

**I B. Tech I Semester Regular Examinations, December – 2016**  
**ENVIRONMENTAL STUDIES**

(Com. to Agri.E, AME, Bio-Tech.E, CHEM, CE, EEE, ME, MTE, MM, PCE, PE, AE)

**Time: 3 hours**

**Max. Marks: 70**

Question Paper Consists of **Part-A** and **Part-B**

Answering the question in **Part-A** is Compulsory

**Four Questions should be answered from Part-B**

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**PART -A**

1. a) Explain about Stockholm and Rio summit. [2M]
- b) Write about sustainable mining of granite and laterite. [2M]
- c) What are the various types of Biodiversity? [2M]
- d) Explain the effects of oil pollution on the ocean. [2M]
- e) How water is conserved in urban areas? [2M]
- f) Discuss about Ecotourism. [2M]
- g) What is J-curve? Explain. [2M]

**PART -B**

2. a) Define ecosystem. Explain the structure and function of desert ecosystem. [8M]  
 b) Explain global warming and climate change. [6M]
3. Bring out the importance of the following natural resources for the sustenance [14M] of life and the need to conserve them.  
 i) Forest resources ii) Energy resources
4. a) Discuss the threats to biodiversity which causes its loss. [7M]  
 b) Explain about conservation of biodiversity. [7M]
5. a) What are the causes, effects and control measure for noise pollution? [8M]  
 b) Explain the role of individual in prevention of pollution. [6M]
6. Explain the main provisions of the following Acts. [7M]  
 a) Water (prevention and control of pollution) Act, 1974.  
 b) Forest conservation Act, 1980. [7M]
7. a) Discuss the various stages in the preparation of EMP. [7M]  
 b) Explain the concept of green campus with the self-sustaining environment [7M] friendly aspects.

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**PART -A**

1. a) Write about carbon credits. [2M]
- b) Explain equitable use of natural resources. [2M]
- c) What are the various values of Biodiversity? [2M]
- d) List common sources and effects of noise. [2M]
- e) Explain rooftop rainwater harvesting. [2M]
- f) Write about self-sustaining green campus. [2M]
- g) Explain wasteland reclamation. [2M]

**PART -B**

2. a) What are acid rains? What is their impact on environment? [7M]
- b) Explain ecological succession with examples. [7M]
3. Discuss the availability of strategic minerals in AP and bring out the importance of sustainable mining of granite, coal, sea and river sands. [14M]
4. a) What are Hot-spots of biodiversity? Bring out their significance. [6M]
- b) List out the endangered and endemic species (Trees, birds, animals) of India and explain their importance for man for his sustenance. [8M]
5. a) Explain the sources of e-waste and discuss how it is managed to reduce the risk. [8M]
- b) Discuss the impact of fire crackers on man and his wellbeing. [6M]
6. a) Explain the provisions and powers given to the Government under Environmental (protection) Act 1986. [6M]
- b) Discuss the issues involved in enforcement of environmental legislation and how to create public awareness. [8M]
7. a) What is EIS? What are the stages involved? [7M]
- b) Write explanatory notes on the need of green belt to be maintained by any industry you have visited. [7M]

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**PART -A**

1. a) Explain the role of I.T in environment and human health. [2M]
- b) Write about water logging and salinity. [2M]
- c) Give a list of alternative sources of energy. [2M]
- d) Explain the impact of fire crackers on man and his wellbeing. [2M]
- e) List out the problems related to energy in urban areas. [2M]
- f) Write about green business. [2M]
- g) Explain about pesticide problem on agriculture. [2M]

**PART -B**

2. a) Discuss sustainability with reference to global environmental challenges. [7M]
- b) Explain about food chains and food webs. [7M]
3. Explain land as a resource. Discuss how soil erosion causes land degradation [14M] and desertification with preventive measures to control.
4. a) Define biodiversity and explain the classification. [7M]
- b) What are the values of biodiversity? Explain them. [7M]
5. Write Explanatory notes on:
  - a) Urban solid waste [6M]
  - b) Soil pollution. [4M]
  - c) Flood control methods. [4M]
6. Discuss the provisions of the following Acts.
  - a) Wildlife protection Act, 1972. [7M]
  - b) Air (prevention and control of pollution) Act, 1981. [7M]
7. a) What is Environmental Audit? Explain how it is carried out. [7M]
- b) Describe how you would record the elements and resources of an Ecosystem [7M] during your field visit.

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**PART -A**

1. a) Write about effects of population growth in India. [2M]
- b) Explain how timber extraction effects forest resources [2M]
- c) What do you understand by threats to biodiversity? [2M]
- d) What is nuclear hazard? Give two Examples. [2M]
- e) Explain Environmental Ethics. [2M]
- f) Write about green politics. [2M]
- g) Define sustainable development. [2M]

**PART -B**

2. a) Explain the role of I.T. in environment and human health. [8M]  
 b) Discuss about grassland Ecosystem. [6M]
3. Discuss how the energy needs are growing and explain the use of alternate sources of energy versus oil and natural gas extraction. [14M]
4. a) Explain biodiversity at national and local levels. [6M]  
 b) Discuss why India is a mega- diversity Nation. [8M]
5. a) What are Nuclear hazards? Explain and two case studies of Nuclear accidents. [6M]  
 b) Discuss the sources, effects and management of biomedical and hazardous wastes. [8M]
6. a) Explain Resettlement and Rehabilitation of people affected by developmental project with a case study. [8M]  
 b) Discuss about water conservation methods in agriculture and irrigation. [6M]
7. a) Write about the significance of EIA and the stages involved. [7M]  
 b) Based on your filed visit, summarize your observation and findings of River Ecosystem. [7M]

**MATHEMATICS-I**

(Common to all branches)

**Time: 3 hours****Max. Marks: 70**Question Paper Consists of **Part-A** and **Part-B**Answering the question in **Part-A** is Compulsory,**Four Questions** should be answered from **Part-B**

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**PART-A**

1. (a) Find the orthogonal trajectory of  $r = \frac{2a}{1+\cos\theta}$
- (b) Find the P.I of  $(D+2)^2 y = x^2$
- (c) Find  $L(f(t))$  where  $f(t) = \begin{cases} e^t & \text{if } 0 < t < 1 \\ 0 & \text{if } t > 1 \end{cases}$
- (d) Evaluate  $L^{-1}\left[\frac{2s^2-1}{(s^2+1)(s^2+4)}\right]$
- (e) Find  $\frac{du}{dx}$  If  $u = \sin(x^2 + y^2)$ , where  $a^2x^2 + b^2y^2 = c^2$
- (f) Solve the PDE  $pq(pq + qy - z)^3 = 1$
- (g) Classify the Nature of PDE  $\frac{\partial^2 u}{\partial x^2} + 2\frac{\partial^2 u}{\partial x \partial y} + 4\frac{\partial^2 u}{\partial y^2} = 0$

[7 x 2 = 14]

**PART-B**

2. (a) Solve the D.E  $\frac{dy}{dx} = \frac{x^2 + y^2 + 1}{2xy}$
- (b) A resistance of 100 ohms, an inductance of 0.5 Henry is connected in series with a battery of 20 volts. Find the current in the circuit, if initially there is no current in the circuit
- (a) Solve the D.E  $(D^3 + 1)y = \cos(2x - 1) + x^2e^{-x}$
- (b) Consider an electrical circuit containing an inductance L, Resistance R and capacitance C. let q be the electrical charge on the condenser plate and 'i' be the current in the circuit at any time. Given that  $L = 0.25$  henries,  $R = 250$  ohms,  $q = 2 \times 10^{-6}$  farads and there is no applied E.M.F in the circuit. At time zero the current is zero and the charge is 0.002 coulomb. Then find the charge (q) and current (i) at any time.

[7+7]

[7+7]



4. (a) Evaluate  $L^{-1} \left[ \frac{1}{2} \log \left\{ \frac{s^2 + b^2}{s^2 + a^2} \right\} \right]$

(b) Solve  $(D^2 - 1)x = a \cosh t$  if  $x(0) = 0, x'(0) = 0$ . using Laplace transform method.

[7+7]

5. (a) Find the dimensions of a rectangular parallelopipid box open at the top of max capacity whose surface area is 108 sq inches.

(b) If  $u = x + y + z, u^2 v = y + z, u^3 w = z$  then find  $J \left( \frac{u, v, w}{x, y, z} \right)$

[7+7]

6. (a) Solve  $x(y^2 + z)p - y(x^2 + z)q = z(x^2 - y^2)$

(b) Solve the PDE  $p^2 q^2 + x^2 y^2 = x^2 q^2 (x^2 + y^2)$

[7+7]

7. (a) Solve the PDE  $(D + D^1 - 1)(D + 2D^1 - 3)z = 4 + 3x + 6y$

(b) Solve the PDE  $\frac{\partial^2 z}{\partial x^2} + 2 \frac{\partial^2 z}{\partial x \partial y} + \frac{\partial^2 z}{\partial y^2} = 2 \sin y - x \cos y$

[7+7]

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**MATHEMATICS-I**

(Common to all branches)

**Time: 3 hours****Max. Marks: 70**Question Paper Consists of **Part-A** and **Part-B**Answering the question in **Part-A** is Compulsory,**Four Questions** should be answered from **Part-B**

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**PART-A**

1. (a) Solve the D.E  $(x + 2y^3)\frac{dy}{dx} = y$
- (b) Find the P.I of  $(D-1)^2(D+2)y = e^x$
- (c) Find  $L(\sin 2t \sin 3t)$
- (d) Evaluate  $L^{-1}\left[\frac{3s+1}{(s+1)^4}\right]$
- (e) Find  $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y}$  if  $u = f(x+y, x-y)$
- (f) Solve the PDE  $pq = p + q$ .
- (g) Solve the PDE  $\frac{\partial^2 z}{\partial x^2} - \frac{\partial^2 z}{\partial x \partial y} + \frac{\partial z}{\partial y} - z = 0$

[7 x 2 = 14]

**PART-B**

2. (a) Find the Orthogonal trajectory of the family of confocal conics  $\frac{x^2}{a^2} + \frac{y^2}{a^2 + \lambda} = 1$ , where  $\lambda$  is a Parameter.
- (b) The number of N of bacteria in a culture grew at a rate proportional to N. The value of N was initially 100 and increased to 332 in one hour. What was the value of N after 3/2 hours?

[7+7]

3. (a) Solve the D.E  $(D^2 + 1)y = \sec^2 x$  by the Method of variation parameters
- (b) Consider an electrical circuit containing an inductance L, Resistance R and capacitance C. Let q be the electrical charge on the condenser plate and 'i' be the current in the circuit at any time. There is applied E.M.F Esinωt in the circuit. Then find the charge on the capacitor.

[7+7]

4. (a) Evaluate  $\int_0^\infty e^{-t} \frac{\sin^2 t}{t} dt$  using Laplace transform
- (b) Solve  $(D^4 - k^4)y = 0$  if  $y(0) = 1, y'(0) = 0, y''(0) = 0, y'''(0) = 0$ . using Laplace transform method

[7+7]

5. (a) Find the point in the plane  $2x + 3y - z = 5$  which is nearest to the origin.
- (b) Prove that  $u = x\sqrt{1-y^2} + y\sqrt{1-x^2}$ ,  $v = \sin^{-1}(x) + \sin^{-1}(y)$  are functionally dependent and find the relation between them. [7+7]
6. (a) Solve the PDE  $z(y-x) = qy^2 - px^2$
- (b) Solve the PDE  $z^2(p^2 + q^2) = x^2 + y^2$  [7+7]
7. (a) Solve the PDE  $(D^2 - DD^1 - 2D)z = \sin(4y + 3x)$
- (b) Solve  $\frac{\partial^2 z}{\partial x^2} - 6\frac{\partial^2 z}{\partial x \partial y} + 9\frac{\partial^2 z}{\partial y^2} = 12x^2 + 36xy$  [7+7]

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**MATHEMATICS-I**

(Common to all branches)

**Time: 3 hours****Max. Marks: 70**Question Paper Consists of **Part-A** and **Part-B**Answering the question in **Part-A** is Compulsory,**Four Questions** should be answered from **Part-B**

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**PART-A**

1. (a) Write the working Rule to find the orthogonal trajectory of the curve  $f(x, y, c) = 0$
- (b) Solve the D.E  $(D^2 + 1)^2 (D - 1)y = 0$
- (c) Find  $L(\sqrt{t}e^{-3t})$
- (d) Evaluate  $L^{-1}\left[\frac{1}{s(s+1)^3}\right]$
- (e) Find  $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y}$  if  $u = \sin^{-1}\left[\frac{x^2 y^2}{x+y}\right]$
- (f) Form the partial differential equation by eliminating a and b from  $z = (x^2 + a)(y^2 + b)$
- (g) Find the P.I of  $(D - D^1 - 1)(D - D^1 - 2)z = e^{2x-y}$

[7 x 2 = 14]

**PART-B**

2. (a) Solve the D.E :  $(x^3 y^2 + x)dy + (x^2 y^3 - y)dx = 0$
  - (b) If the temp of a cup of coffee is  $92^0\text{C}$  when freshly poured in a room having temperature  $24^0\text{C}$ , in one minute it was cooled to  $80^0\text{C}$ . How long a period must elapse, before the temp. of the cup becomes  $65^0\text{C}$ ? A body kept in air with temp  $25^0\text{C}$  cools from  $140^0\text{C}$  to  $80^0\text{C}$  in 20 minutes. Find when the body cools down to  $35^0\text{C}$ .
- [7+7]
3. (a) Solve the D.E  $(D^2 + 3D + 2)y = xe^x \sin x$
  - (b) Consider an electrical circuit containing an inductance L, Resistance R and capacitance C. let q be the electrical charge on the condenser plate and 'i' be the current in the circuit at any time. Given that  $L = 0.1$  henries,  $R = 20$  ohms,  $q = 25 \times 10^{-6}$  farads and there is no applied E.M.F in the circuit. At time zero the current is zero and the charge is 0.05 coulomb. Then find the charge (q) and current (i) at any time
- [7+7]

4. (a) Find Laplace transform of unit impulse function  
(b) Solve  $(D^3 + D^2)x = 6t^2 + 4$  if  $x(0) = 0, x'(0) = 2, x''(0) = 0$ . using Laplace transform method. [7+7]
5. (a) Find the Maximum and minimum distance of the point  $(1, 2, 3)$  from the sphere  $x^2 + y^2 + z^2 = 1$   
(b) Expand  $xy^2 + \cos xy$  in powers of  $(x-1)$  and  $(y-\pi/2)$  up to second degree terms. [7+7]
6. (a) Solve the PDE  $x^2 p^2 + y^2 q^2 = 1$   
(b) Solve the PDE  $(y + z)p - (z + x)q = x - y$  [7+7]
7. (a) Solve the PDE  $\frac{\partial^2 z}{\partial x^2} + \frac{\partial z}{\partial x \partial y} - 6 \frac{\partial^2 z}{\partial y^2} = y \cos x$   
(b) Solve the PDE  $(D^3 - 7DD'^2 - 6D'^3)Z = \sin(x + 2y) + e^{2x+y}$  [7+7]

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**MATHEMATICS-I**

(Common to all branches)

**Time: 3 hours****Max. Marks: 70**Question Paper Consists of **Part-A** and **Part-B**Answering the question in **Part-A** is Compulsory,**Four Questions** should be answered from **Part-B**

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**PART-A**

1. (a) Solve the D.E  $(1 + y \cos x)dx + \sin x dy = 0$
- (b) A particle is executing simple harmonic motion with amplitude 5 meters and time 4 seconds. Find the time required by the particle in passing between points which are at distances 4 and 2 meters from the centre of the force and is on the same side of it.
- (c) Find  $L(f(t))$  where  $f(t) = \begin{cases} \cos\left(t - \frac{2\pi}{3}\right) & \text{if } t > \frac{2\pi}{3} \\ 0 & \text{if } t < \frac{2\pi}{3} \end{cases}$
- (d) Evaluate  $L^{-1}\left\{\frac{1}{(s^2+1)(s^2+9)}\right\}$
- (e) If  $u = \sqrt{x^2 + y^2}, v = \tan^{-1}\left(\frac{y}{x}\right)$  then find  $J\left(\frac{u, v}{x, y}\right)$
- (f) From the partial differential equation of from by eliminating f and g from  $z = f(y) + g(x+y)$ .
- (g) Find the P.I of  $\left(D^2 + 3DD^1 + 2D^{1^2}\right)z = 12xy$

[7 x 2 = 14]

**PART-B**

2. (a) Show that the family of curves  $r^n = a \sec n\theta$  &  $r^n = b \cos ec n\theta$  are orthogonal
- (b) A voltage  $Ee^{-at}$  is applied to a circuit containing Inductance L and resistance R, then find the current in the circuit, if initially there is no current in the circuit

[7+7]

3. (a) Solve the D.E  $(D^4 + 2D^2 + 1)y = x^2 \cos x$
- (b) Consider an electrical circuit containing an inductance L, Resistance R and capacitance C. Let q be the electrical charge on the condenser plate and 'i' be the current in the circuit at any time. Given that  $L = 0.1$  henries,  $R = 2$  ohms,  $q = 1/260$  farads and there is applied E.M.F  $100\sin 60t$  in the circuit. At time zero the current and the charge are both zero. Then find the charge on the capacitor and current in the circuit.

[7+7]



4. (a) State convolution theorem and use it to evaluate  $L^{-1}\left[\frac{1}{(s^2 + 4s + 13)^2}\right]$
- (b) Solve  $(D^3 + D)x = 2$  if  $x(0) = 3, x'(0) = 1, x''(0) = -2$ . using Laplace transform method [7+7]
5. (a) Find the extreme points of  $f(x, y) = 1-x^2-y^2$
- (b) Expand  $\tan^{-1}\left(\frac{y}{x}\right)$  in powers of  $(x-1)$  and  $(y-1)$  up to third degree terms hence evaluate  $f(1.1, 0.9)$  approximately. [7+7]
6. (a) Solve the PDE  $p \cos(x+y) + q \sin(x+y) = z$
- (b) Solve the PDE  $(x+y)(p+q)^2 + (x-y)(p-q)^2 = 1$  [7+7]
7. (a) Solve  $(D^2 - D'^2 - 3D + 3D')z = xy + e^{x+2y}$
- (b) Solve the PDE  $\frac{\partial^2 z}{\partial x^2} - \frac{\partial z}{\partial x \partial y} - 2 \frac{\partial^2 z}{\partial y^2} = (y-1)e^x$  [7+7]

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**I B. Tech I Semester Regular Examinations Dec. - 2016**  
**MATHEMATICS-II**  
**(Mathematical Methods)**  
**(Com. to CSE, IT, Agri Engg.)**

**Time: 3 hours****Max. Marks: 70**

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\*\*\*\*\*

**PART A**

1. a) Find real root of the equation  $3x = e^x$  by using Bisection method up to 3 approximations.

b) Show that  $e^x \left( u_0 + x\Delta u_0 + \frac{x^2}{2!} \Delta^2 u_0 + \dots \right) = u_0 + u_1 x + u_2 \frac{x^2}{2!} + \dots$

c) Evaluate  $\int_0^1 \frac{dx}{1+x}$  using Trapezoidal rule.

d) Explain about Dirichlet's conditions for a Fourier expansion.

e) The temperatures at one end of a bar  $OA$  of 50 cm length with insulated sides are kept at  $0^\circ C$  at  $O$  and  $100^\circ C$  at  $A$  until steady state conditions prevail. Find steady state temperature.

f) If  $F(p)$  is the complex Fourier transform of  $f(x)$  then prove that

$$F\{f(ax)\} = \frac{1}{a} F\left(\frac{p}{a}\right), a > 0.$$

g) Using Newton-Raphson method find square root of a number.

