

2016-17

**B.Tech (AUTUMN SEMESTER) EXAMINATION**  
**(ELECT./MECH./CHEM./ELECTRONICS/COMPUTER/ARCITECTURE/PETRO CHEM.**  
**ENGG.)**  
**ATMOSPHERIC CHEMISTRY**  
**(O.E.)**  
**AC-308**

**Maximum Marks: 60****Credits: 04****Duration: Three Hours****Answer all the questions.****Assume suitable data if missing.****Notations used have their usual meaning.**

Q.No.	Question	M.M.
1(a)	What are the various zones of the atmosphere? Discuss the significance of troposphere and stratosphere.	[6]
(b)	Write short notes on the followings:	[3x3]
	(i) Clean Air Act	
	(ii) Primary and secondary pollutants	
	(iii) Composition of the atmosphere	
2 (a)	What are the criteria pollutants existing under NAAQS. Explain the formation of oxides of sulphur and nitrogen and health hazard related to them.	[6]
(b)	Write short notes on <b>any three</b> of the followings:	[3x3]
	(i) Cyclone separators	
	(ii) Fabric filters	
	(iii) Spray tower	
	(iv) PM <sub>2.5</sub> and PM <sub>10</sub>	
3 (a)	Explain <b>any two</b> methods of quantitative estimation of each SO <sub>2</sub> and NH <sub>3</sub> .	[5]
(b)	Write brief notes on <b>any two</b> of the followings:	[5x2]
	(i) Adsorption and absorption	
	(ii) Volumetric and gravimetric analysis	

Contd... 2.

## (iii) Atomic absorption spectrometry

- 4 (a) Describe the significance of hydrological cycle with labelled diagram. [5]
- (b) Write brief notes on the followings: [5x2]
- Alternative fuels
  - Impact of increased exposure to UV radiation
- OR
- 4' (a) Describe the regional impact of temperature changes on any two continents. [6]
- (b) Write an informative notes on the followings: [3x3]
- Formation of photochemical Smog
  - Factors affecting indoor air quality
  - Catalytic destruction of ozone

2016-17

**B.TECH. (AUTUMN SEMESTER) EXAMINATION  
OPEN ELECTIVE (ALL BRANCHES)  
NUMERICAL TECHNIQUES  
AM351**

**Maximum Marks: 60****Credits: 04****Duration: Two Hours***Answer all questions.**Programmable calculators are not allowed.**Write answers up to four decimals.*

Q. No.	Question	M.M.
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- 1(a)** Use Doolittle's LU factorization method, to solve the following system of [07] equations:

$$5x - 2y + z = 4 ; 7x + y - 5z = 8 ; 3x + 7y + 4z = 10.$$

**OR**

- (a)'** Transform the matrix [07]

$$A = \begin{bmatrix} 1 & 2 & 4 \\ 2 & 1 & 2 \\ 4 & 2 & 1 \end{bmatrix}$$

to tridiagonal form by using Given's method and hence form the sturm sequence for eigen values.

- (b)** Compute singular value decomposition (SVD) of the matrix [08]

$$\begin{bmatrix} 2 & 4 \\ 1 & 3 \\ 0 & 0 \\ 0 & 0 \end{bmatrix}$$

- 2(a)** (i) Calculate the divided difference  $f(x_1, x_2, x_3, x_4)$  for  $f(x) = \frac{1}{x^2}$ . [4+3]

- (ii) Find the value of the uniform mesh size  $h$  that can be used to tabulate the function  $f(x) = (1+x)^6$  on  $[0, 1]$  using quadratic interpolation formula such that  $\epsilon = 5 \times 10^{-5}$ .

**OR**

- (a)'** Calculate the rational approximation  $R_{2,3}(x)$  for the function  $\tan^{-1}x$ . Also find the order of its approximation. [07]

Contd... 2

- (b) (i) Verify whether the function defined by

$$f(x) = \begin{cases} -x^2 - 2x^3, & -1 \leq x \leq 0 \\ x^2 + 2x^3, & 0 \leq x \leq 1 \end{cases}$$

[3+5]

is a cubic spline on  $[-1, 1]$  or not.

- (ii) Obtain a cubic spline fit for the data

x	0	1	2	3
f(x)	1	2	33	244

Under the conditions  $M(0) = 0 = M(3)$  and valid in the interval  $[2, 3]$ .

Hence obtain the estimate of  $f(2.5)$ .

