

**Department of Civil Engineering  
Bundelkhand Institute of Engineering and Technology Jhansi  
Paper on Engineering Graphics & Design Lab (KCE 201)/ Computer Aided Engineering Graphics Lab (ECE 251)  
(For Electrical Engineering) Even Semester 2018 – 2019**

Attempt all the questions. Each question carries equal marks.

- Q. 1** Draw the orthographic projections of the following points in a single reference line
- (a) Point A is 25 mm below H.P and 35 mm in front of VP
  - (b) Point B is 42 mm above H.P and 25 mm behind VP
  - (c) Point C is in V.P and 30 mm above H.P
  - (d) Point D is 35 mm above H.P and 40 mm in front of VP
  - (e) Point E is in H.P and 40 mm behind VP
- Q. 2** A pentagonal plane of side 40 mm is perpendicular to HP and makes an angle of  $45^\circ$  with VP. Draw its projections.
- Q. 3** A hexagonal prism of side of base 30 mm and height 70 mm is resting with its base on H.P. Draw the isometric drawing of the prism.
- Q. 4** Write freehand the following, using single stroke vertical CAPITAL letters of 5 mm (h) size  
"FAILURE IS THE OPPORTUNITY TO BEGIN AGAIN MORE INTELLIGENTLY."



## Bundelkhand Institute of Engineering and Technology Jhansi

Class Test - II

Subject: Professional English (KAS - 204)

Student Name:

Time: 1 hr

F.M.: 15

Roll No.:

### A. Answer any four of the followings:

$2 \times 4 = 08$

Differentiate between

- i. general & technical communication
- ii. skimming and scanning style of reading
- iii. inductive and deductive style of writing
- iv. active and passive thinking listening
- v. conversation and dialogues

### B. Answer any two of the followings:

$3.5 \times 2 = 07$

- i. Explain the characteristics of technical writing? Why are simplicity and brevity more essential than sonorous and figurative style in technical writing? Explain.
- ii. What are features of kinesics in presentation? How are these non-verbal methods as necessary as verbal strategies?
- iii. What are the paralinguistic features of presentation strategies? How does voice modulation improve articulation.

**Bundelkhand Institute of Engineering & Technology, Jhansi**

**Class Test II**

**Subject Name: Programming for Problem Solving**

**Branch: EC, EE & CH**

**Time: 1-hour**

**Subject Code: KCS 201**

**Semester: 2<sup>nd</sup>**

**Max Marks: 15**

**Note: Each question carry equal marks:**

- |   |     |
|---|-----|
| Q1. Explain the following string handling function<br>(a) Strcpy()    (b) Strcat()    (c) Strcmp()    (d) strupr()                                      | [3] |
| Q2. Write a program c to Sum of two matrix of N x N dimension.  | [3] |
| Q3. What is pointer? How to you declare and initialize them? Write a program to swap the values of two variables using pointer?                         | [3] |
| Q4. Details of students to be entered through keyboard. Write a program to read and display the name, roll number, sex, height and weight of a student. | [3] |
| Q5. Differentiate between array and structure.  | [3] |

**Class Test -1**

**ENGINEERING PHYSICS [EE+CH]**

**MM:15**

**Time: 1hrs**

- 1.** Light consists of two wavelengths  $5500\text{A}^0$  and  $4700\text{A}^0$ , which is incident normally on grating surface. if there are 15000 lines per inch of grating surface. Calculate the separation of two lines in cm in first order spectrum. Given lens of focal length 120 cm is used to observe the spectrum on screen. **[5]**
- 2.** Show that the diameter of Newton's ring with two curved surfaces in contact is given by  $D_n^2 = \frac{4n\lambda R_1 R_2}{R_1 \pm R_2}$ . Where  $R_1$  and  $R_2$  are radii of the curvature of curved surfaces. **[5]**
- 3.** Calculate the velocity of electrons accelerated through a potential of 1 million volts. **[5]**
- 4.** Interpret the negative result of Michelson- Morley experiment. **[5]**
- 5.** At very low velocities, how Lorentz equations reduced to Galilean equations. **[5]**

(Following Roll No. to be filled by candidate)

1	8	0	4	3	2	0	0	1	6
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Roll No.

**B. TECH.****SECOND SEMESTER THEORY EXAMINATION, 2018-19****KAS- 203****MATHEMATICS - II****Time: 3 Hours****Max. Marks: 100**

Note:

- Attempt all questions. All questions carry equal marks.
- Be precise in your answer. In case of numerical problem assume data whenever not provided.