$(7 \times 2 = 14M)$

**PART B**

2. a) Solve  $x^3 = 2x + 5$  for a positive root by regula-falsi method.

b) Solve the system of equations by Newton Raphson method  $3yx^2 - 10x + 7 = 0$  and

$$y^2 - 5y + 4 = 0. \quad (7M+7M)$$



3. a) Fit a interpolating polynomial in x for the following data

|   |   |   |   |    |    |
|---|---|---|---|----|----|
| x | 1 | 4 | 6 | 8  | 10 |
| y | 1 | 7 | 9 | 12 | 21 |

- b) Using Lagrange's formula fit a polynomial to the data

|      |   |    |    |    |
|------|---|----|----|----|
| x    | 0 | 2  | 5  | 9  |
| f(x) | 1 | 12 | 15 | 33 |

(7M+7M)

4. a) Evaluate  $\int_0^2 \frac{dx}{x^3 + x + 1}$  by using Simpson's 1/3<sup>rd</sup> rule with h= 0.25.

- b) Evaluate y(0.8) using Runge Kutta method given  $y' = (x + y)^{\frac{1}{2}}$ ,  $y(0.4) = 0.41$

(7M+7M)

5. a) Find the Fourier series of  $x \cos x$  for  $0 < x < 2\pi$ .

- b) Find half range Fourier sine series of  $f(x) = \pi - x$  in  $[0, \pi]$ .

(7M+7M)

6. A tightly stretched flexible string has its ends fixed at  $x=0$  and  $x=10$ . At time  $t=0$ , the string is given a shape defined by  $f(x) = kx(10-x)$ , where  $k$  is a constant and then released. Find the displacement of any point  $x$  of the string at any time.

(14M)

7. a) Find the Fourier transform of  $\frac{1}{\sqrt{|x|}}$ .

- b) Find the inverse Fourier transform of  $f(x)$  of  $F_s(p) = \frac{p}{1+p^2}$

(7M+7M)

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**MATHEMATICS-II**  
**(Mathematical Methods)**  
**(Com. to CSE, IT, Agri Engg.)**

**Time: 3 hours****Max. Marks: 70**

Question Paper Consists of **Part-A** and **Part-B**

Answering the question in **Part-A** is Compulsory,  
**Four** Questions should be answered from **Part-B**

\*\*\*\*\*

**PART A**

1. a) Find positive root of the equation  $x^3 - 2x - 5 = 0$  using Regula-Falsi method. Carry out two approximations.
- b) Find the missing term in the following table

|   |   |   |   |   |    |
|---|---|---|---|---|----|
| X | 0 | 1 | 2 | 3 | 4  |
| Y | 1 | 3 | 9 | - | 81 |

- c) The table below shows the temperature  $f(t)$  as a function of time:

|        |    |    |    |    |    |    |    |
|--------|----|----|----|----|----|----|----|
| $t$    | 1  | 2  | 3  | 4  | 5  | 6  | 7  |
| $f(t)$ | 81 | 75 | 80 | 83 | 78 | 70 | 60 |

Using Simpson's  $\frac{1}{3}$  rd rule, evaluate  $\int_1^7 f(t)dt$ .

- d) Expand the function  $f(x) = x^3$  as a Fourier series in  $-\pi \leq x \leq \pi$ .
- e) Write One-Dimensional wave equation with initial and Boundary conditions.
- f) If  $F_s(p)$  and  $F_c(p)$  are the Fourier sine and cosine transforms of  $f(x)$  respectively, then

$$\text{prove } F_s[f(x)\cos ax] = \frac{1}{2}[F_s(p+a) + F_s(p-a)].$$

- g) Evaluate (i)  $\Delta^2 e^{2x+3}$  (ii)  $\Delta^2 \cos 2x$ . (7×2 = 14M)

**PART B**

2. a) Using Regula-falsi method, find the real root of  $2x - \log x = 6$  correct to three decimal places.
- b) Solve the system of equations by Newton Raphson method  $x^2 + y^2 - 1 = 0$  and

$$y - x^2 = 0.$$

(7M+7M)

3. a) Fit a interpolating polynomial in x for the following data

|   |    |   |   |    |    |
|---|----|---|---|----|----|
| x | 0  | 1 | 2 | 3  | 4  |
| y | -3 | 3 | 4 | 27 | 57 |

- b) Find Interpolating polynomial by Lagrange's method and hence find  $f(2)$  for the following data

|        |     |   |   |    |
|--------|-----|---|---|----|
| x      | 0   | 1 | 3 | 4  |
| $f(x)$ | -12 | 0 | 6 | 12 |

(7M+7M)

4. a) Evaluate  $\int_0^{0.6} e^{-x^2} dx$  by using Simpson's 1/3<sup>rd</sup> rule with  $h= 0.1$ .

- b) Find  $y(74)$  given that  $y(50)= 201$ ,  $y(60)= 225$ ,  $y(70)=248$  and  $y(80)=274$ . Using Newton's difference formula.

(7M+7M)

5. a) Expand  $\cos\pi x$  in  $(0,1)$  as Fourier sine series.

- b) Obtain the Fourier sin series of  $f(x) = e^{-x}$  in the interval  $0 < x < 2\pi$ .

(7M+7M)

6. The ends A and B of a rod 20 cm long have the temperature at  $30^0 C$  and  $80^0$  until steady states prevail. The temperatures of the ends are change at  $40^0C$  and  $60^0C$  respectively. Find the temperature distribution in the rod at time  $t$ .

(14M)

7. a) Find the Fourier sine and cosine transform of  $f(x) = \frac{1}{1+x^2}$ .

- b) Find the inverse Fourier cosine transform of  $F_c(p) = p^n e^{-ap}$ .

(7M+7M)

**I B. Tech I Semester Regular Examinations Dec. - 2016**  
**MATHEMATICS-II**  
**(Mathematical Methods)**  
**(Com. to CSE, IT, Agri Engg.)**

**Time: 3 hours****Max. Marks: 70**

Question Paper Consists of **Part-A** and **Part-B**

Answering the question in **Part-A** is Compulsory,  
**Four** Questions should be answered from **Part-B**

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**PART A**

1. a) Using Newton-Raphson method find reciprocal of 18.

- b) The function  $y = \sin x$  is tabulated below

|              |   |                 |                 |
|--------------|---|-----------------|-----------------|
| $x$          | 0 | $\frac{\pi}{4}$ | $\frac{\pi}{2}$ |
| $y = \sin x$ | 0 | 0.70711         | 1.0             |

Using Lagrange's interpolation formula, find the value of  $\sin\left(\frac{\pi}{6}\right)$ .

- c) Solve numerically using Euler's method  $y' = y^2 + x$ ,  $y(0) = 1$ . Find  $y(0.1)$  and  $y(0.2)$ .
- d) Express  $f(x) = x$  as a Half range sine series in  $0 < x < 2$ .
- e) Solve  $u_x - 4u_y = 0$ ,  $u(0, y) = 8e^{-3y}$  by the method of separation of variables.
- f) Find finite Fourier cosine transform of  $f(x) = x$ ,  $0 < x < 4$ .
- g) Using Euler's method find an approximate value of  $y$  corresponding to  $x = 0.4$  given that

$$\frac{dy}{dx} = x + y \text{ and } y = 1 \text{ at } x = 0. \quad (7 \times 2 = 14M)$$

**PART B**

2. a) Find a real root of the equation  $x^3 - 4x - 9 = 0$  using False position method correct to three decimal places.
- b) Solve the system of equations by Newton Raphson method  $3yx^2 - 10x + 7 = 0$  and  $y^2 - 5y + 4 = 0$ . (7M+7M)



3. a) From the following table of half yearly premium for policies at different ages, estimate the premium for policies at the age of 63.

|           |        |       |       |       |       |
|-----------|--------|-------|-------|-------|-------|
| Age x     | 45     | 50    | 55    | 60    | 65    |
| Premium y | 114.84 | 96.16 | 83.32 | 74.48 | 68.48 |

- b) Apply Lagrange's formula to find  $f(5)$  given that  $f(1)=2$ ,  $f(2)=4$ ,  $f(4)=16$  and  $f(7)=128$ .

(7M+7M)

4. a) Evaluate  $\int_0^6 \frac{e^x}{x+1} dx$  by using Simpson's 1/3<sup>rd</sup> rule with  $h=1$ .

- b) Evaluate  $y(0.1)$  and  $y(0.2)$  using Runge Kutta method given  $y' = xy + y^2$ ,  $y(0)=1$ .

(7M+7M)

5. a) Find the Fourier series of the function  $f(x) = |\sin x|$  in  $[-1, 1]$ .

- b) Obtain the Fourier cosine series of  $f(x) = e^{-x}$  in the interval  $0 < x < 2\pi$ .

(7M+7M)

6. The ends A and B of a rod of length 20 cm have the temperatures at 30°C and 80°C until steady state conditions prevails. The temperature of the ends is changed to 40°C and 60°C respectively. Find the temperature distribution in the rod at time t.

(7M+7M)

7. a) Find Fourier transform of  $f(x)$  defined by  $f(x) = e^{-x^2/2}$ ,  $-\infty < x < \infty$ .

- b) Find the inverse Fourier cosine transform of  $F_c(p) = \frac{\sin ap}{p}$ .

(7M+7M)

**I B. Tech I Semester Regular Examinations Dec. - 2016**  
**MATHEMATICS-II**  
**(Mathematical Methods)**  
**(Com. to CSE, IT, Agri Engg.)**

**Time: 3 hours****Max. Marks: 70**

Question Paper Consists of **Part-A** and **Part-B**

Answering the question in **Part-A** is Compulsory,  
**Four** Questions should be answered from **Part-B**

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**PART A**

1. a) By the fixed point iteration process, find the root correct to two decimal places of the equation  $x = \cos x$  near  $x = \frac{\pi}{4}$ .
- b) Prove that  $\mu^2 = 1 + \frac{\delta^2}{4}$ .
- c) Write merits and demerits of Runge-Kutta method.
- d) Find Fourier series for the function  $f(x) = |x|, -\pi < x < \pi$ .
- e) Solve  $4u_x + u_y = 0$  and  $u(0,y) = e^{-5y}$  by the method of separation of variables.
- f) Find finite Fourier sine transform of  $f(x) = x, 0 < x < \pi$ .
- g) Write the formula for half range cosine series expansion of  $f(x)$  in  $(0,l)$ .  $(7 \times 2 = 14M)$

**PART B**

2. a) Using regula-falsi method, find the real root of  $2x - \log x = 6$  correct to three decimal places.
- b) Solve the system of equations by Newton Raphson method  $3yx^2 - 10x + 7 = 0$  and  $y^2 - 5y + 4 = 0$ .  $(7M+7M)$



3. a) Using Lagrange's Interpolation formula find the value of  $y(10)$  from the following table

|        |    |    |    |    |
|--------|----|----|----|----|
| x      | 5  | 6  | 9  | 11 |
| $y(x)$ | 12 | 13 | 14 | 16 |

- b) Fit a interpolating polynomial in  $x$  for the following data

|   |   |   |   |   |    |
|---|---|---|---|---|----|
| x | 0 | 1 | 2 | 3 | 4  |
| y | 3 | 5 | 6 | 9 | 17 |

(7M+7M)

4. a) Evaluate  $\int_1^7 \frac{e^x dx}{x+1}$  by using Simpson's 1/3<sup>rd</sup> rule with  $h=1$ .

- b) Using Runge-Kutta fourth order formula, find  $y(0.2)$  for the equation  $y' = \frac{y-x}{y+x}$   $y(0) = 1$   
taking  $h=0.1$ .

(7M+7M)

5. a) Find the Fourier series of the function  $f(x) = e^x$  in  $[0,2]$ .

- b) Obtain the Fourier sine series of  $f(x) = xsinx$  in the interval  $0 < x < \pi$ .

(7M+7M)

6. A tightly stretched flexible string has its ends fixed at  $x=0$  and  $x=10$ . At time  $t=0$ , the string is given a shape defined by  $f(x) = kx(10-x)$ , where  $k$  is a constant and then released. Find the displacement of any point  $x$  of the string at any time.

(14M)

7. a) Find Fourier cosine transform of  $f(x) = \frac{e^{-ax}}{x}$

- b) Find the inverse Fourier cosine transform of  $F_c(p) = p^n e^{-ap}$ .

(7M+7M)

**I B. Tech I Semester Regular Examinations Dec. - 2016**  
**MATHEMATICS-II**  
**(Numerical Methods and Complex Variables)**  
**(Com. to ECE, EIE, E.Com.E.)**

**Time: 3 hours****Max. Marks: 70**

Question Paper Consists of **Part-A** and **Part-B**  
 Answering the question in **Part-A** is Compulsory,  
**Four** Questions should be answered from **Part-B**

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**PART-A**

1. a) What is transcendental equation? Given an example.
- b) What is the difference between interpolation and extrapolation?
- c) Find  $y(0.1)$  by Taylor's series method for  $y' = y - x$ ,  $y(0) = 1$
- d) Show that the function  $e^x(\cos y + i \sin y)$  is holomorphic
- e) State the Cauchy's theorem.
- f) Evaluate  $\int_0^{1+i} (x^2 - iy) dz$  along the path  $y = x$
- g) Find the Pole and residue of  $f(z) = \frac{e^z}{(z-1)^2}$

[2+2+2+2+2+2+2]

**PART-B**

2. a) Find the Real root of the equation  $\tan x = x$  using Bisection method.
- b) Find the Real root of the equation  $x + \log_{10} x - 2 = 0$  using false position method. [7+7]
3. a) Estimate the minimum weight of bib taps when bore is 20 mm using the following table

|                          |      |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|------|
| Bore(mm)                 | 8    | 10   | 15   | 25   | 32   | 40   | 50   |
| Weight of bib taps in kg | 0.25 | 0.30 | 0.40 | 1.25 | 1.70 | 2.15 | 3.65 |

- b) Determine the value of  $f(x)$  at  $x = 25$  for the following data

[7+7]

|          |    |    |    |    |
|----------|----|----|----|----|
| x        | 20 | 24 | 28 | 32 |
| $y=f(x)$ | 24 | 32 | 35 | 40 |

4. a) Evaluate  $\int_0^{\frac{\pi}{2}} e^{\sin x} dx$  by (i) Trapezoidal rule (ii) Simpson's 1/3<sup>rd</sup> Rule
- b) Find  $y(0.1)$  for the D.E  $\frac{dy}{dx} = xy^2$ ,  $y(0) = 1$  using RK method of fourth order



5. a) Find the Analytic function whose real part is  $u(x, y) = \frac{\sin 2x}{\cosh 2y + \cos 2x}$   
b) Show that the function  $f(z) = z\bar{z}$  is differentiable but not analytic at origin. [7+7]
6. a) Using Cauchy's integral formula, evaluate  $\int_C \frac{\cosh \pi z}{z(z^2 + 1)} dz$ , where C is  $|z| = 2$  [7+7]  
b) Express  $f(z) = \frac{z}{(z-1)(z-3)}$  in a series of positive and negative powers of  $(z-1)$
7. a) Evaluate  $\int_0^\infty \frac{\cos x}{(1+x^2)^2} dx$   
b) Evaluate  $\int_C \frac{e^z}{(z^2 + \pi^2)^2} dz$   
Where C is  $|z| = 4$  by using residue theorem [7+7]

**I B. Tech I Semester Regular Examinations Dec. - 2016**  
**MATHEMATICS-II**  
**(Numerical Methods and Complex Variables)**  
**(Com. to ECE, EIE, E.Com.E.)**

**Time: 3 hours****Max. Marks: 70**

Question Paper Consists of **Part-A** and **Part-B**  
 Answering the question in **Part-A** is Compulsory,  
**Four** Questions should be answered from **Part-B**

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**PART-A**

1. a) What is Algebraic equation? Given an example.
- b) Prove that  $\nabla = 1 - E^{-1}$
- c) Explain single step method with simple example?
- d) Determine whether the function  $2xy + i(x^2 - y^2)$  is analytic.
- e) Evaluate  $\int_0^{1+i} (x^2 - iy) dz$  along the path  $y = x^2$
- f) Obtain Taylor's series for  $f(z) = e^z$  about  $z = 1$
- g) Find the Pole and residue of  $f(z) = \frac{z}{(z^2 - 4)}$

**[2+2+2+2+2+2+2]****PART-B**

2. a) Find the Real root of the equation  $x^2 - x - 4 = 0$  using iteration method [7+7]
- b) Find the Real root of the equation  $e^{2x} - e^x - 2 = 0$  using Newton Raphson method



3. a) The viscosity of an oil is experimentally measured at different temperatures as shown in the following table

|                            |      |     |     |     |
|----------------------------|------|-----|-----|-----|
| Temp in $^{\circ}\text{C}$ | 110  | 130 | 160 | 190 |
| Viscosity                  | 10.8 | 8.1 | 5.5 | 4.8 |

Find the Viscosity of the oil at the Temperature of  $140\ ^{\circ}\text{C}$

- b) Determine the value of  $f(x)$  at  $x = 10$  for the following data

[7+7]

|          |      |      |      |      |
|----------|------|------|------|------|
| x        | 2    | 5    | 9    | 11   |
| $y=f(x)$ | 94.8 | 87.9 | 81.3 | 75.1 |

4. a) Evaluate  $\int_0^1 \log x \cos x dx$  by (i) Trapezoidal rule (ii) Simpson's  $3/8^{\text{th}}$  Rule [7+7]

- b) Find  $y(0.1)$  for the D.E  $\frac{dy}{dx} = x^2 y - 1$ ,  $y(0) = 1$  using Taylor's series method

5. a) Define analytic function and Verify the whether  $f(z) = \frac{x^3(1+i) - y^3(1-i)}{x^2 + y^2}$ , ( $z \neq 0$ ) and  $f(0) = 0$ , is analytic [7+7]

- b) Define Harmonic function and verify whether  $u(x, y) = e^{2x}(x \cos 2y - y \sin 2y)$  is harmonic and find its harmonic conjugate.

