

B. Tech. II Semester (Even Semester)
 Minor Examination 2018-2019
 Subject Name: Engineering Mathematics-II

Max. Marks : 30

Time: 2 hrs.

Note: Attempt all questions.

Q.1 Attempt any three of the following. Q. 1(a) is compulsory

(a) Solve the following system of differential equations

$$\frac{dx}{dt} + \frac{2}{t}(x - y) = 1, \quad \frac{dy}{dt} + \frac{1}{t}(x + 5y) = t. \quad (4)$$

(b) Solve $(D^2 - 1)y = x^2 \cos x + (1 + x^2 + 3x)e^x$.(c) (i) Show that $J_2'(x) = (1 - \frac{4}{x^2})J_1(x) + \frac{2}{x}J_0(x)$

(ii) Find the indicial equation for the differential equation

$$x(1 + x^2)y'' + (\cos x)y' + (1 - 3x + x^2)y = 0 \quad (3)$$

(d) (i) Show that $xJ_n'(x) = nJ_n(x) - xJ_{n+1}(x)$.(ii) If $y = \sum_{n=0}^{\infty} a_n x^n$ is the solution of differential equation $y'' + xy' + 3y = 0$, then find ratio $\frac{a_n}{a_{n+2}}$.(iii) Evaluate $\int_0^{\pi} \sqrt{\pi x} J_1(x) dx$. (3)

Q.2 Attempt any three of the following. Q. 2(a) is compulsory.

(a) Solve by method of variation of parameters

$$(1 - x^2) \frac{d^2y}{dx^2} - 4x \frac{dy}{dx} - (1 + x^2)y = x. \quad (4)$$

(b) Solve

$$\left(\frac{d^2y}{dx^2} + y \right) \cot x + 2 \left(\frac{dy}{dx} + y \tan x \right) = \sec x. \quad (3)$$

(c) Solve

$$\cos x \frac{d^2y}{dx^2} + \sin x \frac{dy}{dx} - 2y \cos^3 x = 2 \cos^5 x. \quad (3)$$

(d) Solve

$$(i) \quad x^2 \frac{d^2y}{dx^2} - (x^2 + 2x) \frac{dy}{dx} + (x + 2)y = x^3 e^x$$

$$(ii) \quad (x^2 D^2 + 3xD + 1)y = \frac{1}{(1-x)^2}. \quad (3)$$

Q. 3 Attempt any three of the following. Q. 3(a) is compulsory.

(a) Solve in the form of series

$$(x - x^2)y'' + (1 - 5x)y' - 4y = 0 \quad (4)$$

(b) Use power series method to solve

$$\frac{d^2y}{dx^2} + x^2 y = 2 + x + x^2 \text{ about } x = 0 \quad (3)$$

(c) State and prove Rodrigues's formula.

(i) Prove that $J_{-n}(x) = (-1)^n J_n(x)$, for any integer n .(ii) Show that $nP_n(x) = xP'_n(x) - P'_{n-1}(x)$, where $P_n(x)$ is Legendre polynomial. (3)

B. Tech.
 Year: 1st Semester: 2nd
 Major Examination: 2018-19
 Engineering Physics-II

Note: Attempt all questions.

Q. 1	Attempt any five parts of the following:	5*2=10
a.	Define following terms- I- Unit Cell II- Primitive Cell III- Lattice Space IV-Crystal Structure	
b.	Define the term "Atomic Packing Fraction" and obtain it for a body centred cubic (bcc) lattice. What will happen, if the atom size composing the lattice is increased by 10 %?	
c.	Copper has a face centred cubic (fcc) structure. Its atomic radius is 1.278 \AA^0 . If the atomic weight of copper is 63.5, calculate its density.	
d.	What are "Miller Indices"? What is their physical significance? In an orthorhombic crystal, a plane cuts intercepts of length $3a$, $-2b$ and $3c/2$ along three axes. Obtain Miller indices for the plane, if a , b and c are the primitive vectors of the unit cell.	
e.	A broad casting studio measuring $25 \times 12 \times 7$ meters has a reverberation time 0.78 second, when 250 audiences are sitting in it. Obtain the reverberation time when it is empty. Given that their absorption coefficient is 0.4 and the absorption area of each person is 0.6 m^2 .	
f.	Define the terms "Live Room" and "Dead Room" and obtain the formula for reverberation time of a dead room.	
g.	What do you mean by "Piezoelectric Effect". Briefly describe the production method of ultrasonic waves using it.	
Q. 2	Attempt any two parts of the following:	2*5=10
a.	Write down Maxwell's equations in Integral and Differential forms. Which laws of electrostatics do those represent and why? Explain it.	
b.	A spherical capacitor consists of a hollow spherical conductor of radius R_1 and surrounded by another concentric conductor of radius R_2 . If the inner sphere is given a charge $+Q$ and the outer sphere is given a charge $-Q$, using Gauss law of electrostatics, show that the capacitance of the spherical capacitor is given by $\frac{4\pi\epsilon_0 R_1 R_2}{(R_2 - R_1)}$.	
c.	Derive the formula for "Skin Depth" in conducting media for a good conductor and explain its physical significance.	
Q. 3	Attempt any two parts of the following:	2*5=10
a.	Derive Maxwell's fourth equation. Explain the physical significance of	

Printed Pages: 2

	displacement current density. Explain, why has Maxwell introduced it?	
b.	Using Maxwell's equations, prove that light is also an electromagnetic wave.	
c.	A plane electromagnetic wave has wavelength 6.0 cm. Its electric field component is oscillating in Y-direction with a maximum magnitude of 40 V/m. Write the equations for electric field and magnetic field as a function of position x and time t assuming that the wave is propagating along X direction.	
Q. 4	Attempt any two parts of the following:	2*5=10
a.	Explain the phenomenon of band gaps in solids. Discuss the case of Silicon and explain the electrical conductivity in metals, semiconductors and insulators.	
b.	What is superconductivity? How is it different from normal conductors? Explain superconductivity on the basis of BCS theory.	
c.	Obtain the formula for carrier charge density for intrinsic semiconductors	
Q. 5	Attempt any two parts of the following:	2*5=10
a.	Obtain London's equation for superconducting materials. How does it explain the Meissner Effect? Also define the term "Penetration Depth" using it.	
b.	Determine the transition temperature and critical field at 4.2 K for a given specimen of a superconductor if the critical fields are 1.40×10^5 and 4.12×10^5 amp/m at 13.8 K and 11.8 K respectively. 13.8	
c.	Why do the properties of materials change, when sizes are reduced to few tens of nanometers? Give five potential applications of nanomaterials.	

ROLL NO 2018041012

B.Tech Ind Year II Sem
EVEN SEMESTER
MINOR TEST 2018-2019

Subject Name: Introduction to Computer Programming

Time: 2 Hrs.

Max Marks: 20

Note: Answer all questions.

Q.1 Attempts any three parts of the following. Q.1 (a) is compulsory

a) Write a C program to find the largest and smallest numbers among the given list of 3 numbers? 4

b) What is flow chart? How is it different from an Algorithm? Explain with suitable example. 2

c) What is the high-level language? What are different types of high-Level language? 2

d) What are identifiers, constant and variables? Explain with suitable examples. 2

Q.2 Attempts any two parts of the following. Q.2 (a) is compulsory

a) Write a program to print the pattern of asterisks as shown below: 4

```
* * * * * * *  
* * * * * *  
* * * * *  
* * * *  
* * *  
* *  
*
```

b) State difference between the declaration of variable and definition of symbolic name? 2

c) What are the fundamental data types? Write their format specifies memory bytes and range. 2

Q.3 Attempts any two parts of the following. Q.3 (a) is compulsory

a) Write a program to compute the value of Euler's number e, that is used as the base of natural number algorithms. Use the following formula 4
$$e = 1 + 1/1! + 1/2! + 1/3! + 1/4! + \dots + 1/n!$$

b) What is an operating system? What are the various categories of operating system? 2

c) Differentiate between break and continue statement with examples. 2

Printed Pages: 2

BAS-08

Roll No. 2018041012

B.Tech
(SEM-II) EVEN SEMESTER
MINOR TEST (EXAMINATION) 2018-2019

Engineering Physics-II

Time: 2 Hrs.

Max. Marks: 20

Note: Answer all questions.

Q.1 Attempt any Three parts of the following. Q. 1(a) is compulsory.

- (a). I- Sketch neat and clean diagram of NaCl crystal and Obtain coordination number of Na^+ ion. 4
II- Define the term packing fraction and obtain it for body centered cubic lattice (bcc). 2
- (b). How many atoms are there in per mm^2 surface area of (111) plane for lead (Pb), which has fcc structure. Given that the radius of Pb atom is 1.74 \AA . 2
- (c). If the intensity of sound is increased by 10db from its original value, what will be the percentage change in its intensity? 2
- (d) I- Write down conditions for a good auditorium. 2
II-What do you mean by noise? What measures can be taken to check noise? 2

Q.2 Attempt any Two parts of the following. Q. 2(a) is compulsory.