**1. Attempt any *FOUR* parts of the following:** [4×5]a. Solve  $(D^2 - 3D + 2)y = xe^x + \sin 2x$ .b. Show that  $\int_0^{\pi/2} \sqrt{\sin \theta} d\theta \times \int_0^{\pi/2} \frac{d\theta}{\sqrt{\sin \theta}} = \pi$ .c. Test the convergence of the series  $\frac{2}{1^2+1} + \frac{2^2}{2^2+1} + \frac{2^3}{3^2+1} + \dots$ d. Show that the function  $u = x^3 - 3xy^2$  is harmonic and find the corresponding analytic function.e. Expand  $\frac{1}{(z+1)(z+3)}$  in the regions: (i)  $|z| < 1$  (ii)  $1 < |z| < 3$ .**2. Attempt any *TWO* parts of the following:** [2×10]

a. Solve the simultaneous differential equations

$$\frac{d^2x}{dt^2} - 4\frac{dx}{dt} + 4x = y,$$

$$\frac{d^2y}{dt^2} + 4\frac{dy}{dt} + 4y = 25x + 16e^t.$$

b. Solve by method of variation of parameters:  $\frac{d^2y}{dx^2} - 2\frac{dy}{dx} = e^x \sin x$ .

c. Solve in series the differential equation

$$9x(1-x)\frac{d^2y}{dx^2} - 12\frac{dy}{dx} + 4y = 0.$$

3. Attempt any **TWO** parts of the following: [2×10]

a. Prove that  $\Gamma(m)\Gamma\left(m+\frac{1}{2}\right) = \frac{\sqrt{\pi}}{2^{2m-1}}\Gamma(2m)$ .

b. Show that if  $l, m, n$  are all positive

$$\iiint x^{l-1} y^{m-1} z^{n-1} dx dy dz = \frac{a' b' c'}{8} \frac{\Gamma(l/2) \Gamma(m/2) \Gamma(n/2)}{\Gamma(l/2 + m/2 + n/2 + 1)}$$

where the triple integral is taken throughout the part of the ellipsoid

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1 \text{ which lies in the positive octant.}$$

c. Find the volume of the tetrahedron bounded by the plane  $\frac{x}{a} + \frac{y}{b} + \frac{z}{c} = 1$  and the co-ordinate planes.

4. Attempt any **TWO** parts of the following: [2×10]

a. Test the convergence of series:  $1 + \frac{3}{7}x + \frac{3.6}{7.10}x^2 + \frac{3.6.9}{7.10.13}x^3 + \dots$ .

b. Find the Fourier series to represent  $e^{ax}$  in the interval  $-\pi < x < \pi$ .

c. Find the mobius transformation which maps the points  $z = 1, i, -1$  into the points  $w = i, 0, -i$ .

5. Attempt any **TWO** parts of the following: [2×10]

a. Evaluate  $\int_0^{2+i} (\bar{z})^2 dz$ , along the real axis from  $z = 0$  to  $z = 2$  and then along a line parallel to  $y$ -axis from  $z = 2$  to  $z = 2+i$ .

b. Evaluate the integral  $\int_C \frac{e^{2z}}{(z+1)^5} dz$  around the boundary of the circle

$$|z| = 2.$$

c. Evaluate by contour integration:  $\int_0^{2\pi} \frac{d\theta}{a + b \sin \theta}$ , where  $a > |b|$ .

(Following Roll No. to be filled by candidate)

1	8	0	4	3	2	0	1	6
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Roll No.

**B. TECH.****SECOND SEMESTER THEORY EXAMINATION, 2018-19****KAS- 201****PHYSICS****Time: 3 Hours****Max. Marks: 100**

Note:

- Attempt all questions. All questions carry equal marks.
- Be precise in your answer. In case of numerical problem assume data wherever not provided. Illustrate the answers with suitable sketches.

**1. Attempt any *FOUR* parts of the following:** [4×5]

- Write down the postulates of special theory of relativity. Discuss the origin of second postulate i.e. constancy of speed of light in vacuum.
- What is the principle of propagation of light waves in a fibre? Define acceptance angle and acceptance cone.
- The speed of an electron is measured with an uncertainty of  $2 \times 10^{-4}$  m/s. What is the minimum space required by the electron to be confined in an atom? Interpret the results.
- Calculate the penetration depth for 2 MHz electromagnetic wave through copper. Given,  $\sigma = 5.8 \times 10^7 \text{ S/m}$ ,  $\mu_0 = 4\pi \times 10^{-7} \text{ Tm/A}$ ,  $\mu_{\text{copper}} = 0.999994\mu_0$ .
- A light ray enters from air to fibre. The refractive index of air is 1.0 and that of core and cladding as 1.5 and 1.48 respectively! Calculate the critical angle, the fractional change in refractive index, the acceptance angle and numerical aperture.