6. a) Evaluate  $\oint \left[ \frac{e^z}{z^3} + \frac{z^4}{(z+i)^2} \right] dz$ , where  $c: |z| = 2$  [7+7]

- b) Expand  $f(z) = \frac{z+3}{z(z^2-z-2)}$  in power series where (i)  $|z| < 1$  (ii)  $1 < |z| < 2$  (iii)  $|z| > 2$

7. a) Evaluate  $\int_0^{2\pi} \frac{d\theta}{5 - 4 \sin \theta}$  [7+7]

- b) Evaluate  $\int_C \frac{z \cos z}{\left(z - \frac{\pi}{2}\right)^3} dz$  where C is the Region bounded by  $|z - 1| = 1$  using Residue theorem

**I B. Tech I Semester Regular Examinations Dec. - 2016**  
**MATHEMATICS-II**  
**(Numerical Methods and Complex Variables)**  
**(Com. to ECE, EIE, E.Com.E.)**

**Time: 3 hours****Max. Marks: 70**

Question Paper Consists of **Part-A** and **Part-B**  
 Answering the question in **Part-A** is Compulsory,  
**Four** Questions should be answered from **Part-B**

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**PART-A**

1. a) what is an iterative process , why should we apply iterative technique
- b) Define Newton forward interpolation formula
- c) When do you use numerical integration? Give an example
- d) Find the analytic function whose real part is  $\frac{x}{x^2 + y^2}$
- e) Evaluate  $\int_0^{1+i} (x^2 + iy) dz$  along the path  $y = x$
- f) Obtain Taylor's series for  $f(z) = 1/z^2$  about  $z = 1$
- g) Find the Singularity of the function  $f(z) = e^{1/z}$

**[2+2+2+2+2+2+2]****PART-B**

2. a) Find the Real root of the equation  $2x^3 - 3x - 4 = 0$  using Newton Raphson method
- b) Find the Real root of the equation  $4 \sin x = e^x$  using false position method [7+7]
3. a) Determine the value of  $f(x)$  at  $x = 225$  form the following data

**[7+7]**

|          |    |     |     |     |      |
|----------|----|-----|-----|-----|------|
| x        | 50 | 100 | 150 | 200 | 250  |
| y = f(x) | 5  | 5.7 | 7.7 | 8.9 | 10.7 |

- b) Calculate  $f(3)$  from the following table

|        |   |    |    |   |   |    |
|--------|---|----|----|---|---|----|
| x      | 0 | 1  | 2  | 4 | 5 | 6  |
| Y=f(x) | 1 | 14 | 15 | 5 | 6 | 19 |

4. a) Evaluate  $\int_0^{\frac{\pi}{2}} \frac{\cos x}{1+x} dx$  by (i) Simpson's 3/8<sup>th</sup> Rule (ii) Simpson's 1/3<sup>rd</sup> Rule [7+7]

b) Find y (0.1) for the D.E  $\frac{dy}{dx} = x + y + xy$ ,  $y(0) = 1$  using Modified Euler's method

5. a) Show that  $\left( \frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2} \right) \log|f'(z)| = 0$ , where f(z) is analytic function. [7+7]

b) If  $f(z) = u + iv$  is analytic and  $v = \frac{2 \sin x \sin y}{\cos 2x + \cosh 2y}$ , find u.

6. a) Evaluate  $\int_c \frac{ze^{2z}}{(z-2)^3} dz$  where c is the circle with radius 3 by Cauchy integral formula

b) Obtain Laurent's expansion for  $f(z) = \frac{1}{(z+2)(z+1)}$  in  $1 < |z| < 2$  [7+7]

7. a) Evaluate  $\int_0^{2\pi} \frac{d\theta}{3 - 2\sin \theta}$  using residue theorem

b) Find the Residue of  $\frac{1+e^z}{z \cos z + \sin z}$  at  $z = 0$  [7+7]

**I B. Tech I Semester Regular Examinations Dec. - 2016**  
**MATHEMATICS-II**  
**(Numerical Methods and Complex Variables)**  
**(Com. to ECE, EIE, E.Com.E.)**

**Time: 3 hours****Max. Marks: 70**

Question Paper Consists of **Part-A** and **Part-B**  
 Answering the question in **Part-A** is Compulsory,  
**Four** Questions should be answered from **Part-B**

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**PART-A**

1. a) What are possible ways of finding the roots of nonlinear equation
- b) What are the applications of interpolation?
- c) Write the merits and demerits of Euler's method?
- d) Prove that an analytic function with constant imaginary part is constant.
- e) Evaluate  $\int_0^{1+i} (x^2 + iy) dz$  along the path  $y = x^2$
- f) Obtain Taylor's series for  $f(z) = 1/z$  about  $z = 1$
- g) Define Removable singularity and give an example

[2+2+2+2+2+2+2]

**PART-B**

2. a) Find the Real root of the equation  $x^2 - x - 2 = 0$  using iteration method [7+7]
- b) Find the Real root of the equation  $e^x - 4x^2 = 0$  using Bisection method
3. a) Determine the value of  $f(x)$  at  $x = 1.6$  form the following data [7+7]

|        |      |      |      |     |
|--------|------|------|------|-----|
| x      | 1    | 1.4  | 1.8  | 2.2 |
| y=f(x) | 3.49 | 4.82 | 5.96 | 6.5 |

- b) Using Lagrange's Interpolation, find  $f(12)$  given that

|   |   |    |    |    |
|---|---|----|----|----|
| x | 3 | 7  | 9  | 13 |
| y | 5 | 12 | 13 | 21 |

4. a) Evaluate  $\int_0^{\frac{\pi}{2}} \sin x \log(\sin x) dx$  by (i) Trapezoidal rule (ii) Simpson's 1/3<sup>rd</sup> Rule [7+7]

b) Find  $y(0.1)$  for the D.E  $\frac{dy}{dx} = \frac{x^2}{y^2 + 1}$ ,  $y(0) = 1$  using Picard's method

5. a) Show that for the function  $f(z) = \begin{cases} \frac{z^5}{|z|^4}, & z \neq 0 \\ 0, & z = 0 \end{cases}$  Cauchy- Riemann equation are satisfied

at  $z = 0$ , but  $f(z)$  is not differentiable at 0. [7+7]

b) Show that the function  $f(x, y) = x^3y - xy^3 + xy + x + y$  can be the imaginary part of an analytic function of  $f(z)$  also find the real part of the complex function

6. a) Evaluate  $\int_c \frac{ze^{2z}}{(z - \pi i)^3} dz$  where  $c$  is the circle with radius 4 by Cauchy integral formula

b) Obtain Laurent's expansion for  $f(z) = \frac{1}{(z+2)^2(z+1)}$  in  $|z| > 2$  [7+7]

7. a) Evaluate  $\int_0^\infty \frac{dx}{(x^4 + 1)}$

b) Find the residue of  $f(z) = \frac{z^3}{(z-2)(z-3)(z-1)^4}$  at  $z = 1$  [7+7]

**I B. Tech I Semester Regular Examinations Dec. - 2016****ENGINEERING CHEMISTRY****(Com. to AE, BOT, CHEM, CE, MM, MET, PE, PCE, AME, ME)****Time: 3 hours****Max. Marks: 70**Question Paper Consists of **Part-A** and **Part-B**Answering the question in **Part-A** is Compulsory,  
**Four** Questions should be answered from **Part-B**

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**PART-A**

1. a) A sample of water has 13.6 ppm of calcium sulphate. If the water is softened by lime and soda process, what would be the quantities of lime and soda required to soften one litre of this water?
- b) Of the two polymers – polythene and phenol-formaldehyde resins – which is a thermoplastic and which is a thermo-set. Suggest one method each for fabrication of these two.
- c) If you want to protect iron from corrosion by cathodic protection method, which of the two metals – Mg and Sn – can be used and what is the reason for your selection?
- d) Give the Dulong's formula for the calorific value of a solid fuel, explaining the terms involved in it.
- e) What are the advantages of phase transfer catalyst over conventional catalyst?
- f) If methanol is used as a fuel in a fuel cell, what would be the reactions at the electrodes?
- g) What are biodegradable polymers and why are they important? (7×2=14M)

**PART-B**

2. a) What are fibre reinforced plastics? What are the roles of the reinforcement and the matrix in the properties of these fibre reinforced plastics?  
b) With neat sketches, explain injection moulding and compression moulding. (7M+7M)
3. a) During proximate analysis of a sample of coal weighing 2.256 grams was heated at  $110^{\circ}\text{C}$  for one hour and then weighed giving 2.020 grams of product. This product was then burnt completely and the residue weighed 0.450 gram. Another fresh sample of the same coal was heated with vented Lid at  $950^{\circ}\text{C}$  for exactly seven minutes and the residue weighed 1.600 grams. Calculate the percentages of different constituents.  
b) Differentiate between petrol knocking and diesel knocking.  
c) Why rocket fuels are different from normal fuels? (6M+5M+3M)

4. a) Describe the construction of calomel electrode.  
b) Explain water line corrosion.  
c) Write briefly about electroless plating. (5M+4M+5M)
  
5. a) With suitable examples explain sol-gel method of preparation of nano materials.  
b) What are super conductors? Mention their applications?  
c) Why green chemistry is important for engineers? (6M+5M+3M)
  
6. a) Explain the complexometric determination of hardness of water.  
b) A zeolite softener removed completely the hardness of 5,000 litres of hard water. The softener required 55 litres of NaCl solution containing 100grams/ litre of NaCl for regeneration. Calculate the hardness of the hard water sample.  
c) How does chlorination sterilize drinking water? (7M+5M+2M)
  
7. a) How are refractories classified? Give one example each for the different classes.  
b) Explain the mechanism of hydrodynamic lubrication.  
c) What are electric insulators? Discuss three important properties of these insulators. (3M+6M+5M)

**I B. Tech I Semester Regular Examinations Dec. - 2016**  
**ENGINEERING CHEMISTRY**

**(Com. to AE, BOT, CHEM, CE, MM, MET, PE, PCE, AME, ME)**

**Time: 3 hours**

**Max. Marks: 70**

Question Paper Consists of **Part-A** and **Part-B**

Answering the question in **Part-A** is Compulsory,  
**Four** Questions should be answered from **Part-B**

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**PART-A**

1. a) What is the most commonly employed reinforcing material used for producing reinforced plastics? What is the role of the reinforcement?
- b) What is bio-diesel and how is it obtained? How does it differ from normal diesel?
- c) Some metals are passive to corrosion. Give two examples of such metals and explain why they are passive.
- d) Explain the sol-gel method of preparing a nano material.
- e) How is reverse osmosis different from electro-dialysis?
- f) What do you understand by viscosity index of an oil?
- g) Compare natural gas and LPG as fuels.

(7×2=14M)

**PART-B**

2. a) What are stereo-regular polymers? Explain with a neat representation syndiotactic polymers.
- b) Explain how Bakelite is produced.
- c) Write notes on Buna S rubber.

(5M+5M +4M)

(10M+4M)



4. a) Describe the construction of standard hydrogen electrode.  
b) Explain with suitable example, differential aeration corrosion.  
c) Differentiate between cathodic metal coating and anodic metal coating. (5M+5M+4M)
  
5. a) Describe the CVD method of preparing carbon nano tubes.  
b) Explain the principles of green chemistry.  
c) Explain Meissner effect. (5M+6M+3M)
  
6. a) What are the different types of scales one comes across in boilers? Why are these scales undesirable?  
b) How does a deioniser remove the hardness of water?  
c) Explain break point-chlorination. (6M+3M+5M)
  
7. a) Describe the determination of refractoriness of a refractory brick.  
b) What is a lubricant and what are the different functions of a lubricant?  
c) Give an out-line of the production of cement. (5M+3M+6M)



**I B. Tech I Semester Regular Examinations Dec. - 2016**  
**ENGINEERING CHEMISTRY**  
**(Com. to AE, BOT, CHEM, CE, MM, MET, PE, PCE, AME, ME)**

Time: 3 hours

Max. Marks: 70

Question Paper Consists of **Part-A** and **Part-B**

Answering the question in **Part-A** is Compulsory,  
**Four** Questions should be answered from **Part-B**

\*\*\*\*\*

**PART-A**

1. a) What are polycarbonates and why are they called engineering plastics?  
 b) How, sulphur present in coal is determined?  
 c) What are the chemical reactions that take place at the electrodes during discharge of a Nickel – Metal hydride cell?  
 d) What are lyotropic liquid crystals? Give two examples of them.  
 e) Chlorine is a good disinfectant and sterilizing agent. Explain how it functions in such a way.  
 f) What is thermal spalling and how does it affect the stability of refractory bricks?  
 g) What are the constituents for which the flue gases are analysed by Orsat apparatus?

What are the reagents that are used to determine these constituents? (7×2=14M)

**PART-B**

2. a) Write a brief note on conducting polymers.  
 b) What are the important advantages and limitations of plastics as engineering materials?  
 c) What is high density polyethylene and how is it produced? (5M+5M +4M)
  
3. a) Explain fluid bed catalytic cracking process.  
 b) A sample of coal has the following weight percentage analysis:  
 C : 84,            S : 1.5,            N : 0.6,            H : 5.5    and the remaining oxygen  
 Calculate the HCV and LCV of this fuel, given that the latent heat of steam is 587cals/gram.  
 c) How is power alcohol different from normal petrol? (7M+5M +2M)



4. a) What is electrochemical series? Explain its applications.  
b) Explain the pitting corrosion.  
c) Write notes on cathodic protection. (5M+4M +5M)
5. a) Discuss the important properties and applications of carbon nano tubes.  
b) Explain, with examples, two methods of green synthesis.  
c) What are liquid crystals? What are the two important (major) classes of liquid crystals?  
(6M+5M +3M)
6. a) Calculate the total hardness of a sample of water having the following analysis:  
 $\text{Ca}(\text{HCO}_3)_2$  : 20 mg/litre,  $\text{Mg}(\text{HCO}_3)_2$ : 15 mg/lit.,  $\text{CaCl}_2$  : 11 mg/lit, &  
 $\text{Ca}(\text{NO}_3)_2$  : 16 mg/lit.  
Express the results as ppm and  $^{\circ}\text{Clarke}$ .  
b) Write notes on ‘Priming and Foaming’ and ‘Caustic embrittlement’. (6M+8M)
7. a) Describe the construction and working of hydrogen – oxygen fuel cell.  
b) Explain the deterioration of cement concrete in presence of  $\text{Cl}^-$ ,  $\text{CO}_2$  and  $\text{SO}_2$  (8M+6M)



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Question Paper Consists of **Part-A** and **Part-B**

Answering the question in **Part-A** is Compulsory,  
**Four** Questions should be answered from **Part-B**

\*\*\*\*\*

**PART-A**

1. a) What is Thiokol rubber and how is it produced?  
 b) 0.9 gram of coal was burnt in a bomb calorimeter of water equivalent of 440 grams. The heat liberated is absorbed by 2,560 grams of water and the temperature increases by  $0.05^{\circ}\text{C}$ . Calculate the calorific value of the coal.  
 c) What are the reactions that take place at anodic and cathodic areas during differential aeration corrosion?  
 d) What are superconductors? Give two examples of super conductors  
 e) What is caustic embrittlement and what are the reasons for it?  
 f) What is the difference between setting and hardening of cement concrete?  
 g) What are nematic liquid crystals? Give examples.

(7×2=14M)

**PART-B**

2. a) Explain 'Emulsion polymerisation'. What are the advantages of this method?  
 b) How is PVC produced and explain three of its uses.  
 c) What is vulcanisation and how does it improve the properties of rubber. (5M+5M +4M)
3. a) Explain, with reasons, whether sulphur's presence in a fuel is desirable or not.  
 b) Write a brief note on rocket fuels.  
 c) A coal sample contains C : 76%, H : 5.2%, O : 12.8%, N : 2.7%, S : 1.2% and remaining ash. Calculate the minimum weight of air required for the complete combustion of one kg. of the fuel. (5M+4M+5M)
4. a) Write notes on (i) lithium cells and (ii) zinc- air cells  
 b) Explain the electrochemical theory of corrosion. (6M+8M)
5. a) Explain briefly how nano materials are characterised by BET method and TEM method.  
 b) Explain R<sub>4</sub>M<sub>4</sub> principles. (8M+6M)
6. a) Describe the lime soda process of softening hard water.  
 b) Describe desalination of brackish water by reverse osmosis process. (7M+7M)
7. a) Discuss the mechanism of thin film lubrication.  
 b) What are the important constituents of cement and what is the role of each constituent?  
 c) Explain how a fuel cell is different from a normal galvanic cell. (6M+6M +2M)



**I B. Tech I Semester Regular Examinations December- 2016**  
**ENGINEERING DRAWING**  
(Com. to CSE, IT, Agri.E)

**Time: 3 hours**

**Max. Marks: 70**

Question Paper Consists of **Part-A** and **Part-B**  
Answering the question in **Part-A** is Compulsory,  
**Four** Questions should be answered from **Part-B**  
\*\*\*\*\*

**PART-A**

1. (a) Draw a line AB, 150 mm long and divide it into 11 equal parts.  
(b) A line 50 mm long is parallel to HP and perpendicular to VP. Its rear end is 20 mm in front of VP. The line is 35 mm above HP and 30 mm in front of right profile plane. Draw the three views.  
(c) Draw the three possible ways of representing the isometric projection of a hexagonal prism side of base 25 mm and height 60 mm.