- (a). I- What is the difference between lattice space and crystal structure? 4
II- Sketch neat and clean diagram of scc, bcc, fcc and hcp lattices and give one appropriate example of each. 4
- (b). Derive formula for Bragg's law of diffraction- $2d(hkl)\sin\theta = n\lambda$ 2
- (c). The primitive translation vectors of the fcc lattice are given by- 2

$$a_1 = \frac{1}{2}a(\vec{y} + \vec{z}); a_2 = \frac{1}{2}a(\vec{x} + \vec{z}) \text{ & } a_3 = \frac{1}{2}a(\vec{x} + \vec{y})$$

Obtain the primitive translation vector of its reciprocal lattice. 2

Q.3 Attempt any Two parts of the following. Q. 3(a) is compulsory.

- (a) Derive Sabine's formula for a live room. Express it in FPS units. 4
- (b) Define the term "Piezoelectric effect". Explain the method of production of ultrasonic waves using quartz crystal. 2
- (c) A cinema hall has a dimension of $24 \times 15 \times 10$ m. Its reverberation time is 1.3 seconds when empty. Find the reverberation time when an audience of 300 persons is present. Assume the sound absorption by each person is 4.5 sabines. 2

NOTE:- Attempt All questions.

1. Attempt any three parts of the following. Q. 1(a) is compulsory.

- ✓ (a) Explain voltage regulation in rectifiers. Prove that voltage regulation in HWR and FWR is same and given by the expression

$$\% \text{ Regulation} = \frac{r_f}{R_L} \times 100$$

Where r_f = diode forward resistance R_L = Load resistance

- ✓ (b) Find the DC and ac resistance of a Ge Junction diode at 25°C with $I_s = 25\mu\text{A}$ at an applied voltage of 0.2V across diode. (2)

- (c) Explain the current flow mechanism in NPN transistor with leveled structural diagram why collector region area is larger than emitter region area? (2)

- ✓ (d) Why operating point is not selected near saturation region in BJT. (2)
A transistor has $\beta = 150$. Find the collector and base current if $I_E = 10\text{mA}$.

2. Attempt any two parts of the following. Q. 2(a) is compulsory.

- ✓ (a) Draw the circuit diagram of Potential Divider Biasing arrangement in BJT with $V_{CC} = 22.5\text{V}$, $R_C = 5.6\text{K}$, $R_2 = 10\text{K}$ and $R_1 = 90\text{K}$, $\beta = 55$ and $V_{BE} = 0.6\text{V}$. The transistor operates in active region. Determine operating point and stability factor. (4)

- ✓ (b) Draw the complete experimental setup diagram to obtain the characteristics of PNP transistor in CB configuration. Draw input and output characteristic curves with leveled parameters and indicate different regions of operation. (2)

- (c) Compare the performance measures of different rectifier configurations in tabulated form. (2)
Which rectifier configuration is suitable for low voltage rectification?

3. Attempt any two parts of the following. Q. 3(a) is compulsory.

- ✓ (a) Draw the circuit diagram of Half wave rectifier with following data. (4)
Secondary winding resistance = 120 Ohms, Diode forward resistance = 20 Ohms, Load resistance = 5K Ohm. The voltage appearing at the secondary winding is $200 \sin 314t$
Calculate
 (i) I_{dc}
 (ii) R_{dc}
 (iii) PIV
 (iv) efficiency

- ✓ (b) Discuss the capacitive effect of step graded p-n Junction in. (2)
 (i) Forward bias
 (ii) Reverse bias

- (c) What is the significance of operating point in BJT? Why it shifts? Write the Criteria for the selection of operating point. (2)

B. Tech.
Year 1st Semester 1st (ODD SEMESTER)
(ECE,EE & ME)
Major Examination 2018-2019
FUNDAMENTALS OF ELECTRONICS ENGINEERING

M.M.: 50

Time: 3 Hours

Note: - Attempt all the questions. Each question carries equal marks.

1. Attempt any Five parts of the following.

(5x2) = 10

- (a) Give the classification of materials on the basis of Electrical behaviour. Explain each with the help of simple energy band diagram.
- (b) Draw V-I Characterstic curve of Si diode in forward and reverse bias. Write volt ampere equation and elaborate all terms used.
- (c) Determine the rating of a transformer to deliver 100 watts of d.c. power to a load under FWR. Assume $V_{dc} = 10V$.
- (d) Discuss Early effect in transistor. Mention its consequences.
- (e) What are the advantages of h parameters for transistor amplifier analysis? Draw the small signal model of BJT amplifier using h parameters at low frequency in CE configuration.
- (f) Draw the circuit of zener diode voltage regulator with series resistance R_s , and load resistance $R_L = 120 \text{ ohm}$. Calculate the value of R_s if output is maintained at $V_Z = 6.2V$. $V_{in} = 20 - 40V$
- (g) Write short notes on any two of the following.
 - (i) Transition and diffusion capacitance of p-n junction
 - (ii) Clipper circuits
 - (iii) Voltage Doublers

2. Attempt any two parts of the following.

(2x5)=10

- (a) Why N channel MOSFETS are preferred over P channel MOSFETS? With the help of suitable diagram explain the working of P Channel DMOSFET. Indicate it's Characteristics.
- (b) Establish the relation

$$gm = g_{mo} \left(1 - \frac{V_{GS}}{V_\rho}\right)$$

where symbols have their usual meaning.

A JFET has drain current of 4 mA. If $I_{DSS} = 8\text{mA}$ and $V_{GS(\text{OFF})} = -6\text{V}$, find the values of V_{GS} and V_p .

- (c) Why JFET is called voltage controlled device? Explain the operation of n-channel JFET with neat diagram. Draw it's characteristics with different regions of operation

3. Attempt any two parts of the following (2x5)=10

- (a) Describe an OP-AMP. How OP-AMP can be represented in block diagram form. Write characteristics of an ideal OP-AMP. Define CMRR.
- (b) Explain the operation of OP-AMP in non inverting mode with proper Circuit. Derive the expression for its gain. How it can be used as buffer? Write the applications of buffer circuit.
- (c) Draw the circuit of an OP-AMP integrator and derive the expression for its output voltage in terms of input voltage.

4. Attempt any two parts of the following (2x5)=10

- (a) Plot the logical expression.
 $ABCD + A\bar{B}\bar{C}D + A\bar{B}C + AB$
On a 4 variable K Map. Obtain the simplified expression from the map.

- (b) Convert the following numbers as directed with procedures.
- | | |
|----------------------|---------------------|
| (i) $(4021.25)_{10}$ | = () ₂ |
| (ii) $(A6F.CD)_{16}$ | = () ₈ |
| (iii) $(2AC9)_{16}$ | = () ₇ |
| (iv) $(725.25)_{10}$ | = () ₁₆ |
| (v) $(7841)_9$ | = () ₁₀ |

- (c) State and Prove following properties and laws of Boolean algebra.
(i) Distributive property
(ii) Consensus Laws

5. Attempt any two parts of the following (2x5)=10

- (a) State the advantages of DVM over an analog meter. Explain the basic principle of DVM.
- (b) Describe the Working of CRO with the help of block diagram. Mention the practical applications of CRO.
- (c) Explain the operation of basic Digital Multimeter with block diagram. How current and resistance can be measured?

(SEM I) ODD SEMESTER
MINOR TEST (EXAMINATION) 2018-2019
Electrical Circuits & Analysis

Max. Marks: 20

Time: 2 Hrs.

Note: Answer all questions.

Q.1 Attempt any Three parts of the following. Q.1(a) is compulsory.

- (a) Write the statement of the Thvenin's and Norton's theorem. Find the Norton's equivalent circuit for the network shown in Fig.1.

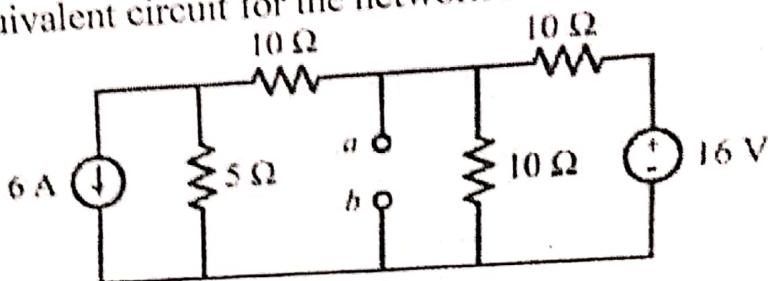


Fig.1

- (b) Write the statement of the Maximum Power Transfer Theorem. Find the value of I_L (in terms of V_s and R) that maximizes the power absorbed by the constant current load carrying current I_L connected in the circuit of Fig.2.

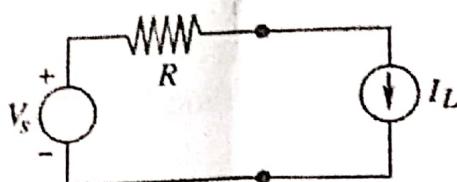


Fig.2

- (c) State and explain Millmans' Theorem. Find the current through 3 Ohm resistor using the Millman's theorem in Fig.3.

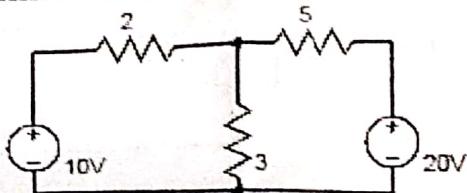


Fig.3

- (d) In the given circuit of Fig. 4, find the maximum power (in Watts) that can be transferred to the load R_L . If $R_L=2$ Ohm, then find the power in the R_L load.