**2. Attempt any *TWO* parts of the following:** [2×10]

- What was the objective of Michelson-Morley experiment? Describe the experiment in detail by giving neat and clean diagram. How the negative results of the experiment were interpreted?

- b. Deduce Lorentz transformation equations and hence derive Galilean transformation equations from these.
- c. What do you mean by time dilation effect? What are proper and improper time intervals? Show that time dilation is a real effect by giving an experimental evidence.

**3. Attempt any TWO parts of the following:** [2×10]

- a. Derive the differential form of wave equation for isotropic dielectric medium and show that in case of dielectric medium, electromagnetic waves travel with the speed less than the speed of light in vacuum.
- b. Show that electromagnetic waves are transverse in nature.
- c. Derive the differential form of electromagnetic waves in case of conducting medium and show that the amplitude of the wave reduces exponentially when the wave penetrates in the medium. Also discuss penetration depth.

**4. Attempt any TWO parts of the following:** [2×10]

- a. What do you mean by wave packet concept? Derive the expression for uncertainty principle using wave packet concept.
- b. Derive the expression for Planck's radiation formula and hence obtain Wien's displacement law for black body radiation.
- c. What was the objective of Davison-Germer experiment? Discuss the experiment in detail to justify the matter wave concept.

**5. Attempt any TWO parts of the following:** [2×10]

- a. What do you mean by coherent sources? Why two independent sources of light cannot be coherent? Give two methods for obtaining coherent sources.
- b. What is meant by resolving power of a grating? State Rayleigh's criterion for just resolution and hence obtain an expression for the resolving power of a grating. Discuss its dependence on various parameters of the grating.
- c. What are Einstein's coefficients? Obtain a relation between the probabilities for spontaneous and stimulated emission.

(Following Roll No. to be filled by candidate)

1	8	0	4	3	2	0	0	1	6
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Roll No.

**B. TECH.****SECOND SEMESTER THEORY EXAMINATION, 2018-19****KCS - 201****PROGRAMMING FOR PROBLEM SOLVING****Time: 3 Hours****Max. Marks: 100**

Note:

- Attempt all questions. All questions carry equal marks.
- Be precise in your answer. In case of numerical problem assume data whenever not provided.

**1.** Attempt any **FOUR** parts of the following: [4×5]

- a. Explain various input and output devices.
- b. Define memory. Explain different types of memory.
- c. What is an algorithm? Write properties of an algorithm.
- d. Explain various storage classes of C language.
- e. Explain Linker And Loader.

**2.** Attempt any **TWO** parts of the following: [2×10]

- a. Write a program to print greater among three numbers.
- b. What is type conversion also explain logical operators of C language.
- c. Explain Different data types in C language.

**3.** Attempt any **TWO** parts of the following: [2×10]

- a. What is an array? Explain different types of array.
- b. Write short note on Structure and union.
- c. Sort the number using selection sort

10,30,20,60,40,15,25,80,75,65,55.

**4.** Attempt any **TWO** parts of the following: [2×10]

- a. What do you mean by call by value and call by reference

- b. What is function .Explain function prototyping?  
c. Write a program using for loop to print

1  
12  
123  
1234  
12345

5. Attempt any **TWO** parts of the following: [2×10]  
a. Explain static and dynamic memory allocation.  
b. Write short note on command line argument and macros.  
c. Write various notation of order of complexity.

B.Tech. (First Year)

Second Class Test (Common for All Branches), 2018-19  
Mathematics-II (KAS-203)

Time: 1 Hr

M. Marks: 15

Note: Attempt ALL Questions.

1. Attempt any four parts of the following:

[4×2=8]

(a) Evaluate  $I = \int_{-1}^1 (1+x)^{1/2} (1-x)^{1/2} dx$ .

(b) Evaluate  $\int_0^\infty 2^{-9x^2} dx$  using Gamma function.

(c) Write the Fourier sine series for the function  $f(x) = \begin{cases} x, & 0 < x < \pi \\ 2, & \pi < x < 2\pi \end{cases}$ .

(d) Discuss the analyticity of  $f(z) = |z|^4$  in the complex plane.

(e) Show that the sequence  $\{(-1)^n\}$  does not converge.

