp. – Including Part Time) Examination, April 2013
(2007 Admn. Onwards)
PT2K6/2K6 EN 106 : BASIC CIVIL ENGINEERING

Time : 3 Hours Max. Marks : 100

***Instructions** : 1) Answer the following questions.*
*2) Draw neat sketches **wherever** required.*

1. a) Explain briefly how measurements are recorded in the field book.
   b) Write a note on angular measurements using a total station.
   c) What are the characteristics of an ideal fire resisting material ?
   d) Write a note on fire protection of buildings.
   e) Distinguish between shallow and deep foundation.
   f) What are the advantages of synthetic flooring over natural flooring material ?
   g) Write a note on determination of comment mortar strength in laboratory.
   h) What are the advantages of R.C.C. over P.C.C. **(8×5=40)**

2. a) Explain briefly indirect methods of chaining along sloping ground. **7**
   b) The distance between two stations was measured with a 20 m chain and found to be 1500 m. The same was measured with a 30 m chain and found to be 1476 m. If the 20 m chain was 5 cm too short, what was the error in the 30 m chain ? **8**

   OR

   c) Write a note on linear measurements using a total station. **7**
   d) List and explain the temporary adjustments of a dumpy level. **8**

P.T.O.

3. a) Write a note on selection of site for buildings. 7

   b) Explain briefly disaster mitigation methods related to earth quake. 8

   OR

   c) Write a note on components of a building. 7

   d) How is our country is divided into different zones under earth quake zoning ? Explain. 8

4. a) Write a note on importance of the safe bearing capacity of soil. 7

   b) Enumerate the quality of materials used for the construction of doors and windows. 8

   OR

   c) Write a note on Raymond piles. 7

   d) Explain how do you select the roof covering materials for building. 8

5. a) Write a note on importance of fineness modulus and grading curve in aggregate selection. 7

   b) Briefly explain compaction factor test on fresh concrete. 8

   OR

   c) List and explain the properties of mild steel and HYSD bars in construction field. 7

   d) Write a note on prestressed concrete construction. 8

M 23007

Reg. No. : .....

Name : .....

Combined I and II Semester B.Tech. Degree (Reg./Sup./Imp. – Including Part Time) Examination, April 2013
(2007 Admn. Onwards)
PT 2K6/2K6 EN 107 : BASIC MECHANICAL ENGS.

Time: 3 Hours Max. Marks : 100

Instructions : *i) Answer **all** questions.*
*ii) Missing data **if any** may be suitably **assumed**.*

1. a) State and explain Zeroth law of thermodynamics.
   b) Derive the expression for work transfer in an adiabatic process.
   c) Give comparison between petrol engine and diesel engine.
   d) Sketch and explain the working of single stage reciprocating pump.
   e) Define the following terms : Subcooled liquid, saturated liquid, wet steam, dry steam and super heated steam.
   f) Give the list of boiler mountings and accessories and their applications.
   g) Sketch and explain the principle of die casting.
   h) Explain with a neat sketch about centreless grinding process. **(5×8=40)**

2. a) A gas is trapped inside the cylinder by means of a piston. Piston is initially loaded such that the initial pressure is 1.42 bar, and initial volume of the gas is 0.028 m^3. Gas is heated until its volume increases to 0.084 m^3. Calculate the work done during the expansion of the gas under the following conditions :
      i) When pressure is constant
      ii) When temperature is constant
      iii) If the system obeys the law $pv^{1.3}$ = constant. **10**
   b) Explain the similarities and dissimilarities between work and heat. **5**

      OR

   c) Give Kelvin-Plancks and Clausius statements of second law, and also prove their equivalence. **10**
   d) Prove that heat transferred during constant pressure process is equal to change in enthalpy of a system. **5**

P.T.O.

3. a) In an air standard diesel cycle, the compression ratio is 16. At the beginning of isentropic compression, the temperature is 15°C and pressure is 0.1 MPa. Heat is added until the temperature at the end of constant pressure process is 1480°C. Calculate

   i) Cut-off ratio

   ii) Heat supplied per kg of air

   iii) Heat rejected per kg of air

   iv) Cycle efficiency. **15**

   OR

   b) Sketch and explain the working principle of

   i) Francis turbine

   ii) Kaplan turbine. **15**

4. a) With a neat sketch explain the working principle of Babcock and Wilcon boiler. **15**

   OR

   b) Sketch and explain Vapour Compression refrigeration system. Also give comparison between vapour compression and vapour absorption refrigeration systems. **15**

5. a) Write a note on :

   i) Stamping

   ii) Coining

   iii) Surfacing. **15**

   OR

   b) Sketch and explain the working of horizontal milling machine. **15**

M 23008

Reg. No. : .....

Name : .....