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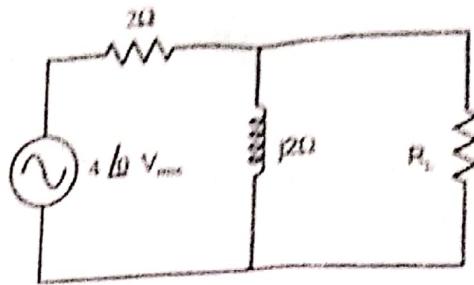


Fig.4

Q.2 Attempt any Two parts of the following. Q.2 (a) is compulsory.

4

- (a) For the circuit shown in the Fig.5, find the Thevenin equivalent voltage (in Volts) across terminals a-b. Find power in 3 ohm and 6 ohm resistor in the circuit shown in Fig.5.

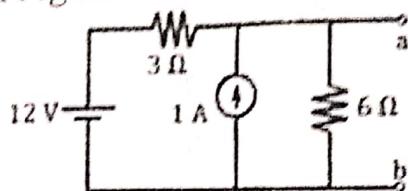


Fig.5

- (b) Write difference between (i) Active networks and passive networks,
(ii) Linear elements and non-linear elements.

2

- (c) Explain the Reciprocity theorem with suitable example.

2

Q.3 Attempt any Two parts of the following. Q.3 (a) is compulsory.

4

- (a) For the R-L-C parallel circuit shown in Fig.6, $R=10\text{ Ohm}$, $X_L=50\text{ Ohm}$, $X_C=100\text{ Ohm}$, $V_S=200\text{ V}$, 50Hz ac. Find I_S and draw the phasor diagram of the circuit.

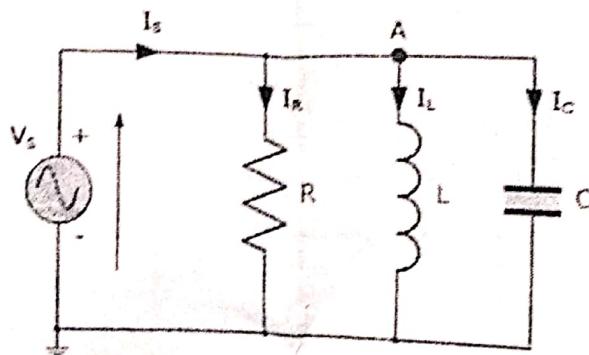


Fig.6

- (b) Convert following:

- (i) $20+j30$ rectangular to polar (ii) $60 < \frac{\pi}{4}$ polar to rectangular
 (ii) $3+j4$ rectangular to polar (iv) $40 < \frac{\pi}{3}$ polar to rectangular

2

- (c) Define, (i) RMS value (ii) Average value (iii) Form factor (iv) Peak Factor. Also, write their values for a sinusoidal ac waveform.

2

BAS-05

Roll No. 2018041012

B. Tech.-I
(SEM. I) Odd Semester (CE, EC & CS)
Minor Test 2017-2018
Subject Name: Environment & Ecology

Time: 02:00 Hrs.

Max. Marks: 30

Note: Answer all question.

BAS - 01

Roll No. 2018041012

Name of the Course: B. Tech-I year
Odd Semester

Minor Examination: 2018-19

Subject Name: Engineering Mathematics - I

Time: 2 hrs.

Max. Marks: 30

Note: Answer all questions.

Q. 1 Attempt any three parts of the following. Q. 1(a) is compulsory.

(a) Evaluate $D^n [\log(x^2 - 2x \cos \alpha + 1)]$

4

(b) If $y = A(x + \sqrt{x^2 - 1})^n + B(x - \sqrt{x^2 - 1})^n$, prove that

3

(i) $(x^2 - 1)y_2 + xy_1 - n^2y = 0$

(ii) $(x^2 - 1)y_{n+2} + (2n + 1)x y_{n+1} = 0.$

(c) Find the characteristic equation of the matrix

3

$$A = \begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix}$$

And also find the value of $A^8 - 5A^7 + 7A^6 - 3A^5 + A^4 - 5A^3 + 8A^2 - 2A + I$ (d) If z be a function of u and v , and u and v be the functions of two other variables x and y such that $u = l x + m y$ $v = l y - m x$ show that

$$\frac{\partial^2 z}{\partial x^2} + \frac{\partial^2 z}{\partial y^2} = (l^2 + m^2) \left(\frac{\partial^2 z}{\partial u^2} + \frac{\partial^2 z}{\partial v^2} \right)$$

Q. 2 Attempt any three parts of the following. Q. 2 (a) is compulsory.

(a) If u, v, w are the roots of the equation in μ and $\frac{x}{a+\mu} + \frac{y}{b+\mu} + \frac{z}{c+\mu} = 1$, then find the Jacobian $\frac{\partial(x,y,z)}{\partial(u,v,w)}$.

4

(b) Expand $\sin^{-1} \left(\frac{2x}{1+x^2} \right)$ in ascending powers of x , upto x^9 .

3

(c) Expand x^y in powers of $(x - 1)$ and $(y + 1)$ upto the third degree terms.

3

Total No. of questions: 3

(d) State and prove Euler's theorem and verify for

$$u(x, y, z) = \frac{x}{y} + \frac{y}{z} + \frac{z}{x}$$

Q.3 Attempt any three parts of the following. Q. 3(a) is compulsory.

(a) Find the inverse of the matrix by row elementary operations

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

(b) Find the rank of the following matrix by reducing it to echlon form

$$\begin{bmatrix} 1 & 2 & -1 & 4 \\ 2 & 4 & 3 & 4 \\ 1 & 2 & 3 & 4 \\ -1 & -2 & 6 & -7 \end{bmatrix}$$

(c) Find the Eigen values and corresponding Eigen vectors of $A^2 - 2A + I$, where

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

(d) Show that if $\beta \neq -5$, system of equations

$$\begin{aligned} 3x - y + 4z &= 3 \\ x + 2y - 3z &= -2 \\ 6x + 5y + \beta z &= -3 \end{aligned}$$

has a unique solution. If $\beta = -5$, show that the equations are consistent.
 Determine the solutions in each case.

4

3

3

3

Madan Mohan Malaviya University of Technology, Gorakhpur
Center for Management Studies
B-Tech ECE (Semester II) Even Semester

Roll no

2 | 0 | 1 | 8 | 0 | 4 | 1 | 0 | 1 | 2

SUBJECT: Knowledge Management

Time: 2hrs

Total Marks: 30

- | | | |
|-------------|--|--------------|
| Q. 1 | Attempt any three of the following Q. 1 (a) is compulsory. | Marks |
| a | Explain the Concept and meaning of Knowledge. Explain different types of Knowledge. | 4 |
| b | Describe the difference between Tacit and Explicit Knowledge. | 3 |
| c | Explain the Need for a Knowledge Management System in an Organization. | 3 |
| d | Describe the Knowledge management cycle with the help of suitable examples. | 3 |
|
 | | |
| Q. 2 | Attempt any three of the following Q. 2 (a) is compulsory. | Marks |
| a | Discuss the requirement of Organizational Knowledge? Explain the characteristics of Organizational Knowledge. | 4 |
| b | Define the concept of Knowledge management with the view of different authors, also elaborate its characteristics. | 3 |
| c | Explain the meaning of Business Intelligence. Also discuss its hierarchy with the help of suitable examples. | 3 |
| d | There are several factors, which have triggered organizations' interest in Knowledge Management. Describe four of these factors. | 3 |
|
 | | |
| Q. 3 | Attempt any three of the following Q. 3 (a) is compulsory. | Marks |
| a | Define the different types of Knowledge management model given by different authors. | 4 |
| b | Explain how Technology can be an enabler of Knowledge? | 3 |
| c | Discuss the relationship between knowledge management and organizational learning. | 3 |
| d | Explain the roots of Knowledge management with the help of diagram and examples | 3 |

B. Tech. I Semester
 ODD SEMESTER
 MAJOR EXAMINATION 2018 - 2019

Subject Name: : Engineering Mathematics-I

Time: 3 Hrs.

Max. Marks: 50

Note: Attempt all questions. Each question carry equal marks.

1. Attempt any five parts of the following:

(5×2 = 10)

(a) If $u = \sin nx + \cos nx$, then show that $u_r = n^r [1 + (-1)^r \sin 2nx]^{1/2}$, where u_r is the r^{th} differential coefficient of u w.r.t. x .

(b) If $u = \sin^{-1} \left[\frac{x^{1/4} + y^{1/4}}{x^{1/6} + y^{1/6}} \right]$, then find $x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2}$.

(c) Expand $\sin(m \sin^{-1} x)$ in ascending power of x .

(d) Using $x = r \cos \theta, y = r \sin \theta$, transform the equation $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$ into polar form as

$$\frac{\partial^2 u}{\partial r^2} + \frac{1}{r} \frac{\partial u}{\partial r} + \frac{1}{r^2} \frac{\partial^2 u}{\partial \theta^2} = 0.$$

(e) Show that the equations $3x + 4y + 5z = a, 4x + 5y + 6z = b, 5x + 6y + 7z = c$ do not have solution unless $a + b = 2c$.