(f) Test for convergence or divergence of the infinite series  $2x + \frac{3x^2}{8} + \frac{4x^3}{27} + \dots$

2. Attempt any two parts of the following:

[2×3.5=7]

a. Find the surface area and volume of the solid formed by the revolution of  $x^2 + 4y^2 = 16$  about its major axis.

b. Obtain the Fourier series expansion of  $f(x) = \begin{cases} 2+x, & -2 < x < 0 \\ 0, & 0 < x < 2 \end{cases}$ . Hence compute  $\sum_{n=1}^{\infty} \frac{1}{(2n-1)^2}$ .

c. Evaluate  $\iiint x^2 y^2 z^2 dx dy dz$  over the region bounded by coordinate surfaces and  $x^2 + y^2 + z^2 \leq 1$ .



### Bundelkhand Institute of Engineering and Technology Jhansi

Class Test - I

Subject: Professional English (KAS - 204)

Student Name:

Time: 1 hr

F.M.: 15

Roll No.:

**A. Answer any four of the followings:**

**2x4 = 08**

**a. Read the passage below and correct the underlined error.**

I'm Elena Guedon. I am from Paris France, but now I live in Chicago Illinois. I am divorce. I have one son named Pierre. Pierre is doctor at a large hospital in Chicago. He is planning for get married. His girlfriend Cassie is a surgeon at the hospital. She is older than he is. I am older than my ex-husband. So I am worry about Pierre's future. But Pierre is sure that him and Cassie will be happy.

**b. Write the phonetic transcription of the following words.**

receipt, determine, poem, examiner, violin, vowel, adequate, environment

**c. Write the number of syllables in the words given in Q. A(b)**

**d. Define any four with suitable examples:**

(i) Blending (ii) Compounding (iii) Acronym (iv) Meronymy (v) homophones

**e. (i) Write two synonyms of: tycoon, appropriate**

(ii) Identify the pairs of homophones from the following clues:

*One word means permitted; the other means a sum of money*

*One word means hit, the other is vegetable.*

P.T.O

**B. Answer any two of the followings**

$$3.5 \times 2 = 7$$

- a. Explain the different organs of speech with their function.
- b. Illustrate all the English vowel sounds within its tongue model and write words with the vowel sounds in initial, medial and final position.
- c. Explain the requisites of writing effective sentences.



**!!! All The Best !!!**

**CLASS TEST - II**

**Subject – Engg. Physics (KAS-201)**

**(EC, EE, CH)**

Time-1hr

**Max Marks-15**

**NOTE- Answer all Questions.**

**Q1. State and write the importance of Maxwell's equations. [3]**

**Q2. Define acceptance angle and numerical aperture. Derive their expressions. [3]**

**Q3. What is Compton Effect? Derive an expression for the direction of recoiled Compton electron. [3]**

**Q4. Derive an expression for poynting theorem. [3]**

**Q5. Describe principle, working and energy level diagram of three level laser.[3]**

**B.Tech. ( First Year) - EC, EE, CH & CS**

**Time: 1 Hr**

**Second Class Test, 2018-19, Mathematics-I (KAS-103)**

**M. Marks: 15**

1. Attempt any four parts of the following:

[4×2=8]

(a) Find the values of  $k$  for which the set of vectors  $(4, k, 1), (9, 3, 4), (1, k, 2)$  is linearly dependent.

(b) Find the  $n$ th derivative of  $\frac{x^2}{(1-x)^2(x+2)}$

(c) If  $[x]$  denotes the largest integer  $\leq x$ , then discuss the continuity at  $x = 3$  of the function  $f(x) = x - [x], \forall x \geq 0$ .

(d) If  $u = (x^2 + y^2)^{1/2}$  and  $x^3 + y^3 + 3axy = 5a^2$ , find the value of  $\frac{du}{dx}$  when  $x = y = a$ .