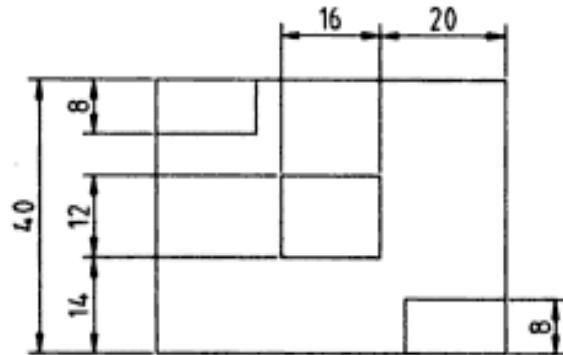
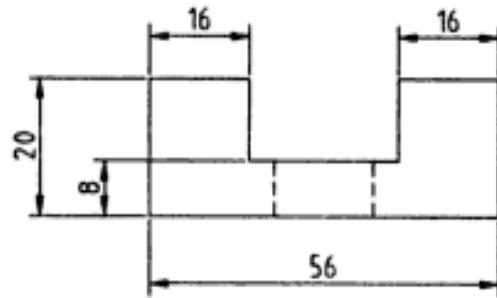
[3+4+7]

**PART-B**

2. (a) Construct a scale having R.F = 1:400 to show meters and long enough to measure up to 60 meters. Measure a distance of 44 meters on the scale.  
(b) Draw an ellipse at major axis 100 mm and minor axis 65 mm using oblong method. Draw a tangent and normal at a point 25 mm above the major axis. [8+6]
3. (a) A Point P is at a distance of 30 mm from HP and VP. Draw the projections of the point for all possible position  
(b) A line AB of 25 mm long is perpendicular to VP and parallel to HP. The end points A and B of the line are 10mm and 35 mm in front of VP respectively. The line is 20 mm above HP. Draw its projections. [7+7]
4. (a) An electric switch (A) and bulb (B), fixed on a wall are 5m apart. The distance between them, measured parallel to the floor is 4 meters. If the switch is 1.5 meters above the floor, find the height of the bulb and inclination of the line joining the switch and bulb, with the floor.  
(b) One end of line AB is 10mm above HP and other end is 100 mm in front of VP. It's FV is  $45^0$  inclined to xy while it's HT & VT are 45mm and 30 mm below xy respectively. Draw projections and find TL with it's inclinations with HP & VP. [6+8]



5. A pentagonal plate of side 30mm is resting on HP on one of its sides with its surface inclined at  $45^0$  to HP and the resting side is inclined at  $55^0$  to VP. Draw its projections. [14]
6. A hexagonal pyramid of base side 30 mm and axis length 60 mm is resting on HP on one of its base corners with its axis inclined at  $35^0$  to HP. The base sides containing the resting corner are equally inclined to HP. Draw its projections. [14]
7. Draw the isometric view of the object shown in figure below. [14]



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**I B. Tech I Semester Regular Examinations Dec- 2016**  
**ENGINEERING DRAWING**  
(Com. to CSE, IT, Agri.E)

**Time: 3 hours**

**Max. Marks: 70**

Question Paper Consists of **Part-A** and **Part-B**  
Answering the question in **Part-A** is Compulsory,  
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\*\*\*\*\*

**PART-A**

1. (a) A point C is 35 mm below HP and 25 mm behind VP. Draw its projections.
- (b) A hexagonal pyramid side of base 25 mm and height 50 mm rests with its base on HP such that one of the edges of the base is inclined at  $20^0$  to VP. Draw the top and front views of the pyramid.
- (c) The top view of a 75 mm long line measures 55 mm. The line is in the V.P, its one end being 25 mm above the H.P. Draw its projections.

[4+5+5]

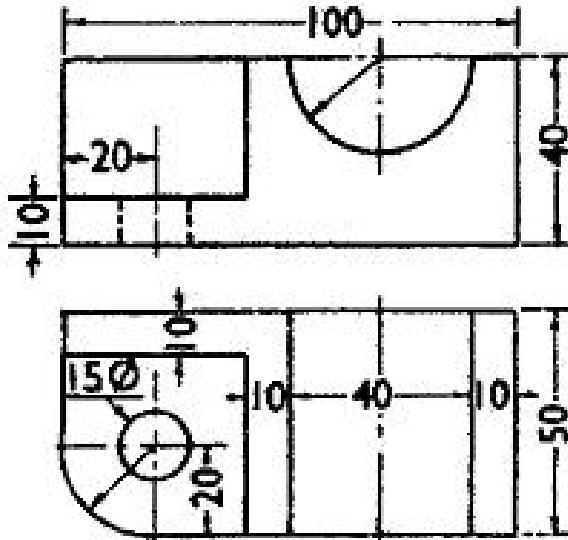
**PART-B**

2. (a) Construct a regular hexagon of 35 mm side with one of its side vertical.  
(b) Construct a vernier scale to show readings of  $1/10^{\text{th}}$  of a meter when 3 cm represents 10 m.  
Construct the scale to read up to 60 m and mark the distances of 35.3 m and 47.3 m on your scale.
3. (a) Two points A and B are on the H.P. The point A is 30mm in front of the V.P., while B is behind the V.P. The distance between their projectors is 75mm and the line joining their top views makes an angle of  $45^0$  with xy. Find the distance of the point B form the V.P.  
(b) A line MN 50mm long is parallel to V.P. and inclined at  $30^0$  to H.P. The end M is 20mm above H.P. and 10mm in front of V.P. Draw the projections of the line.

[6+8]



4. (a) The projections of a line measure 80 mm in the top view and 70 mm in the front view. The midpoint of the line is 45 mm in front of VP and 35 mm above HP. One end is 10 mm in front of VP and nearer to it. Draw the projections. Find true length and true inclinations with reference planes.
- (b) Draw the projections of line LM 40 mm long, parallel to HP and inclined at  $35^0$  to VP. The end L is 20 mm above HP and 15 in front of VP. Find its traces. [8+6]
5. Draw the projections of a rhombus, having diagonals 120 mm and 60 mm long, the smaller diagonal of which is parallel to both the planes, while the other is inclined to  $30^0$  to HP. [14]
6. A hexagonal prism side of base 25 mm and axis 50 mm long rests with one of its base corners on HP such that its base makes an angle of  $60^0$  to HP and its axis is parallel to VP. Draw its projections. [14]
7. Figure 1, shows the orthographic projections of the object. Draw the Isometric projection.[14]

**Figure 1**

(All dimensions are in mm)

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Question Paper Consists of **Part-A** and **Part-B**

Answering the question in **Part-A** is Compulsory,  
**Four** Questions should be answered from **Part-B**

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### PART-A

1. (a) Draw the isometric view of Figure 1.

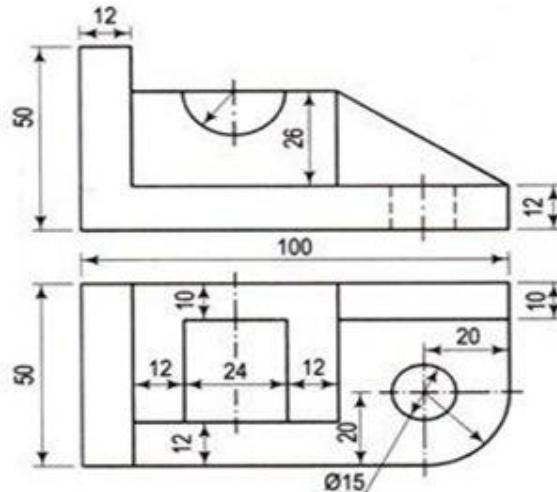


Figure 1

Note: All dimensions are in mm.

- (b) A point B is 45 mm above HP and 60 mm behind VP. Draw its projections. [10+4]

### PART-B

2. (a) The distance between Coimbatore and Madurai is 200 km and its equivalent distance on map measures 10 cm. Draw a diagonal scale to indicate 223 km and 135 km.  
 (b) A plot of ground is in the shape of rectangle 110 m x 50 m. Inscribe an elliptical lawn in it. Take a scale of 1: 1000. [8+6]
3. (a) Draw the projections of the following points , keeping the distance between the projectors as 25mm on the same reference line.  
 i) P- 25mm above HP and 45 in front of VP  
 ii) Q- on HP and 25 mm behind VP.  
 iii) R- 45mm below HP and on VP  
 iv) S- 30mm below HP and 40 mm in front of VP  
 (b) A line measuring 80 mm long has one of its end 60 mm above H.P and 20 mm in front of VP. The other end is 15 mm above HP and in front VP. The front view of the line is 60 mm long. Draw the top view. [8+6]

4. A line AB has its end A 25 mm above HP and 20 mm in front of VP. The end B is 50 mm above HP and the line is inclined at  $30^0$  to VP. The distance between the end projectors of the line when measured parallel to the line of intersection of HP and VP is 60 mm.  
Draw the projections. Find the apparent lengths, apparent inclinations, true length and true inclination with HP. [14]
5. a) Draw the projections of a circle of 75 mm diameter having the end A of a diameter AB in the H.P., the end B in the V.P., and the surface inclined at  $30^0$  to the H.P. and at  $60^0$  to the V.P.  
b) Draw projections of a square lamina of 40 mm side that has a corner on H.P. and 20 mm in front of V.P. All sides equally inclined to H.P and parallel to V.P. [8+6]
6. Draw the projections of the cylinder base 30 mm diameter and axis 40 mm long resting with a point of its base circle on HP such that the axis is making an angle of  $30^0$  with HP and parallel to VP. [14]
7. Figure 2 shows pictorial view of an object. Draw (i) Front View (ii) Left hand side view (iii) Top View iv) Dimension the views [14]

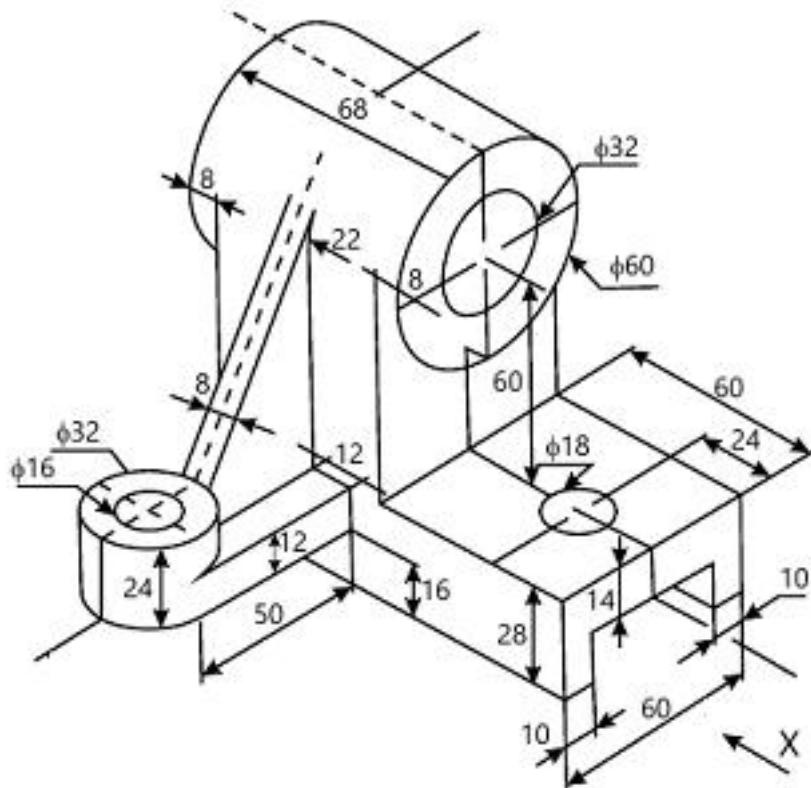


Figure 2  
(All dimensions are in mm)

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**I B. Tech I Semester Regular Examinations Dec- 2016**  
**ENGINEERING DRAWING**  
(Com. to CSE, IT, Agri.E)

**Time: 3 hours**

**Max. Marks: 70**

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Answering the question in **Part-A** is Compulsory,  
**Four** Questions should be answered from **Part-B**

\*\*\*\*\*

**PART-A**

1. (a) An equilateral triangular lamina of side 30 mm is parallel to H.P. and perpendicular to V.P.  
One of its sides is 20 mm in front of V.P. and 30 mm above H.P. Draw its projections.  
(b) A hexagonal pyramid side of base 25 mm, axis 50 mm long lies with one of the its  
triangular faces on HP and its axis is parallel to the VP. Draw its projections.  
(c) Construct a pentagon with a side of 30 mm.

[5+5+4]

**PART-B**

2. (a) Construct an ellipse when the major axis is 120 mm and the distance between the foci is 108 mm. Determine the length of the minor axis. Use arc and circles method.  
(b) The actual length of 300 m of an auditorium is represented by a line of 10 cm on drawing.  
Draw a vernier to read up to 400m mark on it, a length of 343 m.
3. (a) The front view of a 125 mm long line PQ measures 80 mm and its top view measures 100 mm. Its end Q and the mid-point M are in the first quadrant, M being 20 mm from both the planes. Draw the projections of the line PQ.  
(b) A point P is 15 mm above H.P and 20 mm in front of the V.P. Another point Q is 25 mm behind the V.P and 40 mm below the H.P. Draw projections of P and Q keeping the distance between their projectors equal to 90 mm. Draw straight lines joining (i) their top views and (ii) their front views.

[7+7]

[7+7]



4. (a) The distance between the end projectors of a line AB is 60mm. The end A is 25mm above H.P. and 45mm in front of V.P., while the other end B is 60mm above H.P. and 15mm in front V.P. Draw projections and find the true length and also inclination of the line with H.P. and V.P.  
(b) A line AB, 75 mm long is in the second quadrant with the end A in the H.P. and the end B in the V.P. The line is inclined at  $30^0$  to the H.P. and at  $45^0$  to the V.P. Draw the projections of AB and determine its traces. [7+7]
5. A regular pentagonal lamina of 30 mm side has one edge in HP and inclined at an angle of  $30^0$  to VP. Draw its projections when its surface is inclined at  $45^0$  to HP. [14]
6. A cone of 30 mm diameter and 70 mm height rests on the ground on a point of its base circle. The axis of the cone is inclined at an angle of  $45^0$  to HP and parallel to VP the point touching the ground is 30 mm in front of VP. Draw the projections of the cone. [14]
7. Figure 1, shows pictorial view of an object. Draw i) Front view ii) Top view iii) Dimension the view [14]

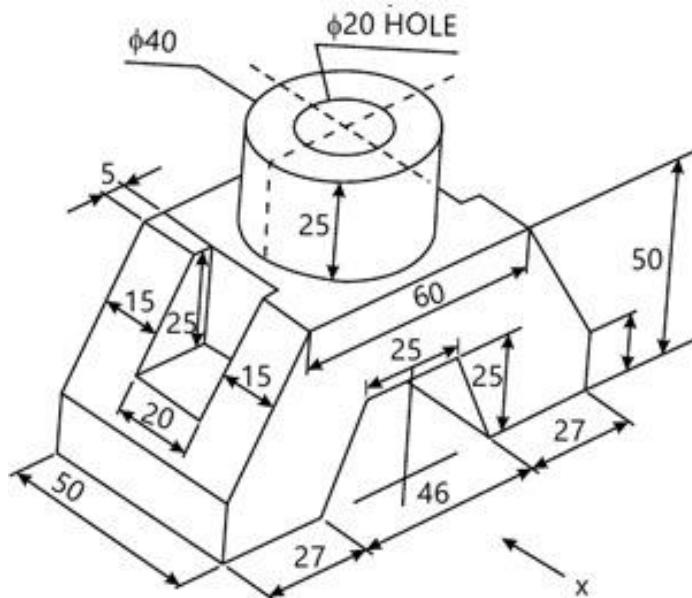


Figure 1

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**I B. Tech I Semester Regular Examinations, December – 2016**  
**ENGINEERING DRAWING**  
(Com. to ECE, EIE, E.Com.E)

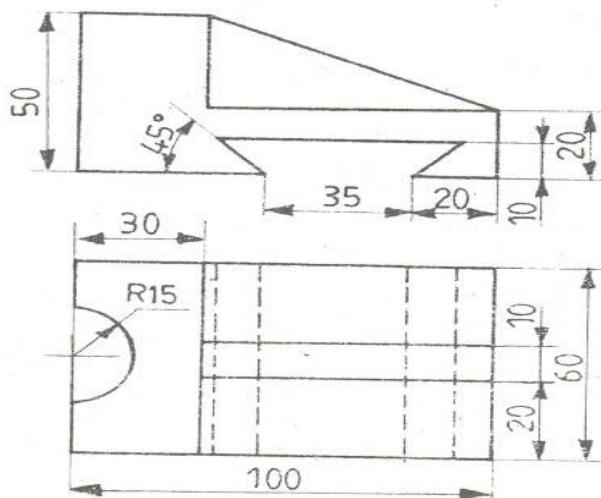
**Time: 3 hours****Max. Marks: 70**

Question Paper Consists of Part-A and Part-B  
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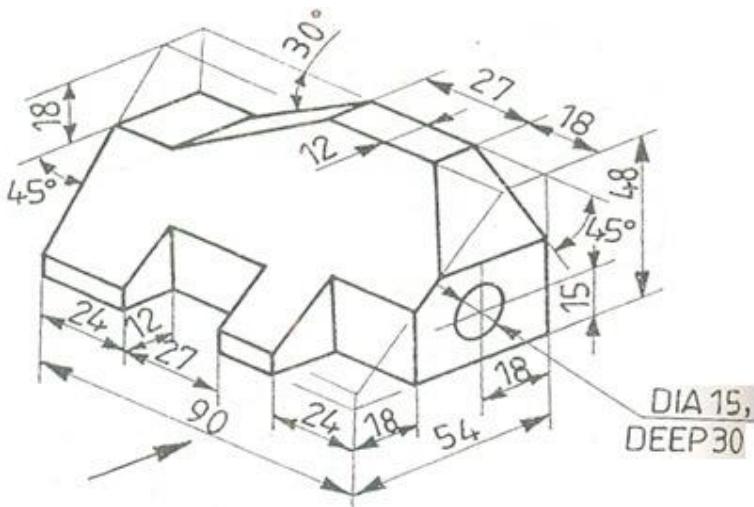
**PART-A**

1. (a) Draw an equilateral triangle of 75mm side and inscribe a circle in it. Draw the projections of the figure, when its plane is vertical and inclined at  $30^0$  to the VP and one of its sides of the triangle is inclined at  $45^0$  to the HP. [6]
- (b) Draw the isometric view: [8]

**PART-B**

2. (a) Describe a regular pentagon about a circle of 100mm diameter. [7]
- (b) A fixed point F is 7.5cm from a fixed straight line. Draw the locus of a point P moving in such a way that its distance from the fixed straight line is equal to its distance from F. Name the curve. Draw normal and tangent at a point 6cm from F. [7]

3. (a) A point P is 20 mm below HP and lies in the third quadrant. Its shortest distance from xy is 40mm. Draw its projections. [7]
- (b) Construct a scale of 1.5 inches =1 foot to show inches and long enough to measure up to 4 feet. [7]
4. A line AB is 75mm long. A is 50mm in front of VP and 15mm above HP. B is 15mm in front of VP and is above HP. Top view of AB is 50mm long. Find the front view length and the true inclinations. [14]
5. A circular plate of negligible thickness and 50mm diameter appears as an ellipse in the front view, having its major axis 50mm long and minor axis 30mm long. Draw its top view when the major axis of the ellipse is horizontal. [14]
6. Draw the projections of a pentagonal prism, base 25mm side and axis 50mm long, resting on one of its rectangular faces on the HP with the axis inclined at  $45^0$  to the VP. [14]
7. Draw (i) Front View (ii) Top View (iii) Side View [14]