(f) Find the rank of the matrix

$$\begin{bmatrix} 2 & 3 & -2 & 4 \\ 3 & -2 & 1 & 2 \\ 3 & 2 & 3 & 4 \\ -2 & 4 & 0 & 5 \end{bmatrix}$$

(g) Find the Eigen values and Eigen vectors of the matrix

$$\begin{bmatrix} -2 & 2 & -3 \\ 2 & 1 & -6 \\ -1 & -2 & 0 \end{bmatrix}$$

2. Attempt any two parts of the following:

(2×5 = 10)

(a) (i) Evaluate

$$\int_0^\infty \int_0^x xe^{-\frac{x^2}{y}} dx dy$$

(ii) Solve by using change of order of integration

$$\int_0^a \int_b^{b+x} x dy dx$$

(b) (i) Find the volume bounded by the surfaces $x^2 + y^2 = 1 + z$ and $z = 0$.

(c) Evaluate

$$\int_0^1 \frac{x^2 dx}{(1-x^4)^{1/2}} \times \int_0^1 \frac{dx}{(1+x^4)^{1/2}}$$

(c) By means of substitution $x+y+z = u, y+z = uv, z = uvw$, evaluate the value of $\iiint x^{-1/2}y^{-1/2}z^{-1/2}(1-x-y-z)^{1/2}dxdydz$ taken over the volume bounded by $x=0, y=0, z=0$ and $x+y+z=1$.

3. Attempt any two parts of the following:

$(2 \times 5 = 10)$

(a) Show that $\beta(m, n) = \int_0^\infty \frac{x^{m-1}}{(1+x)^{m+n}} dx = \int_0^\infty \frac{x^{n-1}}{(1+x)^{m+n}} dx = \frac{\Gamma m \Gamma n}{\Gamma(m+n)}$.

(b) (i) Show that

$$\Gamma\left(\frac{1}{n}\right)\Gamma\left(\frac{2}{n}\right)\Gamma\left(\frac{3}{n}\right)\dots\Gamma\left(\frac{n-1}{n}\right) = \frac{(2\pi)^{\left(\frac{n-1}{2}\right)}}{n^{1/2}}.$$

(ii) Evaluate $\int_0^\infty e^{-ax} x^{n-1} \cos bx dx$ in terms of Gamma function. Use it to evaluate

$$\int_{-\infty}^\infty \cos x^2 dx$$

(c) Evaluate $\iiint \sqrt{a^2 b^2 c^2 - b^2 c^2 x^2 - c^2 a^2 y^2 - a^2 b^2 z^2} dxdydz$ taken throughout the ellipsoid $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$.

4. Attempt any two parts of the following:

$(2 \times 5 = 10)$

(a) (i) A fluid motion is given by $\vec{v} = (y \sin z - \sin x)\hat{i} + (x \sin z + 2yz)\hat{j} + (xy \cos z + y^2)\hat{k}$. Is motion irrotational? If so, find the velocity potential.

(ii) Show that $\operatorname{div} \left\{ \operatorname{grad} \left(\frac{x}{r^3} \right) \right\} = 0$, where r is the magnitude of position vector $\vec{r} = xi + yj + zk$.

(b) Evaluate $\iint_S \vec{F} \cdot \hat{n} dS$, $\vec{F} = 18z\hat{i} - 12\hat{j} + 3y\hat{k}$ and S is the surface of the plane $2x + 3y + 6z = 12$ in the first octant.

(c) Verify divergence theorem for $\vec{F} = 4x\hat{i} - 2y^2\hat{j} + z^2\hat{k}$ taken over the region bounded by cylinder $x^2 + y^2 = a^2, z = 0, z = b$.

5. Attempt any two parts of the following:

$(2 \times 5 = 10)$

(a) (i) Find the greatest value of the directional derivative of $\phi(x, y, z) = 2x^2 - y - z^4$ at $(2, -1, 1)$.

(ii) Find the directional derivative of $xyz^2 + xz$ at $(1, 1, 1)$ in the direction of the normal to the surface $3xy^2 + y + z = 0$ at $(0, 1, 1)$.

(b) Verify Green's theorem in a plane for $\int_C (3x^2 - 8y^2)dx + (4y - 6xy)dy$ where C encloses the region bounded by $y = \sqrt{x}$ and $x = \sqrt{y}$.

(c) (i) Apply Stokes' theorem to evaluate $\int_C ydx + zdy + xdz$, where C is the curve of intersection of $x^2 + y^2 + z^2 = a^2$ and $x + z = a$.

(ii) Prove that $\int_C \vec{r} \cdot d\vec{r} = 0$, where $\vec{r} = xi + yj + zk$.

B. Tech.-I
 (SEM. I) Odd Semester
 Major Test 2018-2019
 Subject Name: Environment & Ecology

Time: 03:00 Hrs.

Max. Marks: 50

Note: Attempt all questions. Each question carries equal marks.

Q1. Attempt any five parts of the following:	
✓ a)	What do you mean by urban and industrial waste? 2
✓ b)	Differentiate between thermal and marine pollution. 2
✓ c)	Define the term integrated crop management. Also list its advantages. 2
d)	Name two hot-spots of biodiversity in India. 2
✓ e)	Define the following terms: (1) Population explosion (2) Water logging 2
f)	Define the term ecological succession. 2
✓ g)	What is the role of individual in prevention of pollution? 2
Q2. Attempt any two parts of the following:	
✓ a)	What are the causes and control measures of water pollution? 5
✓ b)	Write a note on acid rain. And list its consequences also. 5
c)	Describe the pond ecosystem with a suitable diagram. 5
Q3. Attempt any two parts of the following:	
a)	What do you mean by solid waste management? Explain the causes and control measures of urban and industrial waste. 5
✓ b)	Explain : (1) Greenhouse effect. (2) Bio-magnification. 5
✓ c)	Write a note on global warming and explain its causes, consequences and control measures. 5
Q4. Attempt any two parts of the following:	
✓ a)	Write short note on: (1) NGO's and their role. (2) Ozone layer depletion. 5
✓ b)	Write salient features of forest conservation act. 5
c)	What do you mean by public awareness? Also list the issues involved in enforcement of environment legislation. 5
Q5. Attempt any two parts of the following:	
✓ a)	What are the causes, effects and control measures of air pollution? 5
✓ b)	How the human population affect the environment? Explain. 5
c)	Write note on women education and child welfare. 5

B. Tech.
 SEMESTER -Ist
 MAJOR EXAMINATION 2018 - 2019
 Subject Name: Engineering Physics-I

Max. Marks: 50

Time: 3 Hrs.

Attempt all questions. Each question carry equal marks.

Attempt any five parts of the following:

 $(5 \times 2 = 10)$

- (a) What do you mean by frame of reference? What are the differences between inertial and non-inertial frame of reference?
- (b) Derive the relativistic velocity addition theorem. Show that no material particle can travel faster than the velocity of light.
- (c) The mass of a moving electron is 11 times its rest mass. Find the kinetic energy and momentum.
- (d) Establish Einstein's mass-energy relation. Give two physical examples of Einstein's mass-energy equivalence.
- (e) Compare the wavelength of a photon and electron having (i)-Same momentum (ii)-Same energy.
- (f) What was the objective of Davisson-Germer experiment? Discuss the results of this experiment.
- (g) State Heisenberg uncertainty principle. If the uncertainty in the location of a particle is equal to its de Broglie wavelength, then find out the uncertainty in its velocity.

Attempt any two parts of the following:

 $(2 \times 5 = 10)$

- (a) Why the Newton's Rings are circular? Derive expression for the diameter of bright ring.
- (b) A diffraction grating used at normal incidence gives a line $\lambda_1 = 6000 \text{ \AA}$ in a certain order superimposed on another line $\lambda_2 = 4500 \text{ \AA}$ of the next higher order. If the angle of diffraction is 30° , calculate the number of lines in 1 cm of the grating.
- (c) Write the condition of secondary maxima for a single slit and show that the intensities of the successive maxima are in the ratio
 $1:1/22:1/61:1/121,\dots$

Attempt any two parts of the following:

 $(2 \times 5 = 10)$

- (a) In Newton's ring experiment, the diameter of 4th and 12th dark rings is 0.4 and 0.7 cm, respectively. Find the diameter of 20th dark ring.
- (b) The indices of refraction of quartz for right handed and left handed circularly polarized light of wavelength 7620 \AA are 1.53914 and 1.53920 respectively. Calculate the rotation of the plane of polarization of the light in degrees produced by a plate 0.5 mm thick.
- (c) Discuss the production and detection of plane, elliptically, and circularly polarised light?

Attempt any two parts of the following:

 $(2 \times 5 = 10)$

- (a) Mention the essential conditions for lasing action. With the help of suitable diagram, explain the principle, construction and working of Ruby laser.
- (b) What is holography? Explain recording and reconstruction of a hologram. List some important applications of holography.
- (c) An optical fibre has NA of 0.20 and a cladding refractive index of 1.59. Determine the acceptance angle for the fibre in water, which has refractive index of 1.33.

- (2 × 5 = 10)
5. Attempt any two parts of the following:
- (a) Describe the construction and working of He-Ne Laser. How it is superior to a Ruby laser.
- (b) Describe the Propagation Mechanism of optical signals through optical fiber with suitable ray diagram.

Explain the following terms:

- (c)
- (i) Numerical aperture
 - (ii) Acceptance angle
 - (iii) Acceptance cone

B.Tech.
(SEM-II) EVEN SEMESTER
MAJOR EXAMINATION 2018-2019

Subject Name: Introduction to Computer Programming

Times: 3 Hrs.