- 3(a) A person runs the same track for five consecutive days and is timed as follows: [08]

Days(x)	1	2	3	4	5
Time(y)	15.30	15.10	15.00	14.50	14.00

Make a least square fit to the above data using the function  $y = a + \frac{b}{x} + \frac{c}{x^2}$ .

OR

- (a)' Obtain the least squares polynomial approximation of degree two for  $f(x) = \sqrt{x}$  on  $[0, 1]$ . [08]
- (b) Obtain the Chebyshev linear polynomial approximation of the type  $ax+b$  to the function  $f(x) = \frac{1}{x^2}$  on the interval  $[1, 2]$ . Hence find the maximal error. [07]
- 4(a) A snack food manufacture markets two kinds of mixed nuts, labelled A and B. [07] Mixed nuts A contain 20% almonds, 10% cashew nuts, 15% walnuts and 55% peanuts. Mixed nuts B contains 10% almonds, 20% cashew nuts, 25% walnuts and 45% peanuts. A customer wants to use mixed nuts A and B to prepare a new mix that contains at least 4 lb of almonds, 5 lb of cashew nuts and 6 lb walnuts for a party. If mixed nuts A and B cost \$2.5 and \$3 per pound, respectively. Determine the mixed nuts A and B to be used to prepare the new mix at minimum cost.

OR

- (a)' Solve the following LPP, graphically: [07]
- Maximize and minimize  $P = 2x + y$
- Subject to  $x + y \geq 4; 3x + y \geq 3; x + 4y \geq 4; x \leq 3; y \leq 2; x, y \geq 0$ .
- (b) Solve the following LPP, by simplex method,: [08]
- Maximize  $Z = 3x + 2y + 5z$
- Subject to  $x + y + z \leq 9; 2x + 3y + 5z \leq 30; 2x - y - z \leq 8; x, y, z \geq 0$ .

2016-2017

**B.TECH. (AUTUMN SEMESTER) EXAMINATION  
(OPEN ELECTIVE)  
(ELECTRICAL/CIVIL/MECHANICAL/ELECTRONICS/COMPUTER & CHEMICAL ENGG.)  
ENGINEERING MATERIALS & MATERIALS SCIENCE**

**Maximum Marks:60****AP-308****Credits:4****Duration: Two Hours**

**Answer all questions. The symbols used have their usual meaning.**

- 1(a)** What are different contributions to the polarization in a poly atomic gas? [8.5]  
 Obtain an expression for oreintational polarization and discuss its dependence on temperature.

**OR**

- 1(a')** Why is local field different from macroscopic field in case of a solid dielectric? Obtain an expression for local field in a solid having cubic symmetry. [8.5]

- 1(b)** What do you understand by ferroelectrics? Draw hysteresis curve for ferroelectric material and discuss it briefly. Give three examples of ferroelectric materials. [6.5]

- 2(a)** What is essential condition for diffusion? Taking into account diffusion and recombination of carriers, obtain continuity equation for holes in a semiconductor. If current is strictly carried by diffusion, write diffusion equations for electrons and holes. [5.0]

**OR**

- 2(a')** How contact potential is developed across the p-n junction? Obtain quantitative relationship between  $V_0$  and doping concentrations on each side of the junction. [5.0]

- 2(b)** Derive an expression for complex electronic polarizability under time varying field and discuss behaviour of real and imaginary parts of electronic polarizability with frequency. [6.5]

- 2(c)** A p<sup>+</sup>-n Si junction is doped with  $N_d = 10^{15} \text{ cm}^{-3}$  on the n-side. The junction area is  $10^{-4} \text{ cm}^2$ . Calculate the junction capacitance with a reverse bias of 10V. (Given-  $e = 1.6 \times 10^{-19} \text{ C}$ ,  $\epsilon_0 = 8.854 \times 10^{-12} \text{ F/m}$  and  $\epsilon_r = 11.8$ ) [3.5]

contd....2

- 3(a) Distinguish between ferromagnetism and antiferromagnetism. Under these [5.0] categories give some examples.
- 3(b) Give an account of Weiss theory of ferromagnetism and show from the plot of [10] Langevin function, spontaneous magnetization exists below the Curie temperature and vanishes above the Curie temperature.
- 4(a) What is superconductivity? Explain the term critical magnetic field in a [7.5] superconductor. How does the critical magnetic field vary with temperature in type-I and type-II superconductors?
- 4(b) Show that the magnetic flux through the superconducting ring is quantized in [7.5] integral multiples of  $(h/2e)$ .