**I B. Tech I Semester Regular Examinations, December – 2016**  
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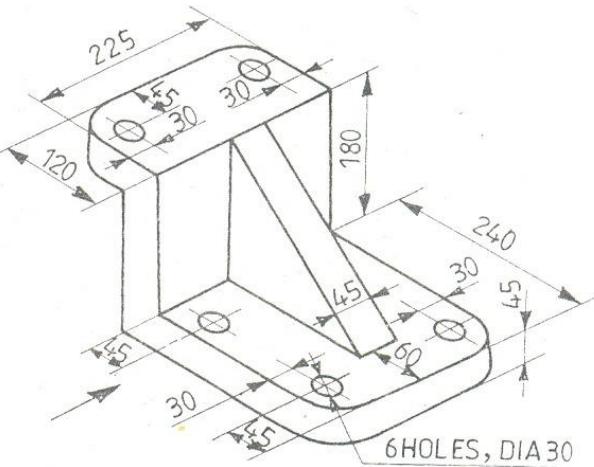
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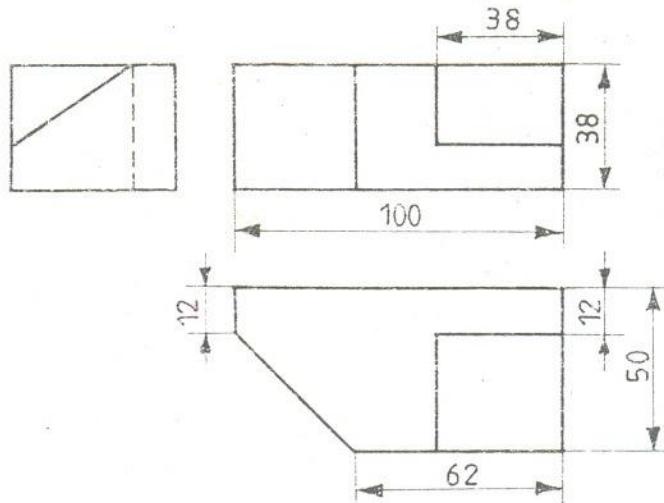
**PART-A**

1. (a) Draw a rhombus of diagonals 100mm and 60mm long, with the longer diagonal horizontal.  
The figure is the top view of a square of 100mm long diagonals, with a corner on the ground. Draw its front view and determine the angle which its surface makes with the ground. [5]
- (b) Draw (i) Front View (ii) Top View (iii) Side View [9]

**PART-B**

2. (a) Construct an ellipse when the distance between the focus and the directrix is 30mm and the eccentricity is  $\frac{3}{4}$ . Draw the tangent and normal at any point P on the curve using directrix. [8]
- (b) Construct a regular polygon of any number of sides, given the length of its sides equal to 25mm. [6]

3. (a) Draw a vernier scale of R.F=1/25 to read centimetres up to 4 meters and on it, show lengths representing 2.39m and 0.91m. [7]
- (b) Two points A and B are in the HP. The point A is 30mm in front of the VP; while B is behind the VP. The distance between their projectors is 75mm and the line joining their top views makes an angle  $45^0$  with xy. Find the distance of the point B from the VP. [7]
4. The end A of a line AB is in the HP and 25mm behind the VP. The end B is in the VP and 50mm above the HP. The distance between the end projectors is 75mm. Draw the projections of AB and determine its true length, traces and inclinations with the two planes. [14]
5. A thin  $30^0$ - $60^0$  set square has its longest edge in the VP and inclined at  $30^0$  to the HP. Its surface makes an angle of  $45^0$  with the VP. Draw the projections. [14]
6. Draw the projections of a cylinder 75mm diameter and 100 mm long, lying on the ground with its axis inclined at  $30^0$  to the VP and parallel to the ground. [14]
7. Draw the isometric view: [14]



**I B. Tech I Semester Regular Examinations, Dec – 2016**  
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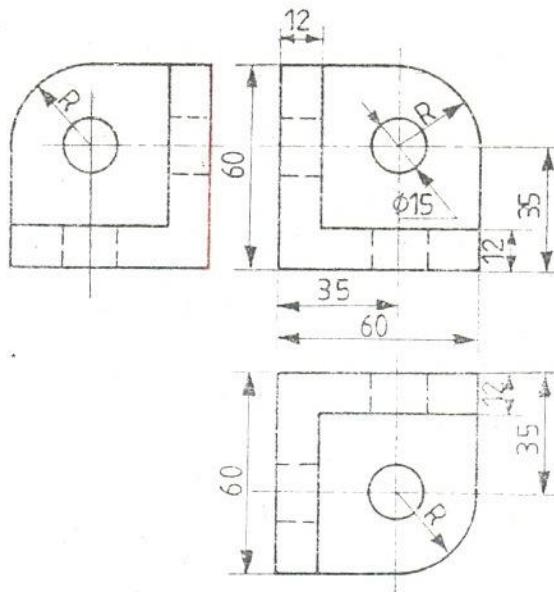
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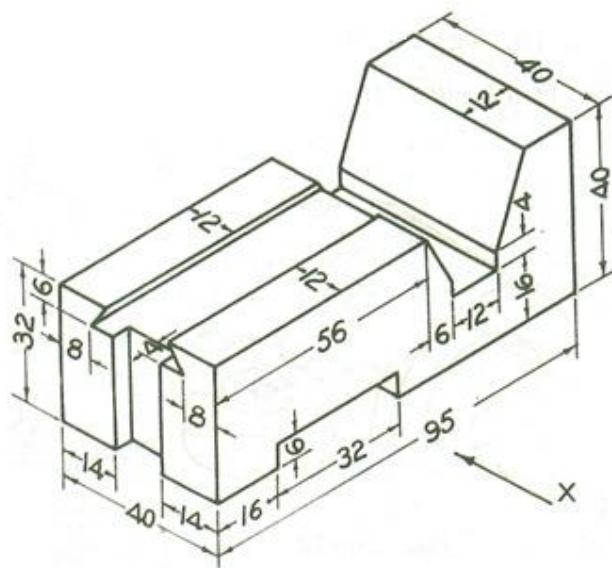
**PART-A**

1. (a) Draw the projections of a circle of 50mm diameter resting in the HP on a point A on the circumference, its plane inclined at  $45^0$  to the HP and (i) the top view of the diameter AB making  $30^0$ angle with the VP [7]
- (b) Draw the isometric view: [7]

**PART-B**

2. (a) The vertex of a hyperbola is 65mm from its focus. Draw the curve if the eccentricity is  $3/2$ .  
Draw a normal and a tangent at a point on the curve, 75mm from the directrix. [7]
- (b) Construct a regular octagon in a square of 75mm side. [7]

3. (a) Draw the projections of the following points on the same ground line, keeping the projectors 25mm apart.
- (i) A in the HP and 20mm behind the VP
  - (ii) B, 40mm above the HP; and 25mm in front of the VP
  - (iii) C, 25mm below the HP; and 25mm behind the VP
  - (iv) D, 15mm above the HP; and 50mm behind the VP [8]
- (b) Draw a diagonal scale of R.F=1/32 showing yards, feet and inches to measure up to 4 yards. [6]
4. Two oranges on a tree are respectively 1.8m and 3m above the ground, and 1.2m and 2.1m from a 0.3m thick wall, but on the opposite sides of it. The distance between the oranges, measured along the ground and parallel to the wall is 2.7m. Determine the real distance between the oranges. [14]
5. A semi circular plate of 80mm diameter has its straight edge in the VP and inclined at  $45^0$  to the HP. The surface of the plate makes an angle of  $30^0$  with the VP. Draw its projections. [14]
6. A hexagonal pyramid, base 25mm side and axis 50mm long, has an edge of its base on the ground. Its axis is inclined at  $30^0$  to the ground and parallel to the VP. Draw its projections. [14]
7. Draw (i) Front View (ii) Top View (iii) Side View: [14]



**I B. Tech I Semester Regular Examinations, Dec – 2016**  
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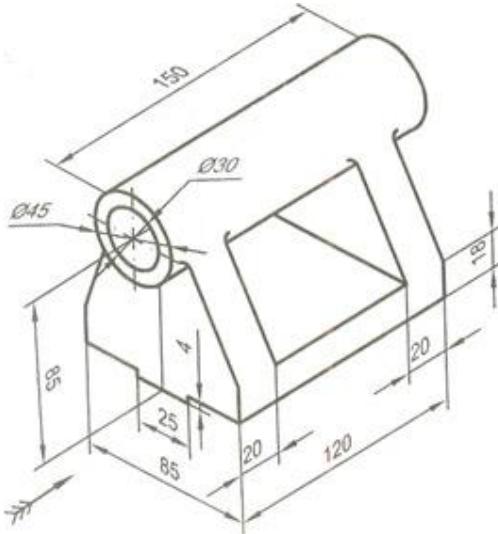
**Time: 3 hours****Max. Marks: 70**

Question Paper Consists of Part-A and Part-B  
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\*\*\*\*

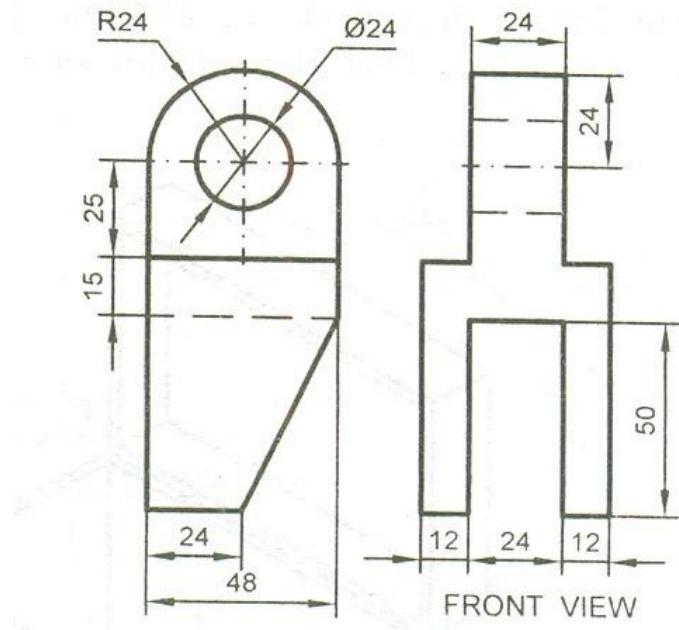
**PART-A**

1. (a) A composite plate of negligible thickness is made up of a rectangle 60mm x 40mm, and a semi circle on its longer side, Draw the projections when the longer side is parallel to the HP and inclined at  $45^0$  to the VP the surface of the plate making  $30^0$  angle with the HP. [7]  
(b) Draw (i) Front View (ii) Top View (iii) Side View [7]

**PART-B**

2. (a) Inscribe a regular heptagon inside the given circle of 68mm diameter. [7]  
(b) Construct a hypocycloid, rolling circle 50mm diameter and directing circle 175mm diameter. Draw a tangent to it at a point 50mm from the centre of the directing circle. [7]
3. (a) Draw the projections of a 75mm long straight line in the following positions:  
(i) parallel to and 30mm above the HP and in the VP  
(ii) perpendicular to the VP; 25mm above the HP and its one end in the VP  
(iii) Inclined at  $30^0$  to the HP and its one end 20mm above it; parallel to and 30mm in front of the VP. [6]  
(b) Construct a diagonal scale of R.F=1/4000 to show meters and long enough to measure up to 500 meters. [8]

4. The front view of a line AB measures 65mm and makes an angle of  $45^0$  with xy. A is in the HP and the VT of the line is 15mm below the HP. The line is inclined at  $30^0$  to the VP. Draw the projections of AB and find its true length and inclination with the HP. Also locate its H.T. [14]
5. Draw the projections of a regular hexagon of 25mm side, having one of its sides in the HP and inclined at  $60^0$  to the VP and its surface making an angle of  $45^0$  with the HP. [14]
6. Draw the projections of a cone, base 75mm diameter and axis 100mm long, lying on the HP on one of its generators with the axis parallel to the VP. [14]
7. Draw the isometric view: [14]



**I B. Tech I Semester Regular Examinations, Dec – 2016**  
**ENGINEERING MECHANICS**

(Com. to AE, AME, BOT, CHEM, CE, EEE, ME, MTE, MM, PCE, PE)

**Time: 3 hours**

**Max. Marks: 70**

Question Paper Consists of Part-A and Part-B

Answering the question in Part-A is Compulsory

**Four Questions should be answered from Part-B**

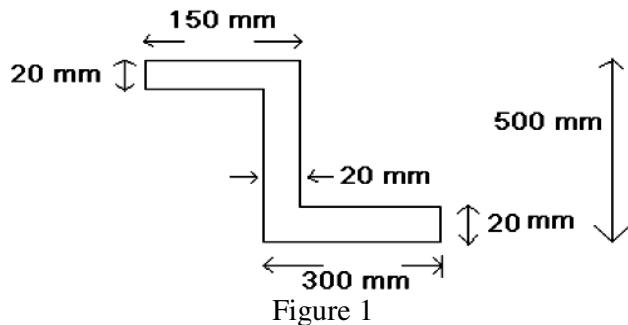
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**PART – A**

1. a) Define equilibrium of motion. Write the equations for equilibrium. (2M)  
 b) State the Laws of friction. (2M)  
 c) Define centroid and centre of gravity. (2M)  
 d) State the Parallel axis theorem. (2M)  
 e) Write the equations of translation. (2M)  
 f) Explain pappus theorem. (2M)  
 g) State work-energy theorem for a system of particles. (2M)

**PART – B**

2. a) What are the laws to add two forces and several concurrent, coplanar forces? (8M)  
 Explain in detail.
- b) A block weighing 100 N is resting on a rough plane inclined  $20^{\circ}$  to the horizontal. It is acted upon by a force of 50N directed upward at angle of  $14^{\circ}$  above the plane. Determine the friction. If the block is about to move up theplane, determine the co-efficient of friction. (6M)
3. a) State and prove Lamis Theorem. (7M)  
 b) Five strings are tied at a point and are pulled in all directions, equally spaced, fromone another. If the magnitude of the pulls on three consecutive strings is 70N, 40N and 55N respectively, find graphically the magnitude of the pulls on two otherstrings, if the system is in equilibrium. (7M)
4. a) Differentiate between centroid and centre of gravity. (7M)  
 b) Find the centroid of the Z section shown in Figure 1. (7M)



5. a) Find the moment of inertia of shaded area shown in Figure 2, below about (7M)  
centroidal axes.

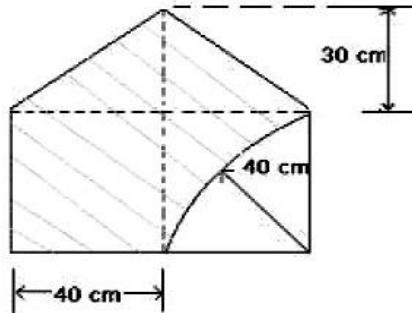


Figure 2

- b) Find the mass moment of inertia of a hollow sphere with respect to a diameter if (7M)  
the mass per unit volume of the material is  $\rho$  and the outer and inner radii are  
 $R_o$  and  $R_i$ , respectively.
6. a) The weight of a body on earth is 980N. If the acceleration due to gravity on (7M)  
earth is  $9.80 \text{ m/s}^2$ , what will be the weight of the body on  
i) The moon, where gravitational acceleration is  $1.6 \text{ m/s}^2$  and  
ii) The sun, where gravitational acceleration is  $270 \text{ m/s}^2$ .  
b) A bullet of mass 80gm and moving with a velocity of 200 m/s is fired into a log (7M)  
of wood and it penetrates to a depth of 8cm. If the bullet moving with the same  
velocity were fired into a similar piece of wood 5cm thick, with what velocity  
would it merge? Also find the force of resistance assuming it to be uniform.
7. a) Derive work energy equation for translation. (5M)  
b) A ball of mass 100gm is moving towards a bat with a velocity of 25m/s as (9M)  
shown in the Figure 3. When hit by the bat, the ball attains a velocity of 35m/s.  
If the ball and bat are in contact for a period of 0.02 sec, determine the average  
impulse force exerted by the bat on the ball during the impact.

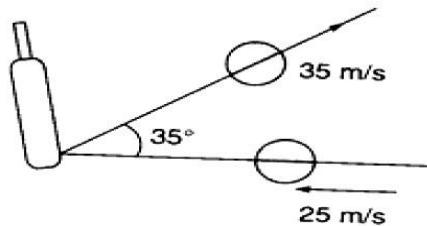


Figure 3

**I B. Tech I Semester Regular Examinations, Dec – 2016**  
**ENGINEERING MECHANICS**

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**Max. Marks: 70**

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Answering the question in Part-A is Compulsory

Four Questions should be answered from Part-B

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**PART – A**

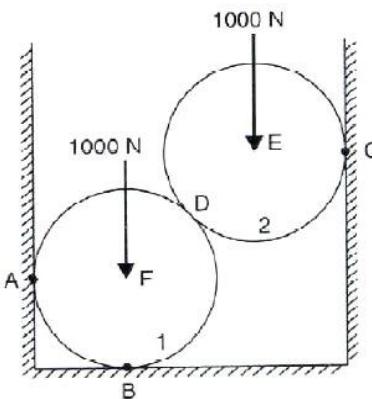
1. a) State the conditions for equilibrium of a rigid body in three dimensions.
- b) State triangular law of forces. What is the use of this law?
- c) Define a Free Body Diagram. Give two examples.
- d) What is general plane?
- e) Write impulse momentum equation.
- f) What is a rolling body? Explain its importance.
- g) What is transfer theorem? Explain.

[7 x 2 = 14]

**PART – B**

2. a) Three forces of magnitude 150N, 300N and 500N are acting at the origin O (0,0,0) and are directed from the points A (3,2,4), B (3,-2,-4) and C (-1,-3,-4) respectively to the origin. Determine the magnitude of the resultant.  
b) Explain the types of friction with examples.
3. a) Two spheres, each of weight 1000N and radius 25cm rest in a horizontal channel of width 90cm as shown in the Figure 3(a). Find the reactions on the points of contact A, B and C.

[8+6]



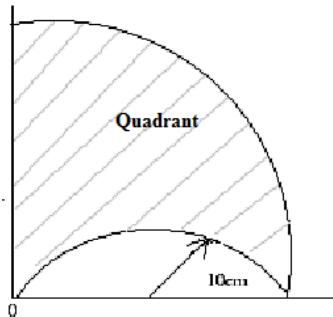
*Figure. 3(a)*

- b) A ladder 5m long and of 250N weight is placed against a vertical wall in a position where its inclination to the vertical is  $30^{\circ}$ . A man weighing 800N climbs the ladder. At what position will he induce slipping? The co-efficient of friction for both the contact surfaces of the ladder viz. with the wall and the floor is 0.2.

[7+7]

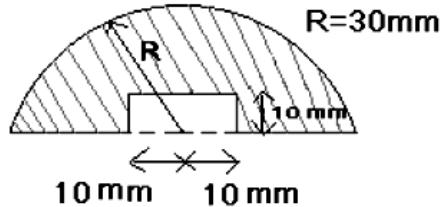
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4. a) Locate the centroid of the shaded area as shown in the Figure 4(a).

*Figure. 4(a)*

- b) State and prove parallel axis theorem. [8+6]

5. a) Find the moment of inertia about the horizontal centroidal axis of shaded portion as shown in the Figure 5(a).