Max Marks: 50

Note: Attempts all questions. Each question carries equal marks.

Q.1 Attempts any five parts of the following (5x2=10)

- (a) Write a C program to check whether all the elements in a given list of n numbers are distinct or not.
- (b) What are variables and in what way it is different from constants?
- (c) What are header files and what is its use in C programming?
- (d) $\text{int } z, x=5, y=-10, a=4, b=2;$
$$z = x++ - y * b / a;$$
 then calculate the value of z.
- (e) Describe the following
i) Static RAM vs Dynamic RAM ii) static vs auto iii) break vs continue
- (f) Write a C program to print the following pattern

9
7 7 7
5 5 5 5 5
3 3 3 3 3 3 3
1 1 1 1 1 1 1 1

- (g) If $a = 10, b = 12, c = 0$, find the values of the expressions in the following :

- a) $a! = 6 \&& b > 5$
b) $a == 9 \parallel b < 3$
c) $! (a > 5 \&& c)$
d) $5 \&& c != 8 \parallel !c$

Q.2 Attempts any two parts of the following. (2x5=10)

- (a) What is an array? Write a program to compute Mean and Median of an array containing 10 integers.
- (b) Explain the following conditional statements with an example
i) if ii) if-else iii) nested if-else
- (c) Write a C language program to read two matrices, multiply them and print the resultant matrix.

Q.3 Attempts any two parts of the following. (2x5=10)

- (a) Write a program in C to find the number of vowels and consonants in given string.

- (b) Create a structure to store book details: *title name, ISSN No. Publisher* and *Price*. Store the records for 'n' (user input) books and display them in the decreasing order of price.
- (c) Create a function to receive an array of integer as an argument. Find the prime numbers present in the array and display them within function definition.

Q.4 Attempts any two parts of the following.

(2x5=10)

- (a) Write a program using dynamic memory allocation to read a string from user. Copy its content to another string and display it.
- (b) Write a program to concatenate two strings (Do not use inbuilt string function)
- (c) Write a program to sort an integer array using pointer.

Q.5 Attempts any two parts of the following.

(2x5=10)

- (a) Write short notes on:
- Passing arrays as arguments
 - Value passing mechanism **Call by value and call by reference.**
- (b) Write a function to compute the LCM of three user input numbers. The function arguments are pointers.
- (c) Write a program to read a string from user and write it into a file. **Read it from the file and print it in reverse order.**

Time: 3 Hrs.

Note: Attempt all questions. Each question carry equal marks.

(5 × 2 = 10)

1. Attempt any five parts of the following:

(a) Solve the differential equation

$$(D^2 - 4D - 5)y = xe^{-x}.$$

(b) Solve the differential equation

$$x^2 \frac{d^2y}{dx^2} + 4x \frac{dy}{dx} + 2y = e^x.$$

(c) Solve the system of linear differential equation

$$\frac{d^2x}{dt^2} - 3x - 2y = 0; \quad \frac{d^2y}{dt^2} + x + y = 0.$$

(d) Solve the differential equation

$$\frac{d^2y}{dx^2} + 4y = 4 \tan 2x$$

by using method of variation of parameters.

(e) Find the power series solution of the equation

$$(x^2 + 1)y'' + xy' - xy = 0$$

in the powers of x .(f) Prove that $P_n(1) = 1$.

(g) Prove that

$$J_{-\frac{1}{2}}(x) = \sqrt{(2/\pi x)} \cos x.$$

(2 × 5 = 10)

2. Attempt any two parts of the following:

(a) Find the Laplace transform of the function $e^{kt}(at^2 + bt + c)$.(b) Find the Laplace transform of the function $e^{-t}(3 \sin 2t - 5 \cos 2t)$.(c) Find the Laplace transform of the function $\sinh at \cos at$.

3. Attempt any two parts of the following:

(2 × 5 = 10)

(a) Evaluate

$$L^{-1} \left\{ \frac{6}{2s-3} - \frac{3+4s}{9s^2-16} + \frac{8-6s}{16s^2+9} \right\}.$$

(b) Find the Laplace transform of the function $\text{erf}(\sqrt{t}) = \frac{2}{\sqrt{\pi}} \int_0^{\sqrt{t}} e^{-u^2} du$. Hence deduce $L\{t \text{erf}(\sqrt{t})\}$.

(c) Solve the differential equation

$$ty'' + y' + 4ty = 0, y(0) = 3, y'(0) = 0$$

by using Laplace transformation.

4. Attempt any two parts of the following:

(2×5 = 10)

(a) Find the Fourier series for $f(x) = e^x$ in $(-\pi, \pi)$.

(b) Find the Fourier half range cosine series for $f(x) = x(\pi - x)$ in $(0, \pi)$.

(c) Find the Fourier half range sine series for $f(x) = \cos x$ in $(0, \pi)$.

5. Attempt any two parts of the following:

(2×5 = 10)

(a) Solve the partial differential equation

$$(2D^2 - 5DD' + 2D'^2)z = 24(y - x), \quad D \equiv \frac{\partial}{\partial x}, D' \equiv \frac{\partial}{\partial y}.$$

(b) Solve the partial differential equation

$$r - 2s + t = \sin(2x + 3y)$$

(c) Solve the partial differential equation

$$\frac{\partial^2 z}{\partial x^2} + \frac{\partial^2 z}{\partial y^2} = \cos mx \sin ny.$$

BACHELOR OF TECHNOLOGY FIRST YEAR

EVEN SEMESTER

MAJOR EXAMINATION 2018-2019

TECHNICAL WRITING

Time- 3 Hours

Maximum Marks- 50

Note: Attempt all questions. Each question carries equal marks.

Q.1. Attempt any five parts of the following. (5 x 2=10)

- a) What are the key features of Scientific and Technical writing? Enumerate in detail.
- b) Discuss the role of LSRW in second language learning process.
- c) What do you understand by Reading Comprehension? How does Reading Comprehension differ from Listening Comprehension?
- d) How will you organize a Thesis? Discuss the various parts of Thesis.
- e) What role does the 'Punctuation and Capitalization' play in Technical writing?
- f) How can technical writing be useful in the growth of ECE Professional?
- g) What is a Sentence? Catalogue its various types.

Q.2. Attempt any two parts of the following. (2 x 5 = 10)

- a) What do you mean by Report? Define Report and mention its various types.
- b) Draft your Resume for the post of Junior Engineer in Reliance Telecom.
- c) Suggest key components of Professional Proposal.

Q.3. Attempt any two parts of the following. (2 x 5 = 10)

- a) How does effective report writing help in the growth of Electronics and Communication Engineering professional?
- b) You attended a techno-cultural fest *Abhudaya* at MMMUT. Draft a Press Report on the same to be published in the Times of India as its media correspondent.
- c) What are the different layouts of Letter Writing? Explain Full Blocked layout in detail.

Q.4. Attempt any two parts of the following.

(2 x 5 = 10)

- a) Discuss the various types of audiences an Engineering Professional may have to interact with.
- b) What are issues one must address before entering in Multicultural communicative situations?
- c) How will you refer to an 'online' and a 'printed' source in the reference section of your project.

Q.5. Attempt any two parts of the following.

(2 x 5 = 10)

- a) Discuss the role played by body language, gestures, postures and eye-contact in facing interviews and giving oral presentations.
- b) Draft an acknowledgement you wish to submit with your dissertation/ project.
- c) Differentiate among Resume, Bio-data and CV so as to make their meaning and concept clear.

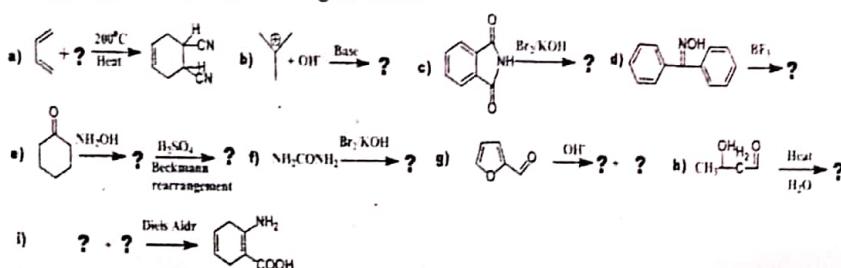
B.Tech.
EVEN SEMESTER
Major Examination 2018-2019
Subject Name: Engineering Chemistry

Time: 3 hrs. Max. Marks: 50 Note: Attempt all questions. All questions carry equal marks.

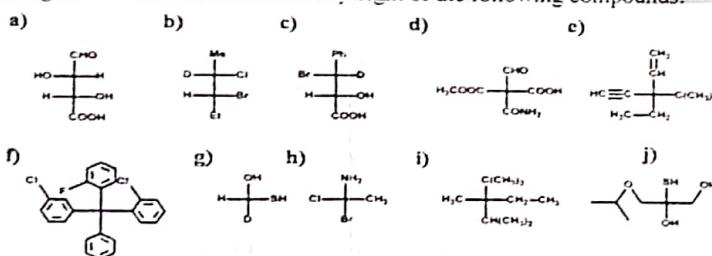
Q.1 Attempt any five of the following.