OR

- 4'(a) Explain a.c. Josephson effect. Show that the current oscillates with frequency [6.0]  
 $\omega=2eV/h$
- 4'(b) A superconductor sample has a critical temperature of 3.722 K in zero [3.0] magnetic field and intercept of magnetic field at 0 K is 0.0305 T. Evaluate the critical field at 2 K.
- 4'(c) How does entropy change at the transition temperature? Illustrate with an [6.0] example. What is its physical meaning?

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2016-2017

**B.TECH. /B.ARCH. (AUTUMN SEMESTER) EXAMINATION  
INTELLECTUAL PROPERTY RIGHTS (IPR)  
(OPEN ELECTIVE)  
(HU-301)**

**Maximum Marks: 60****Time: 2 hours*****Answer all the questions.*****UNIT - I**

- 1.(a) What do you understand by the term Intellectual Property Rights (IPRs)? Discuss the scope of IPR as expanded by TRIPS Agreement, 1995. (07)
- 1.(b) Write short notes on any two of the following: (04)
- i) Functions of WIPO. (04)
  - ii) Traditional knowledge (04)
  - iii) Protection of Plant Varieties and Farmers Rights. (04)

**UNIT - II**

- 2.(a) Define Patent. What are the three important requirements of an invention to qualify for the grant of patent? Explain in brief. (05)
- 2.(b) Who can file an application for patent? Outline the procedure for grant of patent. (05)
- 2.(c) "Protection of Confidential Information/Trade Secret is least known and also least talked about, although it is perhaps the most important form of protection for Industries, R&D institutions and other agencies dealing with IPRs". Comment. (05)
- OR
- 2.(c') What are non patentable inventions under Section 3 & 4 of The Patents Act 1970? Illustrate your answer. (05)

**UNIT - III**

- 3.(a) "Copyright gives protection for the expression of an idea & not for the mere idea itself". Comment? (7.5)
- 3.(b) Define copyright infringement and plagiarism. Bring out the similarities and differences between copyright infringement and plagiarism. (7.5)

**OR**

- 3.(b') Explain the procedure for registration of semi-conductor integrated layout design. Discuss also the effects registration and non-registration. (7.5)

**UNIT - IV**

- 4.(a) What do you mean by infringement of trademark? What are the steps involved in the registration of trademark under the Trademarks Act 1999. (07)
- 4.(b) Explain any two , of the following: (04)
- i) Geographical Indication of Goods (04)
  - ii) Certification trademark & Collective marks (04)
  - iii) Passing Off (04)
  - iv) Well known trademark (04)

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2016-17

**DEPARTMENT OF CIVIL ENGINEERING**  
**B. TECH. VII SEMESTER EXAMINATION**  
**PROJECT MANAGEMENT CE-484 (OPEN ELECTIVE)**

**Maximum Marks: 60****Duration: Two Hours****Note: Answer all the questions.****Assume suitable data, if required.****Notations used have their usual meaning.****All parts of a question should be attempted in one continuation in one copy.****Normal distribution function table is attached with the question paper.**

<b>Q.No.</b>	<b>Question</b>	<b>M.M.</b>
<b>1(a)</b>	Write down the definition of the project given by Project Management Institute USA and UNIDO .	[02]
<b>1(b)</b>	Draw the flow chart diagram of project management process. Discuss its importance for any organization .	[10]
<b>2 (a)</b>	Explain six inherent characteristics of a project ,	[06]
<b>2 (b)</b>	Define the following types of cost with example  I. Direct cost II. Fixed cost III. Opportunity cost IV. Conversion cost V. Sunk cost VI. Historical cost	[06]
<b>3 (a)</b>	Write down the differences between CPM and PERT network analysis .	[02]
<b>3 (b)</b>	Time estimates in weeks of different activities of a network are shown in Fig. 1.Determine the critical path and calculate the probability of completion of the project one week earlier than the expected time .	[10]
<b>4 (a)</b>	List key deliverables in a project management plan. Draw work breakdown structure for a house construction .	[06]

contd...2.

- 4 (b) A project consists of 10 activities with dependencies as given below:

[06]

Activity	Depends on
A	None
B	None
C	A
D	B,C
E	B
F	D
G	E
H	F,G
I	F,G
J	H,I

Draw the network diagram and number the events according to Fulkerson's Rule

OR

- 4'(a) What do you understand by the term specification? Explain different types of [06] specifications used in industry with example.
- 4'(b) What are the different general economic considerations to be kept in mind during [06] purchasing?
- 5 (a) Discuss concept of wage and its types in detail [06]
- 5 (b) Discuss the basic philosophy of various types of rewards offered in lieu of [06] achievement to a worker in the industry.