*Figure. 5(a)*

- b) Deduce an equation for moment of inertia of right circular solid cone about its generating axes of base radius 'R' and altitude 'h'. [7+7]

6. a) A train is uniformly accelerated and passes successive kilometer stones with velocities of 18km/hr and 36km/hr respectively. Calculate the velocity when it passes the third kilometer stone. Also find the time taken for each of the two intervals of one kilometer.

- b) A body weighing 20N is projected up a  $20^0$  inclined plane with a velocity of 12m/s, coefficient of friction is 0.15. Find:  
 i) The maximum distance S, that the body will move up the inclined plane  
 ii) Velocity of the body when it returns to its original position.

7. A 6 kg block slides on a rough surface and come to rest. The deceleration is constant, initial velocity= 0.8m/s. Distance travelled before coming to rest = 2.5m.

- a) Determine the value of friction coefficient.  
 b) An additional 2.5 kg block is fixed to the top of the 6 kg block. Assuming same initial velocity, find the distance travelled by the system before coming to rest.

[14]

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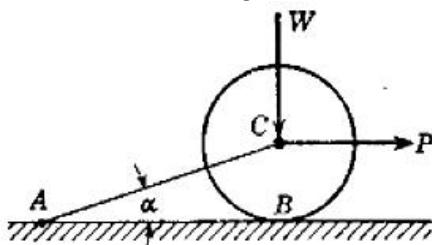
**PART – A**

1. a) State the converse of the law of triangle of forces.  
 b) State the Varignon's theorem.  
 c) Why static coefficient of friction is always greater than kinetic coefficient of friction?  
 d) State D'Alembert principle giving equations.  
 e) Define the term radius of gyration. Write the units.  
 f) What is fixed axis rotation? Explain.  
 g) Explain work-energy method for a plane motion.

[7 x 2 = 14]

**PART – B**

2. a) A body weighing 70kN rests in equilibrium on a rough plane whose slope is  $30^\circ$ . The plane is raised to a slope of  $45^\circ$ . What is the force applied to the body parallel to the plane that will support the body on the plane?  
 b) A right circular roller of weight  $W$  rests on a smooth horizontal plane and is held in position by an inclined bar AC as shown in Figure 2(b). Find the tension  $S$  in the bar AC and the vertical reaction  $R_b$  at B if there is also a horizontal force  $P$  acting at C.

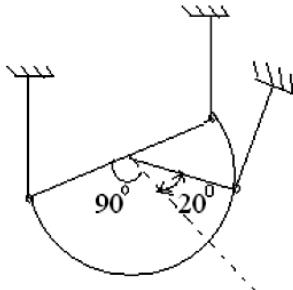


*Figure. 2(b)*

[6+8]

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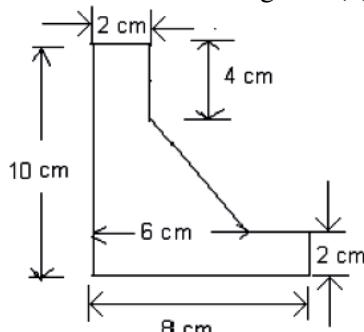
3. a) A system of forces consists of:
- Force  $P_1 = 3i + 5j - 6k$  acting through point (2,1,-3)
  - Force  $P_2 = 5i - 4j + 3k$  acting through point (1,4, 2) and a moment  $M = 20i - 35j + 60k$ .
- The forces are in Newton (N) units, distances in 'm' units and the moment in 'N-m' units. Calculate:
- The component of the resultant forces and its magnitude
  - The total moment of the system about the origin 'O'.
  - The moment of the system about the line through 'O' drawn in the 1<sup>st</sup> octant which makes angles of  $65^\circ$  and  $75^\circ$  with X and Y axes respectively.
- b) A homogeneous semi-circular plate of weight 'W' and radius 'a' is supported by three vertical strings so that the plate is horizontal as shown in Figure 3(b). Determine the tensions in the three strings.



**Figure. 3(b)**

[7+7]

4. a) Differentiate between 'polar moment of inertia' and 'product of inertia'
- b) Find the centroid of the area shown in Figure 4(b).



**Figure. 4(b)**

[6+8]

5. a) A uniform steel rod is bent into the shape of an isosceles triangle ( $OA = OB$ ). Determine the mass moment of inertia about an axis through O perpendicular to the plane of the Figure 5(a). The total mass of the rod is 12 kg.

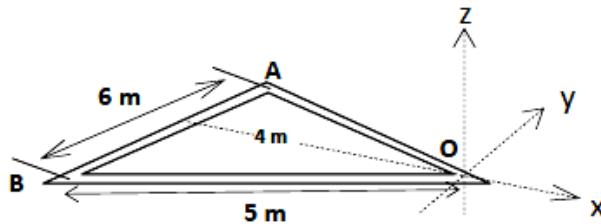


Figure. 5(a)

- b) Derive the Moment of Inertia of a quarter circle of radius 'r' about the base and the centroidal axes.

[8+6]

6. a) Two blocks shown in Figure 6(a) below are originally at rest. Determine: (i) the acceleration of each block (ii) tension in cables. Assume the effect of friction in the pulleys, between the blocks and inclines as negligible. Mass of the pulley can also be neglected.

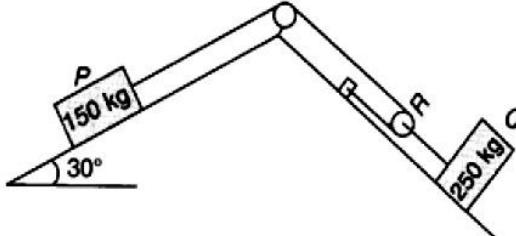


Figure. 6(a)

- b) A car travelling at a speed of  $v = 60$  kmph is braked and comes to rest in 8sec after the brakes are applied. Find the minimum coefficient of friction between the wheels and the road.

[8+6]

7. a) Define work energy principle. Also derive the equation for work energy.  
b) A man of weight 70kg standing at the end of a small boat of weight 35kg fires a bullet of mass 25gm to hit a wooden block of weight 2.25kg resting on the shore. If the bullet embedded block starts moving 5m/s, determine the velocity of the boat.

[6+8]

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**Four Questions should be answered from Part-B**

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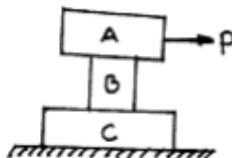
**PART – A**

1. a) What is the principle of transmissibility?
- b) State the Lami's theorem.
- c) Define angle of repose.
- d) What is Polar moment of inertia and product of inertia?
- e) State the converse of the law of triangle of forces.
- f) Define D'Alembert Principle.
- g) What is the importance of impulse momentum method?

[7 x 2 = 14]

**PART – B**

2. Find the least horizontal force 'P' to start motion of any part of the system of three blocks resting upon one another as shown in the Figure 3(a). The weights of the blocks are  $A = 3000\text{N}$ ,  $B = 1000\text{N}$ ,  $C = 2000\text{N}$ . Between A and B,  $\mu = 0.3$ , between B and C,  $\mu = 0.2$  and between C and the ground,  $\mu = 0.1$ .



*Figure 3(a)*

[14]

\*\*\*\*

3. a) What is a force? Give classifications of system of forces.  
 b) Determine the forces  $S_1$  and  $S_2$  induced in the bars AC and BC in Figure 2(b) due to the action of the horizontal applied load at C. The bars are hinged together at C and to the foundation at A and B.

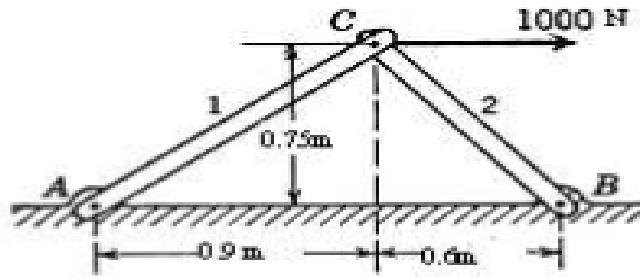


Figure. 2(b)

[6+8]

4. a) From the first principle find the centroid of a right angle triangle of height  $h$  and breadth  $b$ .  
 b) Find the centroid of the area shown in Figure 4(b). All dimensions are in cm.

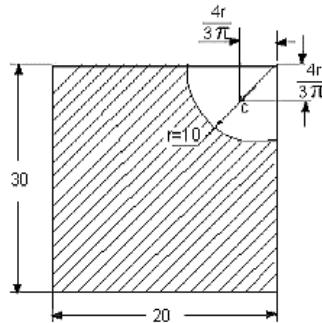


Figure. 4(b)

[7+7]

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Page 2 of 3

5. a) Derive an expression to determine the moment of inertia of a semi-circle about its diametric base.  
 b) Find the moment of inertia of the shaded area, as shown in Figure 5(b) about its centroidal axes parallel to x-axis.

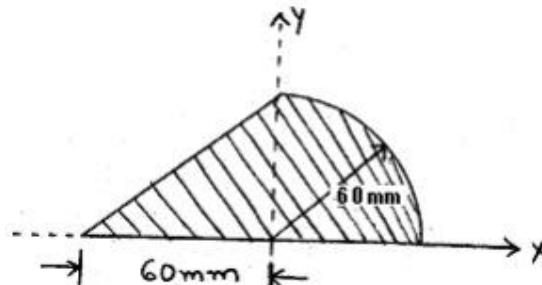


Figure. 5(b)

[6+8]

6. a) The motion of a particle is defined by the relation  $x = t^3 - 12t^2 + 36t + 30$  where x is expressed in meters and t is in sec. Determine the time, position and acceleration, when  $v = 0$ .  
 b) A stone is thrown upwards from the top of a tower 70 m high with a velocity of 19.2 m/s. Determine its position and velocity when  $t = 6$  seconds.

[7+7]

7. a) A 320 KN gun fires a 6 KN shell horizontally with a velocity of 300m/s. What is the recoil velocity of the gun? The recoil is overcome by applying an average fore of 500 KN. What is the distance travelled by the gun and the time taken?  
 b) Explain briefly about work-energy method.

[10+4]

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**I B. Tech I Semester Regular Examinations Dec. - 2016**  
**APPLIED PHYSICS**  
**(Com. to ECE, CSE, IT, EIE, E.Com.E.)**

**Time: 3 hours****Max. Marks: 70**Question Paper Consists of **Part-A** and **Part-B**Answering the question in **Part-A** is Compulsory,**Four** Questions should be answered from **Part-B**

\*\*\*\*\*

**PART-A**

1. a) Two independent non-coherent sources of light cannot produce an interference pattern. Why? (2M)
- b) State the factors on which the resolving power of grating depends. (2M)
- c) Distinguish between polarized light and unpolarized light. (2M)
- d) Explain the role of end mirrors in a laser. (2M)
- e) What do you understand by the gradient of a scalar field? (2M)
- f) Explain matter waves. (2M)
- g) What is meant by effective mass of an electron? (2M)

**PART-B**

2. a) Explain how Newton's rings are formed in the reflected light. Derive an expression for diameter of bright ring. (6M)
- b) Explain the basic principle of interferometer (4M)
- c) Calculate the thickness of the air film at 10<sup>th</sup> dark ring in Newton's rings system viewed normally by a reflected light of wavelength 500nm. The diameter of 10<sup>th</sup> dark ring is 2 mm. (4M)
  
3. a) Discuss Fraunhofer diffraction due to single slit. (6M)
- b) Define Diffraction Grating. What happens when width of the slit is equal to distance between the slits. (4M)
- c) A grating of width 2 inches is ruled with 15000 lines per inch. Find the smallest wavelength separation that can be resolved in the second order at a mean wave length of 5000 Å<sup>0</sup>. (4M)
  
4. a) Explain the principle, construction and working of a Nicol prism with a neat diagram. (10M)
- b) Describe the various methods of pumping mechanisms in lasers. (4M)
  
5. a) State Gauss theorem and explain its physical significance. (6M)
- b) Deduce the equation for the propagation of the plane electromagnetic waves in free space. (8M)
  
6. a) Derive the Schrodinger time independent wave equation. (6M)
- b) Write physical significance of “ψ”. (4M)
- c) An electron is confined to a one dimensional potential box of length 2 Å<sup>0</sup>. Calculate the energies correspond to the second and fourth quantum states. (4M)
  
7. a) Describe the formation of energy bands in crystalline solids. (4M)
- b) Derive an expression for density of charge carriers in an extrinsic p-type semiconductor. (8M)
- c) Write any two applications of Hall effect. (2M)

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\*\*\*\*\*

**PART-A**

1. a) Mention any two applications of interference. (2M)
- b) What happens when the number of rulings in a grating is increased? (2M)
- c) What is meant by double refraction? (2M)
- d) What do you understand by population inversion? (2M)
- e) Define Gauss theorem. (2M)
- f) Determine the wave length of an electron accelerated from rest through a potential difference of 100 volts. (2M)
- g) Distinguish between extrinsic and intrinsic semiconductors (2M)

**PART-B**

2. a) Write the necessary theory to determine the radius of curvature of lens using Newton's rings method. (6M)
- b) What is interferometer? What is its principle? (4M)
- c) In Newton's rings experiment, the diameters of 4<sup>th</sup> and 12<sup>th</sup> dark rings are 0.40 cm and 0.70 cm respectively. Find the diameter of 20<sup>th</sup> dark ring. (4M)
3. a) Derive an expression for the resolving power of the plane diffraction grating. (6M)
- b) Explain the difference between interference and diffraction. (4M)
- c) A grating has 6000 lines/cm. Find the angular separation between two wavelengths 500 nm and 510 nm in the third order spectrum. (4M)
4. a) With the help of suitable diagrams explain the construction and working of He – Ne gas laser. (10M)
- b) What is polarized light? Discuss various methods by which the polarized light can be produced. (4M)
5. a) Define gradient, divergence and curl of a vector. Explain their physical significance. (6M)
- b) Discuss the propagation of electromagnetic waves through isotropic dielectric and homogeneous dielectric media. (8M)
6. a) What are matter waves? Obtain an expression for the wavelength of matter waves. (6M)
- b) What are the drawbacks of Classical Free electron theory? (4M)
- c) An electron is bound in one-dimensional infinite well of width  $10^{-10}$  m. Find the energy values in the ground state and first excited state. (4M)
7. a) Discuss in brief about the behavior of a particle in periodically varying potentials. (8M)
- b) Define Hall effect. Obtain an expression for the Hall co-efficient. (6M)



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 Answering the question in **Part-A** is Compulsory,  
**Four** Questions should be answered from **Part-B**  
 \*\*\*\*\*

**PART-A**

1. a) What are coherent sources? Give example. (2M)
- b) What do you mean by resolving power of an instrument? (2M)
- c) Define the working principle of polarimeter. (2M)
- d) Write any four applications of Laser. (2M)
- e) Define divergence of a vector. (2M)
- f) An electron and a proton have the same non-relativistic kinetic energy. Show that the proton has a shorter de Broglie wavelength. (2M)
- g) Define drift and diffusion currents. (2M)

**PART-B**

2. a) With ray diagram discuss the theory of thin films and derive the condition for constructive and destructive interference in the case of reflected system. (8M)
- b) Explain why the center of Newton's rings is dark in the reflected system. (2M)
- c) Calculate the thickness of a soap film ( $\mu = 1.463$ ) that will result in constructive interference in the reflected light, if the film is illuminated normally with light whose wavelength in free space is  $6000 \text{ \AA}^0$ . (4M)
3. a) Discuss Fraunhofer diffraction due to double slit. (6M)
- b) Derive an expression for resolving power of an optical instrument. (4M)
- c) A parallel beam of sodium light incident on plane transmission grating having 4250 lines per cm and a second order spectral line is observed at an angle of  $30^\circ$ . Calculate the wavelength of light. (4M)
4. a) Define a quarter wave plate and a half wave plate. Deduce the thickness of a half wave plate for a given wavelength in terms of its refractive indices. (6M)
- b) Explain the working of a Ruby laser with energy level diagram. (8M)
5. a) The gradient of a scalar field is a vector. Hence explain how to produce a vector from a scalar field. (4M)
- b) State and prove stokes theorem. Give its importance. (10M)
6. a) What are matter waves? Explain their properties. (4M)
- b) Discuss the salient features of quantum free electron theory. (6M)
- c) Calculate the energy (in eV) required to pump an electron from ground state to the second excited state in a metal of length  $10^{-10} \text{ m}$ . (4M)
7. a) Explain the classification of crystalline solids based on band theory. (6M)
- b) Explain Hall effect and obtain an expression for Hall coefficient and also discuss the effect of increasing amounts of dopants in extrinsic semiconductors. (8M)

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\*\*\*\*\*

**PART-A**

1. a) Write the conditions for constructive and destructive interference in thin film (2M)  
due to reflected light.
- b) State the condition for diffraction of light to occur. (2M)
- c) What are different methods of producing polarized light? (2M)
- d) Explain the purpose of active medium in Laser. (2M)
- e) Define Stokes theorem. (2M)
- f) Compute the de Broglie wavelength of an electron whose kinetic energy is 10 eV. (2M)
- g) Define Hall effect. (2M)

**PART-B**

2. a) Obtain an expression for the diameter of the  $n^{\text{th}}$  dark ring in the case of Newton's rings. (6M)
- b) Explain colors of thin films. (4M)
- c) Newton's rings are observed in the reflected light of wavelength  $5900 \text{ \AA}^0$ . The diameter of  $10^{\text{th}}$  dark ring is 0.5cm. Find the radius of curvature of lens used. (4M)
3. a) Explain with theory the Fraunhofer diffraction at a single slit. (6M)
- b) Derive an expression for resolving power of a telescope. (4M)
- c) A diffraction grating having 4000 lines per centimeter is illuminated normally by light of wavelength  $5000 \text{ \AA}^0$ . Calculate its resolving power in the third order spectrum. (4M)
4. a) Describe the construction of Nicol prism. (4M)
- b) Derive the relation between probabilities of absorption, spontaneous emission and stimulated emission in terms of Einstein coefficients. (10M)
5. a) Divergence of a vector field is a scalar. Hence explain how to produce a scalar field from a vector field. (4M)
- b) State and prove Gauss theorem. What is divergence of a vector field? (10M)
6. a) Obtain an expression for energy levels of an electron in a one-dimensional potential well of infinite height. (8M)
- b) What are the drawbacks of Quantum Free Electron theory? (2M)
- c) The minimum energy for a particle entrapped in a one dimensional box is  $3.2 \times 10^{-18} \text{ J}$ . What are next three energies in electron volts the particle can have? (4M)
7. a) Explain i) Effective mass of an electron ii) concept of hole (8M)
- b) Define Drift and Diffusion currents and obtain the relation between mobility and Diffusion coefficient. (6M)



**I B. Tech I Semester Regular Examinations, Dec – 2016**  
**COMPUTER PROGRAMMING**

(Com. to ECE, AE, AME, BOT, CHEM, CE, CSE, IT, EIE, EEE, ME, MTE, MM, PCE, PE,  
E Com. E)