- (a) On the basis of molecular orbital theory explain why F_2 is diamagnetic while O_2 is paramagnetic? Calculate their bond orders? 2
- (b) Draw a neat diagram of one component system and discuss it? 2
- (c) What are polar and nonpolar bonds? Give four examples of each. 2
- (d) Describe homolytic and heterolytic fission of a covalent bond. How carbonium ion and free radicals are obtained? What are inductive effects? Give one example of a system where this effect is operative. 2
- (e) Give one example of E1 and E2 reaction. Explain its mechanism. 2

(f) Attempt any four of the following reactions



(g) Assign R and S conformation to any eight of the following compounds. 2



Q.2 Attempt any two of the following.

- (a) i) Define monomer and degree of polymerization with examples?
ii) Classification of polymers based on structure. 5

- (b) What are copolymers? How does Buna-S differs from Buna-N?
1160g of hexamethylenediamine is copolymerized with 730g of adipic acid. Determine the molecular formula of the copolymer? 5

- (c) How will you synthesize Novolac and Bakelite from phenol?
Give a brief account of the preparation and application of In an experiment in a bomb calorimeter, a solid fuel of 1.8g is burnt. It is observed that increase of temperature is $3.8^\circ C$ of 8000g of water. The fuel contains 2% of hydrogen. Calculate the H.C.V. and L.C.V. value (Equivalent weight of water and Latent heat of steam are 770g and 587cal/g). 5

Q.3 Attempt any two of the following.

- (a) i) Write a mechanism for the polymerization of ethylene in the presence of an organic peroxide as catalyst. 5

iii) Define gross calorific value of a chemical fuel. Describe with a neat diagram, how it is

Defined gross calorific value of a chemical fuel;
Describe with a neat diag, how it is determined by bomb calorimeter.

- (b) Write the method of preparation for the following rubbers and fiber.
 a) Polyurethanes, b) Butyl rubber, c) Polyrhylene terephthalate, d) Neoprene, and h) Alkyd plastic

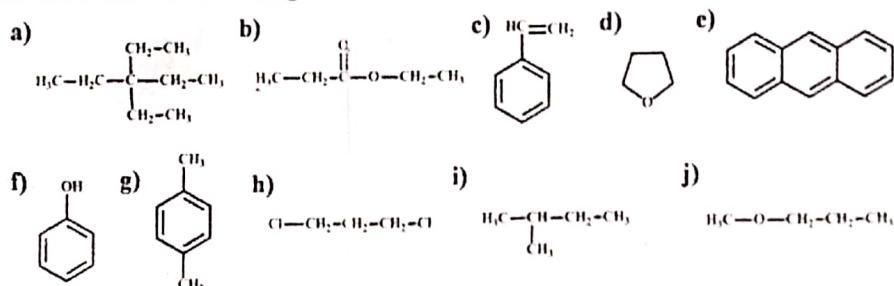
- (c) i) What is Ziegler-Natta catalyst? Give two examples. What is the significance of a catalyst in polymerization?
 ii) Write short notes on:
 a) Addition polymerization and b) Condensation polymerization.

Q. 4 Attempt any two of the following.

- (a) Write short notes on:
 i) Softening of water by Zeolites
 ii) Lime Soda process

- (b) Define shielding and deshielding. How do you mean by splitting of NMR signal? How many NMR signals are expected in the NMR spectrum of t-butyl benzene and tert-Butyl ethyl ether? How will you distinguish between the three dibromobenzene by their NMR spectra

- (c) i) Predict the number of NMR signals and their splitting in the following compounds.



- ii) Calculate the molar absorptivity of a 0.5×10^{-3} M solution, which has an absorbance of 0.17, when the path length is 1.5cm.

Q. 5 Attempt any two of the following.

- (a) Write short notes on:
 i) U.V. spectroscopy, ii) I.R. spectroscopy, and iii) Mass spectroscopy
 A 1.00×10^{-4} M solution of an analyte is placed in a simple cell with a path length of 1.00 cm. When measured at a wavelength of 350 nm, the solution's absorbance is 0.139. What is the analyte's molar absorptivity at this wavelength?

- (b) What is Beer-Lambert law in UV-Vis-spectroscopy?

The absorbance of a Cu sulphate solution containing 0.50mg Cu/mL was reported as 0.35 at 440nm.

- a) Calculate the specific absorptivity, including units, of Cu sulphate on the assumption that a 1.00 cm cuvette was used.
 b) What will be the absorbance if the solution is diluted to twice its original volume?
 (c) i) How will you distinguish between the following pairs of compounds by infrared spectroscopy?
 a) CH_3COOH , and $\text{CH}_3\text{COOC}_2\text{H}_5$
 b) $\text{C}_2\text{H}_5\text{OH}$, and $\text{C}_2\text{H}_5\text{OC}_2\text{H}_5$
 c) $\text{CH}_3\text{CH}_2\text{CH}_2\text{N}(\text{CH}_3)_2$ and $\text{CH}_3\text{CH}_2\text{CH}_2\text{N}_2$
 d) $\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH}$ and $\text{CH}_3\text{CH}_2\text{COOCH}_3$
 ii) Suggest the structure of a compound each with the following NMR spectral features:
 a) As alcohol with two NMR peaks, b) A compound C_5H_{10} with a NMR peak, c) A compound C_4H_8 with a NMR peak, and d) A compound $\text{C}_2\text{H}_6\text{O}$ with a NMR peak
 iii) How will you distinguish between the following compounds by UV spectroscopy?
 a) 1,3-pentadiene, and 1,4-pentadiene
 b) Benzene, and anthracene

**MADAN MOHAN MALAVIYA UNIVERSITY OF TECHNOLOGY
BACHELOR OF TECHNOLOGY (FIRST YEAR)**

EVEN SEMESTER

MINOR TEST 2018-19

TECHNICAL WRITING

Time- Two Hours

Note: Answer all questions:-

Maximum Marks-30

Q.1. Attempt any three parts of the following. Q.1 (a) is compulsory.

- a) Define Technical Writing. How does it differ from General Writing? 4
- b) What makes writing impersonal? Discuss salient features of Impersonal style. 3
- c) What do you mean by Definition? Define a subject of your choice. 3
- d) *Writing is a skill.* Explain it in context to the steps to be followed for good writing. 3

Q.2. Attempt any three parts of the following. Q.2 (a) is compulsory.

- a) Make a précis of the passage and give a suitable title. (3+1=4)

English education and English language have done immense good to India, in spite of their glaring drawbacks. The notions of democracy and self-government are the born of English education. Those who fought and died for mother India's freedom were nursed in the cradle of English thought and culture. The West has made contribution to the East. The history of Europe has fired the hearts of our leaders. Our struggle for freedom has been inspired by the struggles for freedom in England, America and France. If our leaders were ignorant of English and if they had not studied this language, how could they have been inspired by these heroic struggles for freedom in other lands? English, therefore, did us great good in the past and if properly studied will do immense good in future. English is spoken throughout the world. For international contact our commerce and trade, for the development of our practical ideas, for the scientific studies, English-is indispensable "English is very rich in literature," our own literature has been made richer by this foreign language. It will really be a fatal day if we altogether forget Shakespeare, Milton, Keats and Shaw. [Words: 191]

- b) What are different methods of reading? Elaborate in detail. 3
- c) Describe order of Thesis. 3
- d) Describe the flow of communication in an organization with specific illustrations. 3

Q.3. Attempt any three parts of the following. Q.3 (a) is compulsory.

- a) Define synopsis. How does it differ from Abstract? 4
- b) Discuss the order of Research Paper elements. 3
- c) How will you organize Front Matter of your thesis? Discuss key components. 3
- d) What is Bibliography? How does it differ from Reference? 3

B.Tech.
EVEN SEMESTER
Minor Examination 2018-2019
Subject Name: Engineering Chemistry

Time: 2 hrs.

Max. Marks: 20

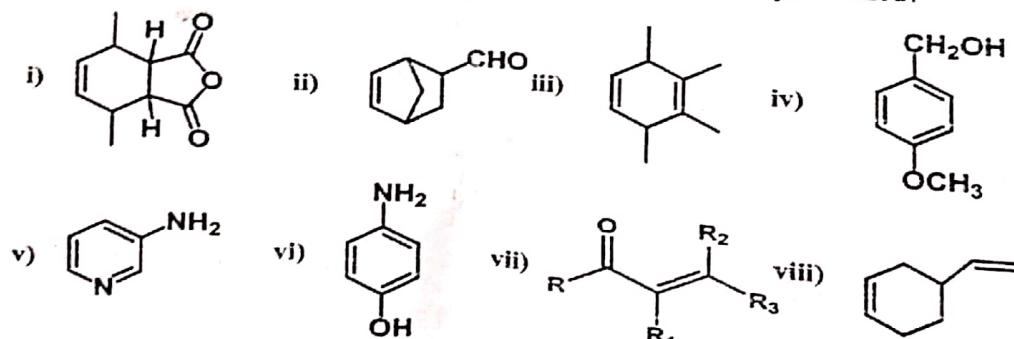
Note: Attempt all questions.

Q.1 Attempt any three of the following. Q. 1(a) is compulsory.