Combined I and II Semester B.Tech. Degree (Reg./Sup./Imp. – Including Part Time) Examination, April 2013
(2007 Admn. Onwards)
PT2K6/2K6 EN 108 : BASIC ELECTRICAL ENGINEERING

Time : 3 Hours Max. Marks : 100

***Instruction** : Answer **all** questions.*

I. a) Write the advantages and disadvantages of wind power generation.

b) Explain the necessity and working of an Earth Leakage Circuit Breaker (ELCB).

c) Explain 2 part part tariff and mention its features.

d) Explain the working of a single phase capacitor start induction motor.

e) Draw the neat diagram of sodium vapour lamp and list the application.

f) State and explain Faraday's laws on electrolysis.

g) Explain the construction and operation of a dynamometer type wattmeter.

h) What are transducers and how they are classified ? **(5×8=40)**

II. a) What is the necessity of earthing of an electrical installation ? Explain with a neat diagram pipe earthing provided for a domestic installation. **8**

b) What are the advantages and limitations of (i) Photo voltaic systems (ii) Fuel cells ? **7**

OR

c) Explain with a neat single line diagram the components of a typical transmission and distribution system indicate the standard voltage levels. **8**

d) With a neat sketch explain how a single lamp can be controlled at two different places. **7**

III. a) Derive the relationship between line and phase values of a balanced 3 phase 'Δ' connected system. **7**

b) What are the causes of low power factor ? What are its disadvantages ? List the methods employed for the improvement of power factor. **8**

OR

P.T.O.

c) Explain with neat diagrams the constructional features of an alternator. List the advantages of rotating pole and stationary armature. **8**

d) A 40 kVA single phase transformer has 500 turns on the primary and 100 turns on the secondary winding. The primary is connected to 3000 V, 50 Hz a.c. supply. Determine (i) Secondary voltage on open circuit. (ii) Current flowing through the two windings on full load and (iii) Maximum value of flux. **7**

IV. a) With a neat diagram explain the process of laser beam welding. **7**

b) A 1.5 kW, 220 V, single phase resistance oven employs nickel-chromium wire for its heating elements. If the wire temperature is not to exceed 1000°C and the temp. of charge is to be 600°C, calculate the diameter and length of the wire. Assume radiating efficiency as 60% and emissivity as 0.9. Determine also the temperature of the wire when the charge is cold.

Assume $\rho = 1.016 \times 10^{-6}\ \Omega m$. **8**

OR

c) Write the features of energy efficient lamps. **7**

d) Explain the process of extraction of metal using electrolysis. **8**

V. a) With a neat diagram explain the constructs and principle of single phase induction energy meter. **8**

b) Two Wattmeters connected to measure the input to a balanced three phase circuit indicate 2,500 and 500 watts respectively. Find the total power and power factor of the circuit, when (i) when both readings are positive and (ii) when the latter reading is obtained after reversing the connections to the current coil of one wattmeter. **7**

OR

c) With a neat diagram explain the principle of a capacitive transducer used for the measurement of displacement. **7**

d) Derive an expression for gage factor of a strain gauge. **8**

M 23009

Reg. No. : .....

Name : .....

Combined I and II Semester B. Tech. Degree (Reg./Sup./Imp.– Including Part Time) Examination, April 2013
(2007 Admn. Onwards)
PT 2K6/2K6 EN 109 : BASIC ELECTRONICS AND COMPUTER ENGG.

Time : 3 Hours Max. Marks : 100

Instructions : *Answer **all** the questions.*
***Use** separate answer books for Part **A** and **B**.*

PART – A

(4×5=20)

I. 1) Explain the principle of operation of varactor diode. **5**

2) What are thermistors ? **5**

3) Explain the types of detectors used in optical fibre communication. **5**

4) Give the block diagram of TV transmitter and receiver. **5**

(2×15=30)

II. 5) a) Find the concentration of holes and electrons in a p-type germanium at 300 K if the conductivity is $100/\Omega$ cm. Also find there values for n-type silicon if the conductivity is $0.1/\Omega$ cm. Given that for Ge; $n_i = 2.5 \times 10^{13}/cm^3$; $\mu_n = 3800\ cm^2/Vs$; $\mu_p = 1800\ cm^2/Vs$ and for Si, $n_i = 1.5 \times 10^{10}/cm^3$, $\mu_n = 1300\ cm^2/Vs$ and $\mu_p = 500\ cm^2/Vs$. **8**

b) Explain a transducer that can measure strain. Give its features. **7**

OR

6) a) A transistor is connected in CE configuration in which collector-supply voltage is 10 V and the voltage drop across 600Ω connected in collector circuit is 0.6 V. If $\alpha = 0.98$, find : **8**

i) Collector emitter voltage and

ii) Base current.

b) Give the block diagram of CRO and explain signal display on CRO. **7**

P.T.O.

III. 7) a) A carrier of 1 MHz with 400 W of its power is amplitude modulated with a sinusoidal signal of 2500 Hz. The depth of modulation is 75%. Calculate the sideband frequencies, the bandwidth, the power in the sidebands and the total power in the modulated ware. **8**

b) Explain the working of YAGI antenna. **7**

OR

8) a) An unmodulated RF carrier power of 10 kW sends a current of 10 A r.m.s. through an antenna. On AM by a sinusoidal voltage, the antenna current increases to 11.6A. Calculate the :

i) modulation index and

ii) total power transmitted. **7**

b) Explain in detail the working of super-heterodyne receives and list their applications. **8**

PART – B

(4×5=20)

IV. 1) Write a note on mother boards. **5**

2) What are the characteristics of computers ? **5**

3) Explain web browsers. **5**

4) Write a note on testing of programes. **5**

(2×15=30)

V. 5) a) Write a note on computer organisation. **8**

b) Explain various types of memories available and their usage levels. **7**

OR

6) a) What are network adapters ? Explain their role in local computer communication. **8**

b) Explain the process of booting as in computer clearly stating the role of BIOS setup in the process. **7**

VI. 7) a) Write a note on internet. Give its applications and impact on society. **8**

b) Differentiate between high level and low level computer languages. **7**

OR

8) a) Write a note on computer network topologies and their types. **8**

b) What is WWW ? Write its features and applications. **7**