**Time: 3 hours****Max. Marks: 70**

Question Paper Consists of Part-A and Part-B  
Answering the question in Part-A is Compulsory  
**Four** Questions should be answered from Part-B

\*\*\*\*

**PART-A**

1. (a) What is the difference between low level and high level language and uses of them?  
 (b) What is the difference between assignment and equality operation?  
 (c) What is difference between **while** and **do-while** loops?  
 (d) What are the uses of functions in C language?  
 (e) What is an array variable? How it is different from ordinary variable?  
 (f) Write the differences between structure and union.  
 (g) What is the use of **fseek( )** function in files. Write its syntax? [7×2=14]

**PART-B**

2. (a) What are the steps involved in program development process? Explain.  
 (b) What is Central Processing Unit (CPU) in a computer? Explain about various components and their functions of CPU. [7+7]
3. (a) List the basic data types, their sizes and range of values supported by ‘C’ language.  
 (b) What do you mean by operator precedence and associativity? How one can override the precedence defined by C language? Give illustrative examples.  
 (c) Write a C program to swap (exchange) the values of two variables without using temporary variable. [5+5+4]
4. (a) Explain about various logical operators available in C language with examples.  
 (b) Write C program to convert the given decimal number into binary number. [7+7]
5. (a) Explain about different storage classes with examples. Discuss their uses and scope.  
 (b) Write a recursive function for finding the factorial value of a given number. [8+6]
6. (a) Explain different string handling functions available in C language.  
 (b) Write a function to multiply two matrices of order ‘ $m \times n$ ’ and ‘ $n \times l$ ’ and write the main program to input array values and output resultant matrix. [7+7]
7. (a) Discuss various valid arithmetic operations that can be performed on pointers in C.  
 (b) Explain the following functions in file operations:  
     (i) **getw( )**     (ii) **putw()**     (iii) **fscanf( )**     (iv) **fprintf( )**  
 (c) How to pass structure variable to functions? Explain with example. [5+5+4]

**I B. Tech I Semester Regular Examinations, Dec – 2016**  
**COMPUTER PROGRAMMING**

(Com. to ECE, AE, AME, BOT, CHEM, CE, CSE, IT, EIE, EEE, ME, MTE, MM, PCE, PE, E Com. E)

**Time: 3 hours**

Max. Marks: 70

Question Paper Consists of Part-A and Part-B  
Answering the question in Part-A is Compulsory  
**Four** Questions should be answered from Part-B

## PART-A

1. (a) Define system software and application software and give examples for each one.  
(b) Explain pre- and post- decrement and increment operation on a variable with an example.  
(c) Write the differences between **nested if( )** statement and **switch( )** statement.  
(d) What are the differences between recursion and iteration?  
(e) What are the differences between an array and string?  
(f) How does a structure differ from an array?  
(g) Distinguish between text mode and binary mode operation of a file. [7x2=14]

## PART-B

2. (a) Distinguish between machine, assembly, low-level and high-level languages.  
 (b) Explain the features and characteristics of procedural and object oriented languages. [7+7]

3. (a) What is meant by type conversion? Why is necessary? Explain about implicit and explicit type conversion with examples.  
 (b) Explain different relational operators available in C language with examples.  
 (c) Write a C program to convert the given years into number of months and days. [5+5+4]

4. (a) Explain various iterative statements available in C language with examples.  
 (b) Write a C program to find the roots of a quadratic equation  $ax^2 + bx + c = 0$  for all possible combination values of  $a$ ,  $b$  and  $c$ . [7+7]

5. (a) Explain about the actual arguments and formal argument in functions. What is the difference between these arguments? Explain the rules to call a function in a main function.  
 (b) Write a C program using functions to compute the function

$$\cos(x) = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} \dots \text{upto 15 terms. Tabulate the values from } 0^0 \text{ to } 180^0 \text{ in steps of } 30^0 \text{ in the main program.}$$

[7+7]

6. (a) What is Array? Discuss about the initialization and accessing of array elements in one dimensional and two dimensional arrays.  
 (b) Write a C program to count number of lines, words and characters in a given text without

$\cos(x) = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!}$  ----- upto 15 terms. Tabulate the values from  $0^\circ$  to  $180^\circ$  in steps of  $30^\circ$  in the main program. [7+7]

6. (a) What is Array? Discuss about the initialization and accessing of array elements in one dimensional and two dimensional arrays.  
(b) Write a C program to count number of lines, words and characters in a given text without using any string header files. [6+8]

7. (a) Explain the following functions in files:  
(i) fseek( ) (ii) ftell( ) (iii) rewind( ) (iv) fopen( ) (v) fclose( ) (vi) feof( )  
(b) Represent a complex number using a structure in C. Write a C program that uses functions  
to perform the following operations:  
(i) Addition of two complex numbers (ii) Subtraction of two complex numbers [7+7]



**I B. Tech I Semester Regular Examinations, Dec – 2016**  
**COMPUTER PROGRAMMING**

(Com. to ECE, AE, AME, BOT, CHEM, CE, CSE, IT, EIE, EEE, ME, MTE, MM, PCE, PE,  
E Com. E)

**Time: 3 hours****Max. Marks: 70**

Question Paper Consists of Part-A and Part-B  
Answering the question in Part-A is Compulsory  
**Four** Questions should be answered from Part-B

\*\*\*\*\*

**PART-A**

1. (a) Why is the C language called as middle level language?  
 (b) What are library functions? Mention their uses in C language.  
 (c) What is the difference between **break** statement and **exit( )** statement in C language.  
 (d) Differentiate between built-in functions and user-defined functions.  
 (e) What is a null character? What are its uses in strings?  
 (f) What are the advantages and disadvantages with bit-fields?  
 (g) Why register storage class does not support all data types? [7x2=14]

**PART-B**

2. (a) Discuss the features and characteristics of application software and system software.  
 (b) Discuss about different computer languages with examples. [7+7]
3. (a) Explain different bitwise operators available in C with examples.  
 (b) An integer is divisible by 9 if the sum of its digits also divisible by 9. Write a C program that prompts the user to input an integer. The program should then output the number and a message stating whether the number is divisible by 9 or not. [7+7]
4. (a) Explain various selection statements available in C language with examples.  
 (b) Read the marks of eight subjects and calculate the percentage of marks. The program should output following grades based on percentage of marks obtained in the eight subjects. Use **nested if** statement to write the code. [7+7]

|                  |           |           |       |              |              |
|------------------|-----------|-----------|-------|--------------|--------------|
| Percentage Marks | 80 to 100 | 70-79     | 60-69 | 50-59        | Less than 49 |
| Grade            | Excellent | Very Good | Good  | Satisfactory | Fail         |

5. (a) What is the difference between recursive and non-recursive functions? Give their merits and demerits.  
 (b) Discuss in details about local variables and global variables with respect to their scope and extent.  
 (c) Write a function to reverse a given integer number. Also write main program. [5+4+5]
6. (a) What is an array? What are the disadvantages in implementing arrays in C language?  
 Discuss problems for implementing of multi-dimensional arrays in C language.  
 (b) Write C program to concatenate two strings without using **strcat( )** function.  
 (c) Write a C program to transpose the given two dimensional array. [5+5+4]
7. (a) How do you define a structure, structure variables, access their elements and perform operations on them? Explain with examples.  
 (b) Write a C program to copy the content of one file into another file. [7+7]

**I B. Tech I Semester Regular Examinations, Dec – 2016**  
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E Com. E)

**Time: 3 hours****Max. Marks: 70**

Question Paper Consists of Part-A and Part-B  
Answering the question in Part-A is Compulsory  
**Four** Questions should be answered from Part-B

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**PART-A**

1. (a) What is the difference between procedural language and object-oriented language?  
 (b) Explain about ternary (or conditional) operator.  
 (c) Write the limitations of **switch()** and **for()** statements.  
 (d) What is meant by modular programming?  
 (e) How does C complier handle the values in an array internally?  
 (f) What is the difference between a pointer and dangling pointer?  
 (g) Why addition and multiplication of two addresses is not possible in pointers. [7×2=14]

**PART-B**

2. (a) What is algorithm? What are the main steps followed in the development of an algorithm?  
 Write an algorithm for sum of digits in a given number.  
 (b) Describe procedure for creating and running C programs using algorithmic approach. [7+7]
3. (a) Explain about formatted and unformatted input and output functions available in C language. Also explain different output format modifiers in C language.  
 (b) Explain different arithmetic operators available in C language with examples.  
 (c) Write a C program to check whether the given integer number is palindrome or not.[5+5+4]
4. (a) Explain in details about multi-way selection statements with example.  
 (b) Write C program to evaluate the following series: [7+7]
 
$$\sin(x) = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} \dots \infty$$
5. (a) Explain different parameter passing techniques in functions with examples.  
 (b) Write C program find the Greatest Common Divisor (GCD) of two numbers using a recursive functions. [7+7]
6. (a) Explain the following string handling functions with examples:  
 (i) strcpy() (ii) strcat() (iii) strrev() (iv) strlen  
 (b) Write a C program to count number of vowels present in a sentence.  
 (c) Write a C program to add two 2-dimensional arrays. [4+5+5]
7. (a) Explain the following with examples:  
 (i) self referential structures (ii) typedef (iii) command line arguments  
 (b) Write a C program to read a data file containing integers. Find the largest and smallest integers and display them. [7+7]

**ENGLISH-I****(Common to all branches)****Time: 3 hours****Max. Marks: 70**Question Paper Consists of **Part-A** and **Part-B**Answering the question in **Part-A** is Compulsory,**Four Questions should be answered from Part-B**

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**PART-A**

1. (a) What is meant by "Human Resource"? Give examples from various professions.
- (b) What are the major problems faced by public because of auto drivers? What do you think is the proper solution to this problem?
- (c) What is the difference between mass production and production by masses?
- (d) Define Alternative Energy Sources. Give examples with the industries in which they can be used.
- (e) Mention any two actions of humans that lead to animal extinct. Explain how these actions affect animals.
- (f) Can professional relationships be same as personal relationships? Give two reasons to support your answer.
- (g) What was the fat man's perspective to War? Is he really happy with his condition? Give reasons.

[7 x 2 = 14]

**PART-B**

2. (a) Write in detail how Srinivasa Ramanujan is an invaluable human resource, particularly to the field of Mathematics.
- (b) What exactly is the problem with Mr. Neave's ideal family?
- (c) Read the passage below and answer the questions that follow:

All elements found on the periodic table have certain distinct properties. Elements are single types of atoms, while atoms are the fundamental building blocks of all matter. Gold, for instance, is a soft, naturally occurring metal known for being beautiful and desired. Gold is malleable, and while it is found naturally in the environment, it is often reworked and incorporated into fine jewelry. Oxygen is a necessary and naturally occurring element. It's an invisible, odorless gas that's a crucial part of the air we breathe and necessary for our bodies to function properly. Often, elements like those noted are combined in varying ways to create new chemical substances. Chemical substances react in certain ways and also have certain discernible properties. For instance, when an oxygen atom and two hydrogen atoms come together they form water, which is essential to life. When the atoms of a specific substance are regrouped, a new substance is formed with often vastly different properties from the original substance. Occasionally something completely harmless, or even necessary, can become dangerous or lethal when its molecules (a grouping of two or more atoms) are regrouped.

The components of table salt are a good example of how different substances can look when their atoms are rearranged. Common table salt, also known as sodium chloride is an interesting chemical compound because, while it is commonly consumed by humans, when you separate its elements—sodium and chlorine you are left with something quite different from the edible seasoning known as salt. The components of salt are sodium and chlorine, both of which are harmful for human consumption and even contact. Sodium requires great care when being handled. If it comes into contact with water, the reaction can be flammable, while powdered sodium has the potential to be combustible (explosive) in oxygen or air. Chlorine, meanwhile, is an extremely caustic and dangerous substance. Chlorine is used primarily as a cleaning agent; it is commonly used in swimming pools to render them sanitary, but is mixed with other chemicals and diluted for these purposes. This is what makes it safe for people to swim in swimming pools.

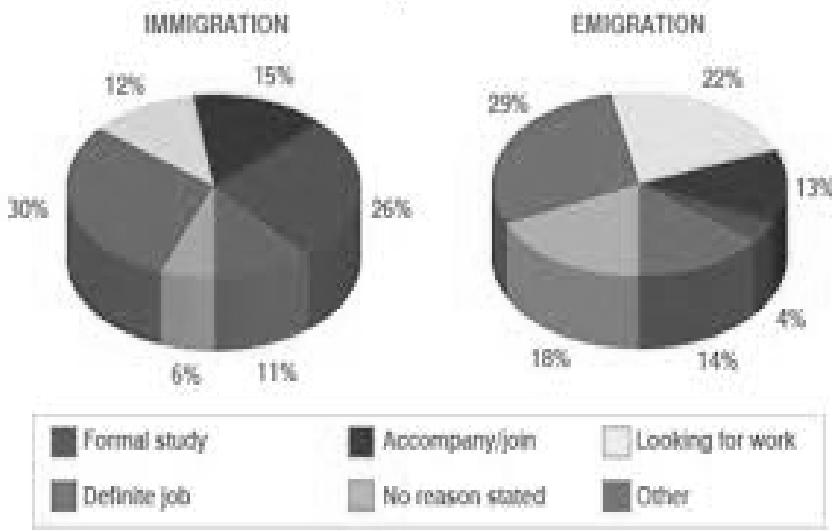
**Answer the following questions in ONE or TWO sentences:**

- (i) What happens when the atoms of a substance are regrouped?
- (ii) The creation of carbon monoxide is an effect. Give a reason.
- (iii) Table salt can be separated into sodium and chlorine. Sodium is explosive. Chlorine is a gas that can kill people. What can be concluded from the statements above?
- (iv) Give a title to the passage.
- (v) Write a synonym to the word “discernible”.
- (vi) What are the uses of chlorine?

[5+3+6]

3. (a) Write a letter to the Editor, The Hindu Newspaper, stating the problems you have been facing due to bad roads and traffic in your home town.
- (b) What are the different perspectives on War expressed in the story “War”?
- (c) Mention the number of people who migrated from UK for various reasons, and prepare a list of points which supports the pie chart. Write the information in the form of a passage of about 200 to 250 words.

**MAIN REASON FOR MIGRATION TO/FROM THE UK - 2007**



[5+3+6]

4. (a) List the advantages and disadvantages of Alternative Energy Sources. What can be the substitutes for power to small scale industries and how?  
(b) Describe the character of Albert Edward Foreman  
(c) Write at least two synonyms for the following words: (Mark will be awarded only if you write TWO synonyms, NOT one)  
(i) Abundant (ii) Reliant (iii) Complacence (iv) Vitality (v) Disillusion (vi) Jaunty [5+3+6]

5. (a) What kind of changes did science and technology bring into our lives? What are the advantages and disadvantages of these changes?  
(b) What made Mriganko Babu see Abhiram in the dusk time? How did he find his watch?  
(c) Match the words in column A with their antonyms in column B. Use these antonyms in your own words.

(The mark will be awarded only if you use them in your own sentences.)

| A               | B            |
|-----------------|--------------|
| (a) Vulnerable  | (a) cheerful |
| (b) Appalling   | (b) arrival  |
| (c) Lamentable  | (c) advanced |
| (d) Retreat     | (d) unique   |
| (e) Rudimentary | (e) strong   |
| (f) Massive     | (f) pleasant |

[5+3+6]

6. (a) What kind of a scientist is Salim Ali? Support your answer with suitable examples from the text.  
(b) Do you think there are many villages lost like the author's in India? Is it for good or bad? Support your answer with examples from present projects in your state/place.  
(c) Use the appropriate forms of the verbs in the passage given below:  
I usually (go) for a walk by that way everyday. That day, I (be lose) in thoughts and (miss) my way. I (bump) into my old school friend which (be) a pleasant surprise for me. It (take) sometime for him to (recognize) me but I could (identify) him immediately. We (hug) each other and (exchange) our contact numbers. After (come) home, I (share) this joyous news with my family.

[5+3+6]

7. (a) How important is training in service industry? Support your answer with suitable examples from your daily life.  
(b) Compare Martin Luther King and Gandhiji as leaders of two different nations.  
(c) Write one paragraph each on any two of the following topics:  
(i) My hometown  
(ii) Solar Cookers

[5+3+6]

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**ENGLISH-I****(Common to all branches)****Time: 3 hours****Max. Marks: 70**Question Paper Consists of **Part-A** and **Part-B**Answering the question in **Part-A** is Compulsory,**Four Questions should be answered from Part-B**

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**PART-A**

1. (a) Why is human resource considered invaluable?  
(b) Write two major problems and solutions to road traffic problems in India.  
(c) How is production by masses better than mass production?  
(d) What are alternative energy sources? How do you think they can help in the progress of our country?  
(e) How are humans contributing to animal extinct? Explain with two examples.  
(f) How are personal relationships different from professional relationships and why?  
(g) What was the unbelievable truth to the bank manager about Albert Edward Foreman? Why is it unbelievable to the manager?

[7 x 2 = 14]

**PART-B**

2. (a) Define the role of human resources in any industry. How can this resource strengthen the industry?  
(b) Do you think Mr. Neave's family is an ideal family? Why/why not?  
(c) Read the passage below and answer the questions that follow:

For any given problem, there is often more than one solution. In some cases, there are very few solutions. In others, a countless array of perfectly good solutions can be introduced. Without a system for testing each solution to figure out which is best, we'd have no quantifiable way of figuring out which one to choose. Once a hypothesis, or potential solution to a problem, is in place, it needs to be tested. More than one hypothesis can be tested, and results should be carefully recorded. Some solutions are more easily identifiable as being "the best." For example: the quickest route from home to school; the gear ratio that will make it easiest and most efficient to ride your bike; the best time of year to plant tomatoes. All of these solutions address very specific, concrete problems and are highly testable. And once you've found a satisfactory solution you may not have to do too much testing. The solution will remain satisfactory indefinitely, as long as all other variables remain constant. Of course, there are other problems we encounter where the solution set is wide-ranging and more open-ended. Have you ever heard the expression "to build a better mousetrap"? It's an old saying that refers to a problem-solving endeavor that invites inventors and engineers to endlessly reimagine new and better solutions. In this case, the problem is very old and famously banal—catching mice.