OR

- 5'(a) Write down detailed account on the evolution of HRM in India [06]
- 5' (b) Discuss various elements of HR planning [06]

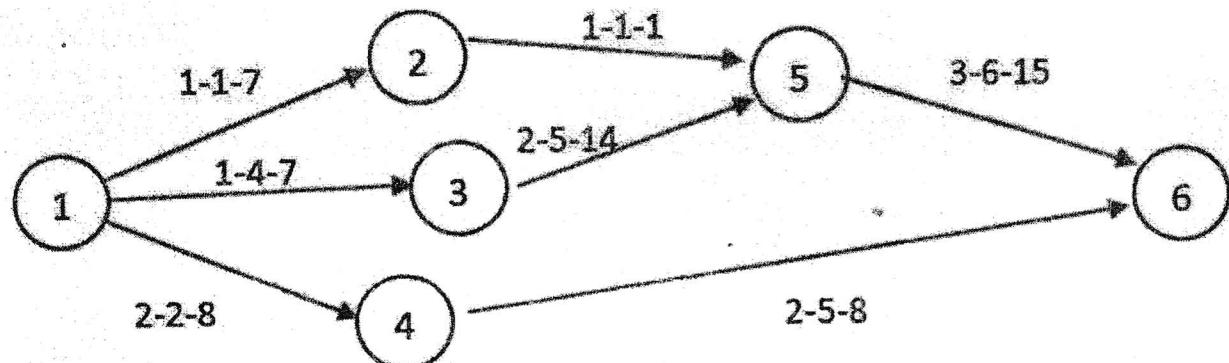


Fig. 1

contd... 3.

Table 9.1. Normal Distribution Function

Normal Deviate -	Probability (%)	Normal Deviate +	Probability (%)
- 0	50.0	0	50.0
- 0.1	46.0	+ 0.1	54.0
- 0.2	42.1	+ 0.2	57.9
- 0.3	38.2	+ 0.3	61.8
- 0.4	34.5	+ 0.4	65.5
- 0.5	30.8	+ 0.5	69.2
- 0.6	27.4	+ 0.6	72.6
- 0.7	24.2	+ 0.7	75.5
- 0.8	21.2	+ 0.8	78.8
- 0.9	18.4	+ 0.9	81.6
- 1.0	15.9	+ 1.0	84.1
- 1.1	13.6	+ 1.1	86.4
- 1.2	11.5	+ 1.2	88.5
- 1.3	9.7	+ 1.3	90.3
- 1.4	8.1	+ 1.4	91.3
- 1.5	6.7	+ 1.5	93.3
- 1.6	5.5	+ 1.6	94.5
- 1.7	4.5	+ 1.7	95.5
- 1.8	3.6	+ 1.8	96.4
- 1.9	2.9	+ 1.9	97.1
- 2.0	2.3	+ 2.0	97.7
- 2.1	1.8	+ 2.1	98.2
- 2.2	1.4	+ 2.2	98.6
- 2.3	1.1	+ 2.3	98.9
- 2.4	0.8	+ 2.4	99.2
- 2.5	0.6	+ 2.5	99.4
- 2.6	0.5	+ 2.6	99.5
- 2.7	0.3	+ 2.7	99.7
- 2.8	0.3	+ 2.8	99.7
- 2.9	0.2	+ 2.9	99.8
- 3.0	0.1	+ 3.0	99.9

**OPEN ELECTIVE**

(3550)

2016-17

**B.TECH. (AUTUMN SEMESTER) EXAMINATION  
ELECTRONICS/COMPUTERS/CHEMICAL/MECHANICAL/ARCHITECTURE/CIVIL  
RENEWABLE ENERGY SOURCES  
COURSE CODE: EE-421(OPEN ELECTIVE)**