- a) i) Discuss the mechanism of S_N^1 and S_N^2 reactions of alkyl halides. (4)
 ii) Draw molecular orbital diagrams and calculate bond order for (i) HF (ii) NO (iii) CO and (iv) NO^+
- (b) i) With the help of phase rule diagram, show how it is possible to have super cooled water. Does it represent a stable phase? (2)
 ii) State the significance of triple point.
- c) What are the two components of a (4+2) cycloaddition reaction? Give two examples (structures) of each. (2)
- d) i) Discuss the applications of Diels-Alder reaction.
 ii) Differentiate between bonding and antibonding molecular orbitals. (2)

Q.2 Attempt any two of the following. Q. 2(a) is compulsory.

- a) i) Write a note on: Aldol condensation.
 ii) What are the differences between E1 and E2 reactions? (4)
- b) Explain the conformation of n-butane.
- (c) From what reactants could each of the following compounds be synthesized? (2)



Q. 3 Attempt any two of the following. Q. 3(a) is compulsory.

- a) What do you understand by liquid crystalline state? Discuss the classification of liquid crystals and write their applications. (4)
- b) Write a note on graphite and its applications.
- (c) i) Give suitable reasons for the following?
 a) Graphite is a conductor, while diamond is insulator.
 b) Graphite is soft, whereas diamond is hard.
 ii) What is the nature of hydrogen bonding? Give two examples of each type of hydrogen bonding. (2)

Subject code BAS.03

Roll no.

2018041012

Professional Communication

B.Tech 1st Year

ODD SEMESTER

MINOR TEST 2018-19

Time- 2 hr.

Max. Marks-30

Note: Answer all questions:-

Q.1. Attempt any three parts of the following. Q.1 (a) is compulsory.

- (a) Define communication and discuss the process with its all necessary components. 4
- (b) What is general communication? Differentiate it from technical communication comparing all aspects. 3
- (c) What are the central components of paragraph? Expound all in detail highlighting their importance. 3
- (d) Explain inductive order of paragraph development and develop a paragraph in the mentioned order. 3

Q.2. Attempt any three parts of the following. Q.2 (a) is compulsory.

- (a) What are the 7 Cs of communication? Explain them. 4
- (b) Discuss language as a tool of communication enumerating all the features. 3
- (c) What are the barriers of communication? Explain at least two of them. 3
- (d) Describe the flow of communication in an organization with specific illustrations. 3

Q.3. Attempt any three parts of the following. Q.3 (a) is compulsory.

- (a) Answer the following:
 - i. One word substitution-
 - a) Study of language
 - b) Not Readable
 - ii. Give antonyms-
 - a) Colossal
 - b) Vilify
 - iii. Synonym of-
 - a) Emancipation
 - b) Constraint
 - iv. Offer correct meanings-
 - a) Eruption, Irruption
 - b) Corpse, Corps

b) Fill in the blanks-

i. Suitable preposition-

a) He is invited lunch. (at / on / for)

b) He is the only heir the great wealth of his father. (of / for / to)

ii. Appropriate articles-

a) reward was given to him for his excellence in management.

b) We should provide hand of help to needy.

iii. Proper conjunctions-

a) Shyam is intelligent he works hard.

b) Rohan must eat he will die.

(c) Define periodic and loose sentence with two examples of each.

(d) Write a précis for the given paragraph.

The whole world is leading towards only the materialistic approach and Carpediem concept of life and turning into a heath or waste land, confronting with spiritual infertility. The contemporary world is surrounded by the flames of numerous problems leading towards the final explosion like communal revolts and civil wars. The spiritual sterility is the root cause of the sufferings of the whole human species. The world is standing at the point of a sleeping volcano with so many turbulences inside. The solution of these turbulences and problems is not the outer reforms or practice of certain legal laws and doctrines, but the inner transformation of the entire humanity. The material and outer progress will never provide the eternal peace and joy to the world. The humanity must investigate the root cause of these problems and their complete solutions. The fundamental principles of Indian culture address all the problems at global level. The application of these principles such as co-existence, universal brotherhood, tolerance and acceptance can bring harmony in all spheres of the globe, which is full of diversity. That will lead to actualize the concept of *Vasudhaiv Kutumbkam* in the world and make the earth a one big family. The world must accept and adopt the solutions presented by Indian culture to resolve the problems of the day. Let us make a collective effort to establish peace and harmony in the whole world and to revive and rejuvenate the greater concept of *Vasudhaiv Kutumbkam*.

Subject Code

BAS : 03

Roll No. 12 | 0 | 1 | 8 | 0 | 4 | 1 | 0 | 1 | 2

B. TECH. (SEMESTER : I) ODD SEMESTER

MAJOR EXAMINATION 2018

PROFESSIONAL COMMUNICATION

Time- 03:00 Hrs

Maximum Marks- 50

Note: Attempt all questions. Each question carries equal marks.

Q.1. Attempt any five parts of the following.

(5 x 2 = 10)

- a) Describe all types of communication in brief.
- b) What are the important features of technical communication? Discuss briefly.
- c) What is extra-personal level of communication?
- d) Explain Chronological order of paragraph development and develop a paragraph in the mentioned order.
- e) Do as directed in the brackets:
 - i. Abstain [change in noun]
 - ii. Concede [write a synonym of it]
 - iii. I prefer fresh food.....packaged food. [Insert a suitable preposition]
 - iv. I never expected to excel the presentation I was nervous. [Insert a Proper conjunction]
- f) Explicate the 7 C's of communication? Expound all highlighting the importance.
- g) Point out major Barriers to Communication.

Q.2. Attempt any two parts of the following.

(2 x 5 = 10)

- a) Develop your C.V. with a covering letter applying for the position of Research Assistant.
- b) Write an appraisal letter to a colleague on his achievement.
- c) What are the recommended types and formats of letter writing?

Q.3. Attempt any two parts of the following.

(2 x 5 = 10)

- ✓a) Enumerate the various types and parts of a report.
- b) Formulate an unsolicited proposal for establishing a creativity centre for students according to the needs.
- ✓c) Draft a report on the **Tech Srijan-18** held in the campus last month.

Q.4. Attempt any two parts of the following.

(2 x 5 = 10)

- ✓a) What could be said to be presentation skill? Why does a professional need that?
- ✓b) Discuss the qualities of an efficient speaker.
- ✓c) Brief the steps of preparation for a presentation.

Q.5 Attempt any two parts of the following.

(2 x 5 = 10)

- ✓a) A presentation is never complete only in verbal form of communication, kinesics brings wholeness to it. Explain.
- ✓b) Point out do's and don't during an oral presentation.
- c) What is contextualization? Explain with real life examples.

BEE-02

Roll No.

2018041012

B. Tech.I (EE & ECE)
I-SEMESTER
MAJOR EXAMINATION 2018 - 19

Subject Name: Electrical Circuits and Analysis

Time: 3 Hrs.

Max. Marks: 50

Note: Attempt all questions. Each question carry equal marks.

1. Attempt any five parts of the following:

(a) Using nodal analysis find current I as shown in the circuit diagram of figure.1

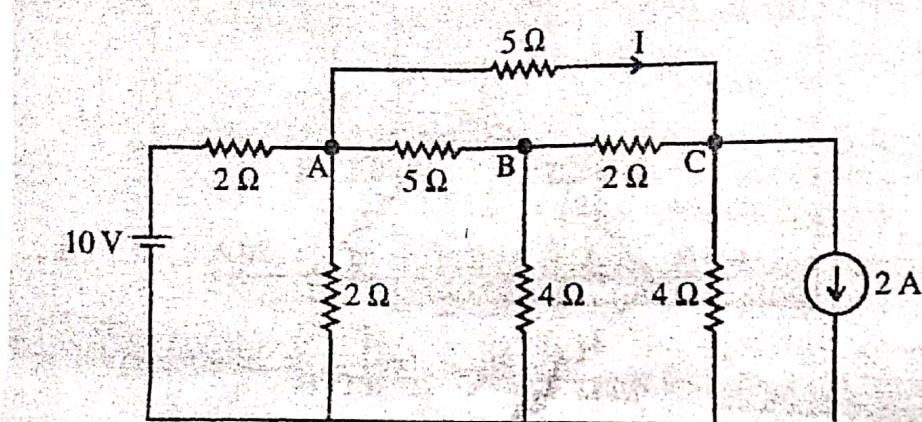


Figure.1

(b) Find the voltage across 5Ω resistance using Thevenin's theorem as shown in circuit diagram of figure.2