**Answer the following questions in ONE or TWO sentences:**

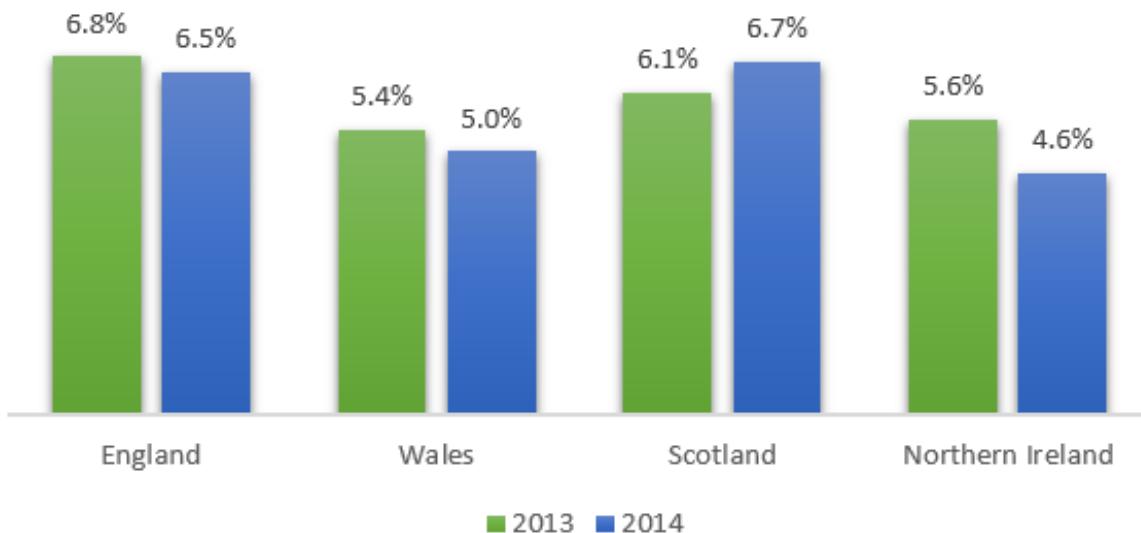
- (i) How do you identify the best solution to a given problem?
- (ii) What kind of problems can be given quick solutions?
- (iii) What is the meaning of the word “quantifiable”?
- (iv) What kind of problems cannot be given quick and single solutions?
- (v) Give a title to this passage.
- (vi) What is the saying “to build a better mouse trap” mean?

[5+3+6]

3. (a) Write a letter to the editor of a newspaper listing the problems faced by private transport users in a city like Hyderabad.
- (b) What was the common problem everyone in the compartment was facing? How did their perspectives change?
- (c) The graph below gives information about female unemployment in four countries of UK. Write the information in the form of a passage of about 200 to 250 words.

**Female unemployment rates in the four countries of the UK**

[www.ielts-exam.net](http://www.ielts-exam.net)



[5+3+6]

4. (a) What does the passage Silent Spring talk about technological advancements in our lives? Do you agree with the author? Why/why not?
- (b) What are the characteristics of Albert Edward Foreman that the youth have to learn from him?
- (c) Write at least two synonyms for the following words: (Mark will be awarded only if you write TWO synonyms, NOT one)
  - (i) Mysterious
  - (ii) Imaginary
  - (iii) Conventional
  - (iv) Sophisticated
  - (v) excessive
  - (vi) skeptical

[5+3+6]

5. (a) What are Salim Ali's contributions as an ornithologist to Indian bird life?  
(b) Did Mriganko Babu really see Abhiram? Give instances from the text to support your answer.  
(c) Match the words in column A with their antonyms in column B. Use these antonyms in your own words.

(The mark will be awarded only if you use them in your own sentences.)

| A                | B                |
|------------------|------------------|
| (i) Morose       | (a) perennial    |
| (ii) Diluted     | (b) failing      |
| (iii) Perishable | (c) exclude      |
| (iv) Thriving    | (d) cheerful     |
| (v) Incorporate  | (e) freed        |
| (vi) Fettered    | (f) concentrated |

[5+3+6]

6. (a) What are the major steps we need to take as a normal public to save animal life from extinction to maintain ecological balance?  
(b) What was the havoc created by Hirakud Dam in the lives of the people who lived on its banks?  
(c) Use the appropriate forms of the verbs in the passage given below:

(i) Every Sunday Sally (drive) her kids to have lunch outside. Her husband (join) them at the restaurant.

One day, while (have) lunch, their younger son Harry (fall) on the floor, (complain) of severe stomach ache. They (rush) him to the nearby hospital. The doctor immediately (attend) to him and (diagnose) it to be appendicitis. Later, Harry (undergo) a surgery. Now, he (recover) completely and (be) back to school.

[5+3+6]

7. (a) How does training help any industry run smoothly? Is the training required for experienced employees also? Give reasons to support your answer.  
(b) What are qualities of Martin Luther King that made him a unique and successful leader?  
(c) Write one paragraph each on any two of the following topics:  
(i) Student etiquette  
(ii) Mini-power grids

[5+3+6]

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**I B. Tech I Semester Regular Examinations December - 2016****ENGLISH-I**

(Common to all branches)

**Time: 3 hours****Max. Marks: 70**Question Paper Consists of **Part-A** and **Part-B**Answering the question in **Part-A** is Compulsory,Four Questions should be answered from **Part-B**

\*\*\*\*\*

**PART-A**

1. (a) How is human resource the backbone of every industry?
- (b) How do you think politicians and police are failing in solving the road traffic problem in India? Why?
- (c) Define mass production and production by masses.
- (d) Mention any two alternative energy resources that can be best used in rural India? Give reasons for considering these energy sources better than others.
- (e) Mention two main causes that affect wild life in IIT Madras campus.
- (f) Can you force your boss to go for a movie with you? Why/why not? Give reasons.
- (g) Compare and contrast the Vicar with the Verger stating two characteristics of each of them.

[7 x 2 = 14]

**PART-B**

2. (a) Justify Indian government's decision of celebrating 22<sup>nd</sup> December as National Mathematics Day.
- (b) Who do you think is the cause for conditions in Mr. Neave's family? Justify your answer with suitable instances from the text.
- (c) Read the passage below and answer the questions that follow:

A rugged young hunter pauses after a successful deer hunt as his dogs bark and jump around him excitedly. He stands motionless, his serious gaze turned downward and his bent leg resting on the root of a large, sawed-off tree stump. A deerskin and rifle are slung over his shoulders, and antlers dangle from one hand. His hunting skills are key to his survival because he will sell the skin and antlers. This somber scene is set in the Adirondack Mountains of New York State. The sky is gray and overcast, with just a hint of sun and blue sky shining through the clouds. The distant mountains look cold and dark, and the oranges, yellows, and golds of autumn in the nearby trees and underbrush are fading to wintry browns. The only living creatures in this lonely landscape are the huntsman and his dogs.

Winslow Homer became an artist after working as a magazine illustrator. He was a great admirer of nature and took hunting vacations in the Adirondacks with his brother for forty years. Because he wanted to capture the mood and feeling of being in nature, Homer patiently observed the natural world and recorded it as realistically as possible.



When he made this painting, the unspoiled wilderness that he loved was quickly disappearing due to the spread of modern cities, railroads, and factories.

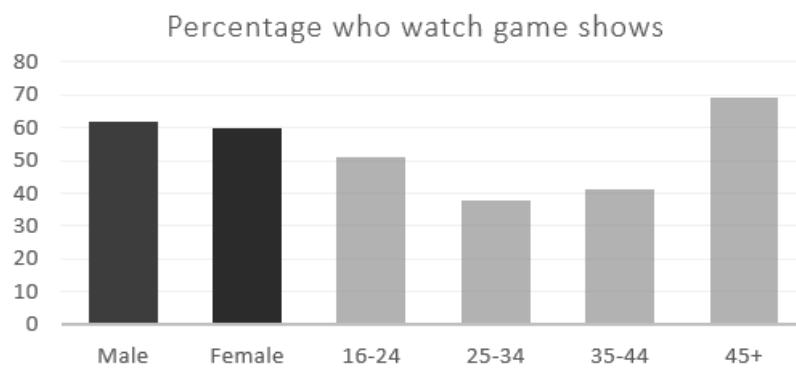
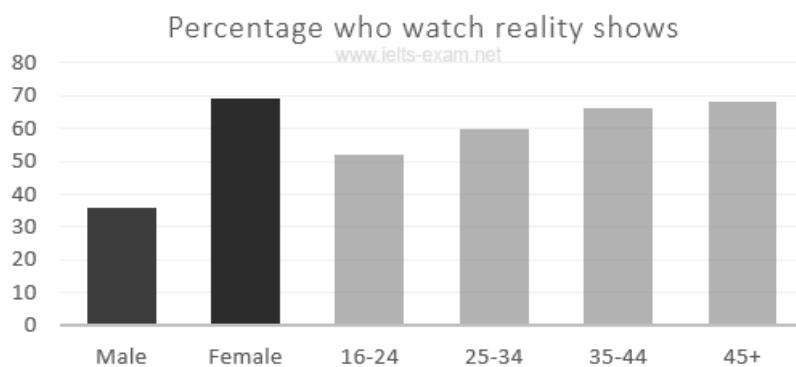
In fact, it was painted just one year before the establishment of the Adirondack National Park, which helps protect millions of acres of mountainous land whose natural beauty can still be enjoyed today.

**Answer the following questions in ONE or TWO sentences:**

- (i) What is the rugged young hunter doing?
- (ii) The first paragraph describes what is happening in the painting. What does the second paragraph describe?
- (iii) Give a synonym to the expression “unspoiled wilderness”.
- (iv) What could be the right title to this text?
- (v) What might have inspired Winslow Homer to make this painting?
- (vi) Describe the hunter in Homer’s painting.

[5+3+6]

3. (a) Write a letter to the editor of a newspaper and list the problems faced by traffic police on the roads to control and traffic and reduce accidents.
- (b) What is the central theme of the story “War”?
- (c) The charts give information about two genres of TV programmes watched by men and women and four different age groups in Australia. Write the information in the form of a passage of about 200 to 250 words.



[5+3+6]



4. (a) Discuss the benefits and disadvantages of technology.  
(b) What helped Albert Edward Foreman cope with the situations he faced?  
Give instances/events from the text to support your answer.  
(c) Write at least two synonyms for the following words: (Mark will be awarded only if you write TWO synonyms, NOT one)  
(i) Promote (ii) Unconventional (iii) Hazard (iv) Delighted  
(v) prevention (vi) Genius

[5+3+6]

5. (a) What are Salim Ali's contributions as an environmentalist?  
(b) Write the story "The scarecrow" from Abhiram's point of view.  
(c) Match the words in column A with their antonyms in column B. Use these antonyms in your own words. (The mark will be awarded only if you use them in your own sentences.)

| A               | B                 |
|-----------------|-------------------|
| (i) Rudimentary | (a) concern       |
| (ii) Apathy     | (b) familiar      |
| (iii) Desolate  | (c) sophisticated |
| (iv) Uncanny    | (d) straight      |
| (v) Appalling   | (e) pleasant      |
| (vi) Distorted  | (f) befriend      |

[5+3+6]

6. (a) What are the steps we need to take to save vanishing animals? Do you think we would really help animal life? Explain.  
(b) What is the message the author tried to convey through the text "The Village Lost"?  
(c) Use the appropriate forms of the verbs in the passage given below:

[5+3+6]

7. (a) As part of office etiquette, how do you think you need to maintain your relationships with your colleagues? Mention some dos and don'ts in the office and with colleagues.  
(b) What made Martin Luther King worthy of honor and celebration even today?  
(c) Write one paragraph each on any two of the following topics:  
(i) Safety in chemical industry  
(ii) My favourite teacher

[5+3+6]

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**ENGLISH-I**

(Common to all branches)

**Time: 3 hours****Max. Marks: 70**Question Paper Consists of **Part-A** and **Part-B**Answering the question in **Part-A** is Compulsory,**Four Questions should be answered from Part-B**

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**PART-A**

1. (a) Are human resources really invaluable? Justify your answer with suitable examples.
- (b) What do you think are the causes for traffic problems in small town market places?
- (c) Compare and contrast production by masses and mass production.
- (d) How renewable energy sources better than non-renewable energy sources? Give two reasons.
- (e) State any two ways that can protect animals from extinct.
- (f) Define professional and personal relationships with examples.
- (g) What are the dreams and images Mr. Neave sees when he closes his eyes? What do they indicate?

[7 x 2 = 14]

**PART-B**

2. (a) How does Srinivasa Ramanujan stand as an icon to say that human resources are invaluable.
- (b) What are the features of an ideal family missing in Mr. Neave's?
- (c) Read the passage below and answer the questions that follow:

Water makes up nearly three-quarters of the Earth's surface, but it does more than just cover our planet – it also plays a vital role in shaping it.

Consider the Grand Canyon. Measuring 277 miles long, 18 miles wide and more than 1 mile deep, it is considered one of the Seven Natural Wonders of the World and attracts more than 5 million visitors per year. This geological marvel was created by the waters of the Colorado River through the processes of weathering and erosion.

Weathering is the process by which moving water breaks down soil, rock and minerals, and erosion is the process by which the flowing water transports soil and rock from one spot and deposits it elsewhere. The two processes often occur in conjunction. Weathering and erosion are very slow processes. Geologists believe the Colorado River has been flowing through the Grand Canyon for at least 17 million years, and it has been gradually shaping the canyon this entire time.

The flowing water of the river and its tributaries has carved away at the rock of the Colorado Plateau, creating the sight we are familiar with today. Caves and caverns are another example of weathering and erosion. Limestone caves, such as the Carlsbad Caverns in New Mexico, are formed when rainwater mixes with carbon dioxide in the ground and wears away at the limestone.

Sea caves, which can be found along coastlines, are formed when powerful waves crash against the shore and break away chunks of rock. Ice caves are formed when glaciers melt, and the ice melt flows across the ground as a stream.



You don't have to travel very far to see the effects of weathering and erosion for yourself, though If you've ever been to the beach, you've already seen evidence of how powerful of a force moving water can be and all you had to do was look down. The sand covering the beach is actually the result of rocks being broken down into tiny pieces and then washed a shore by the waves.

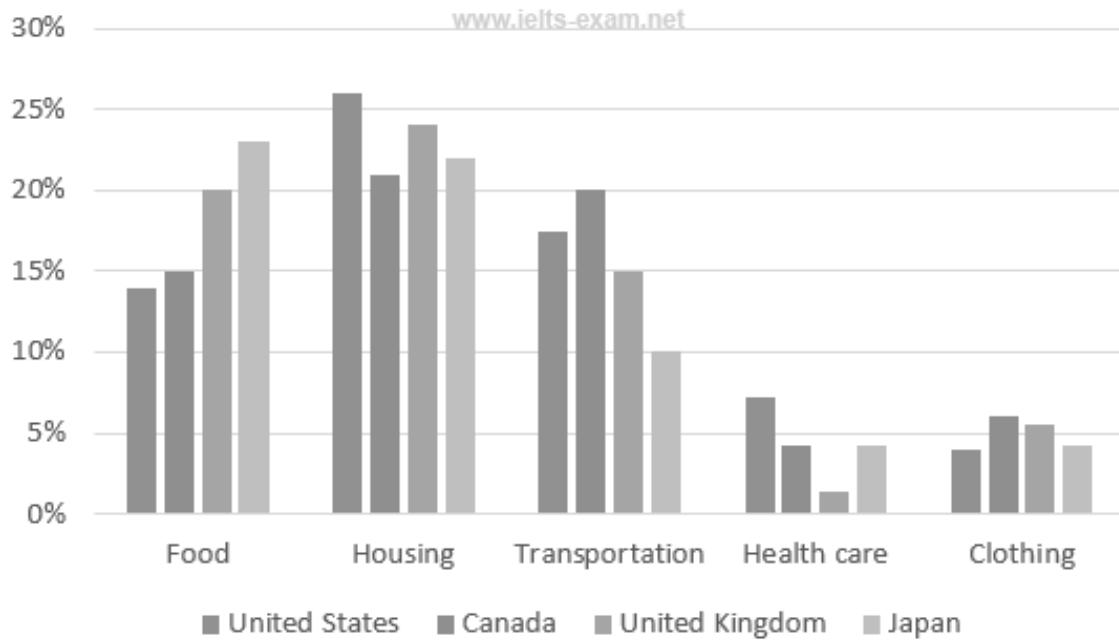
**Answer the following questions in ONE or TWO sentences:**

- (i) What are the two things that water does to the earth?
- (ii) What are the processes by which water can shape the earth?
- (iii) What is geologists' belief about Colorado River?
- (iv) Give two examples of erosion and carving.
- (v) Write a synonym to "Conjunction".
- (vi) Give a title to this text.

[5+3+6]

3. (a) List out the problems related to road safety in India and possible solutions. Support your solutions with reasons to make sure that your solutions are implementable.
- (b) Is it good to live in grief like the lady in the compartment or like the fat man? Give reasons quoting suitable instances from the text.
- (c) The bar chart below shows shares of expenditures for five major categories in the United States, Canada, the United Kingdom, and Japan in the year 2009. Write the information in the form of a passage of about 200 to 250 words.

**Shares of expenditures for selected categories,  
United States, Canada, United Kingdom, and Japan, 2009**



[5+3+6]

4. (a) What are the steps we can take to stop the negative effects of over use of technology in our lives? Do you think these steps can be implemented? Give reasons to support your answer.  
(b) How do you think Albert Edward Foreman managed to be a successful businessman without education? What are the qualities that we need to learn from him?  
(c) Write at least two synonyms for the following words: (Mark will be awarded only if you write TWO synonyms, NOT one)  
(i) Vulnerable (ii) Prevention (iii) Sustained (iv) Numerous  
(v) destruction (vi) rudimentary

[5+3+6]

5. (a) What are Salim Ali's contributions as an environmentalist?  
(b) Was it a dream or a real incident that Mriganko Babu saw Abhiram? Give reasons to support your answer.  
(c) Match the words in column A with their antonyms in column B. Use these antonyms in your own words. (The mark will be awarded only if you use them in your own sentences.)

| A                  | B            |
|--------------------|--------------|
| (i) Hoisted        | (a) ending   |
| (ii) Heart-rending | (b) misguide |
| (iii) Perennial    | (c) pleasant |
| (iv) Jockeyed      | (d) stable   |
| (v) Weird          | (e) lower    |
| (vi) Turbulent     | (f) joyous   |

[5+3+6]

6. (a) How did Salim Ali save the lives of birds in India? What are his contributions as an ornithologist to Indian wild life.  
(b) Is the lesson "The Village Lost" relevant to the present projects on the rivers? Give reasons.  
(c) Use the appropriate forms of the verbs in the passage given below:

Usually, I (work) from 9 to 5. I (work) for the same company for the past 10 years. But this I (want) a change in my job. I started (take) French classes. That is why I (come) to Paris. Real learning of a language (take) place only when we learn to (use) it and that opportunity you (get) only when you (live) in the land where it is (use) as first language. This is the first time I (learn) a new language and it (be) a thrilling experience for me.

[5+3+6]

7. (a) Do experience and safety go together? Give reasons with examples from different industries.  
(b) Why did Martin Luther King embrace his African roots? How did that help him fight against racism in America?  
(c) Write one paragraph each on any two of the following topics:  
(i) Human Resource  
(ii) My family

[5+3+6]

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