**Maximum Marks: 60**

**Credits: 04**

**Duration: Two Hours**

*Answer all the questions.*

*Assume suitable data if missing.*

*Notations used have their usual meaning.*

<b>Q.No.</b>	<b>Questions</b>	<b>M.M.</b>
1(a)	Define energy conservation? Briefly explain its various aspects.	[06]
1(b)	Define cogeneration with the help of block diagram of a power plant.	[06]
<b>OR</b>		
1.(b)'	What are the main objectives and outcomes of Paris Conference on Climate change?	[06]
2.	What is the need of Maximum Power Point Tracker (MPPT) in a solar PV system? A PV system feeds a DC motor to produce 2 hp at the shaft. The motor efficiency is 90%. Each module has 36 multicrystalline silicon solar cells. The cell size is 130mm×130mm and cell efficiency is 17%. Calculate the number of modules required in PC array. Assume global radiation incident normally to panel as 2 kW/m <sup>2</sup> .	[12]
<b>OR</b>		
2'(a)	What is the effect of partial or complete shadowing of a solar cell in a module?	[06]
2'(b)	With the help of diagram, explain the working of Solar thermal power plant.	[06]
3.(a)	Compare the relative performances of various fuel cells.	[06]
3.(b)	Compare the relative performances of fixed dome type and floating drum type of biogas plants.	[06]
<b>OR</b>		

contd... 2.

- 3.(b)' Calculate the volume of fixed dome type biogas digester for the output of two cows. [06]  
 Also Calculate the thermal power available from biogas. Use following data:  
 Retention time= 40days, Dry matter produced=2kg/day/cow, Biogas yield=0.22m<sup>3</sup>/kg of dry matter, Percentage of dry matter in slurry=18%. Density of slurry=1090kg/m<sup>3</sup>, Burner efficiency=60%. Heating value of biogas =23MJ/m<sup>3</sup>.
4. A propeller type wind turbine has free wind velocity of 15m/s at a height of 10m, air density=1.226 Kg/m<sup>3</sup>, alpha= 0.16°, height of tower = 120m, Diameter of rotor = 80 metre, no. of blades=3, wind velocity at the turbine reduces by 20 percent, generator efficiency = 80 percent. Find [12]  
 (a) Total power available in wind.  
 (b) Power extracted by the turbine.  
 (c) Axial thrust on turbine and tip speed ratio for optimal energy extraction.  
 (d) Electrical power generated
5. What are the main hurdles in development of Tidal energy? A single basin type tidal power plant has a basin area of 3 km<sup>2</sup>. The tide has an average range of 13m. Power is generated only during ebb cycle. The turbine stops operating when the head on it falls below 3m. Calculate the average power generated by the plant in single emptying process of the basin if the turbine generator efficiency is 0.65. Density of water=1025kg/m<sup>3</sup>. Estimate the average annual energy generation of plant. [12]
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2016-17

**B.TECH./B.ARCH. (AUTUMN SEMESTER) EXAMINATION  
(OPEN ELECTIVE)  
AIR POLLUTION TECHNOLOGY  
(ME-425)**

**Maximum Marks: 60****Credits: 04****Duration: Two Hours***Answer all the questions.**Assume suitable data if missing.*

<b>Q.No.</b>	<b>Question</b>	<b>M.M.</b>
1.	Answer any <u>two</u> of the following:	[6+6]
	(a) Describe the Plume behaviour as a function of atmospheric stability displaying the diurnal effects on a continuously emitting point source.	
	(b) Describe the Pollution cycle and the various exchanges and interactions between Air-Water-Land.	
	(c) Describe the PINDEX scheme for assessing Air Pollution severity	
2.	Describe in detail, the three routes through which NO may be formed during combustion process.	[12]
	OR	
2'.	Describe the mechanism of formation and control of Carbon monoxide in combustion systems.	[12]
3.	Describe various types of sampling probes. Explain the stack sampling technique to collect the accurate and representative sample. How would you select the traverse points in circular and rectangular stacks.	[12]
	OR	
3'.	Discuss the Chemiluminescence technique for NO measurement and with the help of line diagram, explain the working of a Chemiluminescent NO/NO <sub>x</sub> analyzer.	[12]
4(a).	Name the techniques commonly employed to remove particulates from polluted gas streams. Describe Cyclone separator in detail.	[06]
4(b).	Methane is to be destroyed in a Flare. The flow rate is 0.25 m <sup>3</sup> /s at 3 bar and 25 °C. Assuming that the personnel will not be exposed to flare for periods exceeding 20 minutes, find the height of the flare above the ground if its diameter is 0.2 m. Take the lower calorific value of methane as 50 MJ/kg.	[06]
5.	Write short notes on the following	[6+6]
	(i) Evaporative emissions in petrol engines	
	(ii) Exhaust Emissions from Diesel Engines	