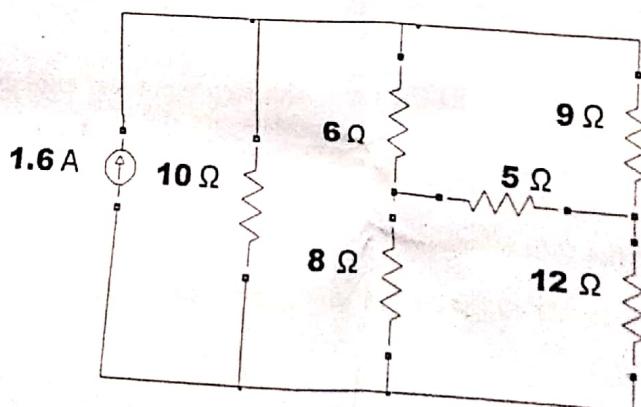


Figure.2

(c) Find mesh currents for the circuit shown in figure.3

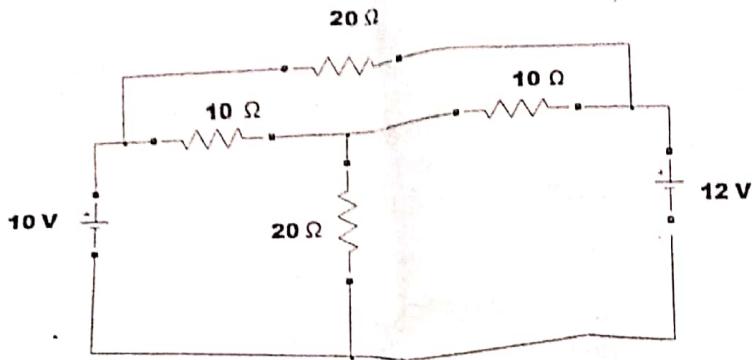


Figure.3

- (d) The equation of an alternating current is $42.42 \sin 628t$, determine its; (i) maximum value, (ii) frequency, and (iii) form factor.
- (e) A series R-L-C circuit has 100Ω resistor, $0.318H$ inductance and C . If supply voltage across this circuit $v = 230\sqrt{2} \sin \omega t$ V, and $i = 2.3\sqrt{2} \sin \omega t$ A; find: (i) the value of capacitance C , (ii) voltage across inductor, and (iii) power absorbed by circuit.
- (f) In a series RL circuit explain: power factor, active power, reactive power and apparent power by drawing the following: (i) Impedance triangle, (ii) Power triangle.
- (g) Two admittances $Y_1 = (0.01 + j0.02) \text{ S}$, and $Y_2 = (0.02 - j0.01) \text{ S}$ are connected in parallel across a supply of 100 V. Find the current drawn from the supply.

2. Attempt any two parts of the following: $(2 \times 5 = 10)$
- (a) An a.c. supply is suddenly switched on to a series R-L load, draw the relevant waveforms for different switching instant and also derive the expression of currents for such switching instants.
- (b) A supply voltage of 24 V is switched on to a circuit with a resistance of $1 \text{ k}\Omega$ and a capacitance of $1000 \mu\text{F}$ in series. Find (i) the time constant of the circuit, (ii) initial rate of rise of capacitor voltage, (iii) the rate of rise when the voltage is 10 V, and (iv) voltage and current after 2 second of switch on.]
- (c) Discuss the transient response of series RLC circuit with step input and explain over damping, critical damping and under damping.
3. Attempt any two parts of the following: $(2 \times 5 = 10)$
- (a) Find the trigonometrical Fourier series for the full wave rectified voltage sine wave as shown in figure. 4

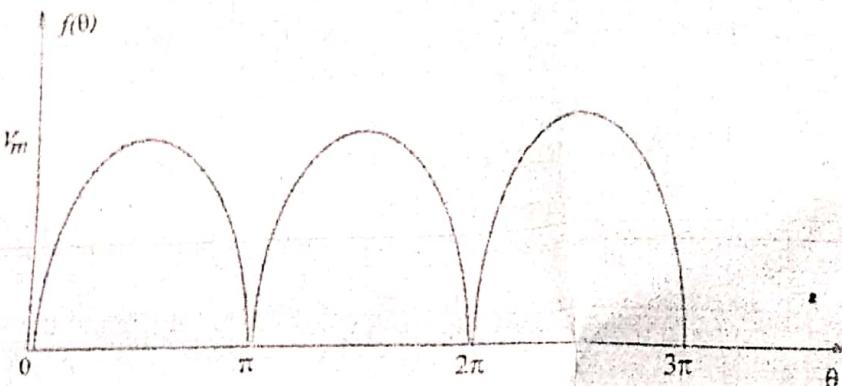


Figure. 4

- (b) If the terminal voltage of the circuit is $100 \sin \omega t + 50 \sin (3\omega t + \pi/4)$ and the current flowing is $10 \sin (\omega t + \pi/3) + 5 \sin 3\omega t$, calculate the total power consumption in the circuit and overall power factor.

(c) What is requirement of earthing. Explain with a relevant circuit diagram, how earthing protects humans from an electric shock at residential premises. Why earthing wires are comparatively thicker.

4. Attempt any two parts of the following: $(2 \times 5 = 10)$
- (a) What is three phase ac system? Explain three phase delta connection with suitable phasor diagram and derive the expression of power for this connection at lagging power factor.
- (b) A three phase, three wire, star connected system has 150 V between phase to phase. Each phase has $Z = 5 \angle -30^\circ$. Find; (i) current in each phase, (ii) total power, draw phasor diagram.
- (c) A balanced three phase, star connected load of 180 kW is taking a leading current of 300 A when connected across a three phase, 440 V, 50 Hz supply. Find the values and nature of the load current and also power factor of the load

5. Attempt any two parts of the following: $(2 \times 5 = 10)$
- (a) Compare between electric circuit and equivalent magnetic circuit. Draw and explain B-H curve for a magnetic material. Explain the factors which affect hysteresis loss. How hysteresis loss depends on the area of hysteresis loop.
- (b) An iron ring is made up of two different materials A and B having a relative permeability of 1000 and 1500 respectively. The mean length of the two material L_A and L_B are 75 cm and 25 cm respectively. The air gap length is 2 mm. The cross sectional area of the core is 10 cm^2 . The magnetizing coil has 1000 turns and a current of 5 A is allowed to flow through it. Calculate the flux produced in the air gap.
- (c) Explain leakage flux. What is meant by coefficient of coupling in a magnetic circuit? Define self and mutual inductance and derive relation of self inductances and mutual inductance between mutually coupled magnetic circuits.

Name of the Course: B. Tech-I year
 Semester-I
 Minor Test (Examination): 2018-19
 Subject Name: Engineering Physics -I

Max. Marks: 20

Time: 2 hrs.

Note: Answer all questions.

Q.1 Attempt any three parts of the following. Q. 1(a) is compulsory.

- (a) Write short note with some examples on (i) Inertial frame of reference (ii) Non-inertial frame of reference (iii) Absolute frame of reference. 4
- (b) Explain the physical significance & negative results of the Michelson Morey Experiment? 2
- (c) Differentiate between ψ and $I\psi I^2$. What is the physical significance of wave function? 2
- (d) Derive the time independent Schrodinger wave equation. Give significance of the equation. 2

Q.2 Attempt any two parts of the following. Q. 2(a) is compulsory.

- (a) State the postulates of special theory of relativity? Derive the mass-energy relation? 4
- (b) What do you understand by time dilation? What is the proper interval of time? Establish the relation between the two? 2
- (c) A beam of μ meson travels with a speed of 0.6 C. Their mean life time as observed in laboratory is 2.9×10^{-6} s. what is their mean life at rest? 2

Q.3 Attempt any two parts of the following. Q. 3(a) is compulsory.

- (a) Write down the Schrodinger equation for a particle in one dimensional potential well. Find the wave functions and energy spectrum for the first three bound state. An electron is bound in one dimensional box of size 4×10^{-10} m. what will be the minimum energy. 4
- (b) Show that the de Broglie wavelength for a material particle of rest mass m_0 and charge q accelerated from rest through a potential difference of V volts realistically is given by

$$\lambda = \frac{h}{\sqrt{2m_0qV(1 + \frac{qV}{2m_0c^2})}}$$
 2
- (c) Describe the Davisson-Germer experiment to demonstrate the wave nature of particle? 2

B-Tech. ECE
 Semester II Even Semester
 Major Examination 2017-18
 Knowledge Management

Time: 3 Hrs.

Max. Marks: 50

Note: Attempt all questions. Each question carries equal marks.

1. Attempt any five parts of the following: (5*2=10)
 - (a) Explain the meaning of Knowledge with the help of suitable examples.
 - (b) Describe knowledge management with different perspective
 - (c) "Tacit knowledge tough to explore over Explicit Knowledge". Comment
 - (d) Describe organizational knowledge management requirement.
 - (e) Knowledge Management System plays an important role in an Organization. Comment
 - (f) Explain the Knowledge Management cycle with the help of examples.
 - (g) Define organizational learning and describe the links between individual and organizational learning.
2. Attempt any two parts of the following: (2*5=10)
 - (a) Discuss the relation of information technology towards knowledge management. Supports your answer with suitable examples.
 - (b) Define the organizational culture. How organizational culture contributes in Knowledge management, support your answer with examples.
 - (c) How does culture contribute to organizational innovation and success?
3. Attempt any two parts of the following: (2*5=10)
 - (a) Discuss the link between organizational characteristics and organizational outcomes.
 - (b) Define the meaning of sharing Knowledge. Also explain the step of Implementing Knowledge Management Program.
 - (c) Discuss the need of Organizational Culture for Development of Knowledge Management?
4. Attempt any two parts of the following: (2*5=10)
 - (a) "Traditional Knowledge Management system has no longer fit in present environment". Comment on Statement in contrast of future of Knowledge management.
 - (b) Describe the key challenges of Knowledge Management. Suggest the ways to overcome these challenges.
 - (c) How Information technology can affect the future of Knowledge management.
5. Attempt any two parts of the following: (2*5=10)
 - (a) Discuss the scope and issues of Knowledge management.
 - (b) Discuss to what extent organizational culture can be managed. Support your answer with examples.
 - (c) Explain the dynamic processes underlying performance improvement initiatives of Knowledge Management.