(e) If  $x = r \cos \theta, y = r \sin \theta$ , prove that (i)  $\frac{\partial r}{\partial x} = \frac{\partial x}{\partial r}$ , (ii)  $r \frac{\partial \theta}{\partial x} = \frac{1}{r} \frac{\partial x}{\partial \theta}$

(f) If  $u = f(y/x) + \sqrt{x^2 + y^2}$ , find the value of  $x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2}$

2. Attempt any two parts of the following:

[2×3.5=7]

a. If  $y = \sin(a \cos^{-1} \sqrt{x})$ , then prove that  $\lim_{x \rightarrow 0} \left( \frac{y_{m+1}}{y_m} \right) = \frac{4m^2 - a^2}{4m + 2}$ .

b. Find the eigen vectors for  $A = \begin{bmatrix} 1 & 0 & 3 \\ 0 & -2 & 0 \\ 3 & 0 & 1 \end{bmatrix}$ . Is it possible to diagonalize  $A$ ?

c. If  $x = u + v, y = uv$ , prove that  $(x^2 - 4y) \frac{\partial^2 z}{\partial y^2} - 2 \frac{\partial z}{\partial y} = \frac{\partial^2 z}{\partial u^2} - 2 \frac{\partial^2 z}{\partial u \partial v} + \frac{\partial^2 z}{\partial v^2}$ .

**Bundelkhand Institute of Engineering & Technology, Jhansi**

**Class Test 1**

**Subject Name:** Programming for Problem Solving

**Subject Code:** KCS 201

**Branch:** EC, EE & CH

**Semester:** 2<sup>nd</sup>

**Time:** 1-hour

**Max Marks:** 15

**Note:** Each question carries equal marks:

- Q1.** Differentiate working of Assembler, compiler, interpreter, loader and [3] linker.
- Q2.** Draw the flow chart of finding largest number among given three [3] numbers.
- Q3.** Write a program in C to simulate calculator using Switch Statement. [3]
- Q4.** Explain a program to print factorial of a given number. [3]
- Q5.** Write a program to swap given two numbers using function. [3]

**B.Tech. (First Year)**  
**First Class Test (Common for All Branches), 2018-19**  
**Mathematics-II (KAS-203)**

**Time:** 1 Hr

**Note:** Attempt ALL Questions.

**M. Marks:** 15

- I.** Attempt any four parts of the following:

[4×2=8]

(a) Solve  $\frac{d^2x}{dt^2} + 2n \cos \alpha \frac{dx}{dt} + n^2 x = 0$ , such that when  $t = 0$ ,  $x = 0, \frac{dx}{dt} = 0$ .

(b) Solve  $x \frac{d^3y}{dx^3} - 2 \frac{d^2y}{dx^2} = 0$ .

(c) Find the particular integral of  $\frac{d^3y}{dx^3} + 3 \frac{d^2y}{dx^2} + 2 \frac{dy}{dx} = x^2$ .

(d) Find the particular integral of  $(D^3 + 1)y = e^{2x} \sin x$ .

(e) Determine the transformation which reduces  $xy'' + (4x^2 - 1)y' + 4x^3y = 2x^3$  into one in which coefficients are constant. Also write this differential equation.

(f) Reduce the differential equation  $x^2y'' - 2(x^2 + x)y' + (x^2 + 2x + 2)y = 0$  into normal form.

[2×3.5=7]

- 2.** Attempt any two parts of the following:

a. Apply method of variation of parameters to solve  $(x-1)D^2y - xDy + y = (x-1)^2$ .

b. Use Frobenius series method to solve  $2x(x+1)y'' - (1-x)y' + y = 0$ .

c. Solve  $\frac{dx}{dt} + 2x + 4y = 1 + 4t; \frac{dy}{dt} + x - y = \frac{3}{2}t^2$ .

Class test 2  
Engineering Physics  
CE+ ME+IT Branch

**Note: Attempt All Questions**

1. State the Postulates of Special Theory of Relativity and derive the expression for Lorentz Transformation. 3
2. Explain briefly construction, working and Energy diagram of Ruby Laser. 3
3. Explain Michelson-Morley experiment and discuss the outcomes. 3
4. The refractive index of the core of a step index is 1.46 and the refractive index difference between the core and cladding of the fibre is 2%. Estimate  
1) Numerical Aperture      2) the critical angle at core Cladding interface within the fibre. 3
5. Calculate the amount of work to be done to increase the speed of an electron from 0.6 C to 0.8 C.  
(Given that rest energy of electron 0.5 MeV) 3

### **CLASS TEST - III**

**Subject – Engg. Physics (KAS-101)**

**(CE, ME, IT, CS)**

**Time-1hr**

**Max Marks-15**

**NOTE- Answer all Questions.**

**Q1. State fundamental conditions for production of interference fringes. [2]**

**Q2. Define acceptance angle and numerical aperture. Derive their expressions. [4]**

**Q3. What is Compton effect? Derive an expression for Compton shift. [4]**

**Q4. Derive an expression for poynting vector. [3]**

**Q5. What is the minimum uncertainty in the frequency of a photon. Whose life time is about  $10^{-8}$  sec. [2]**

**B. TECH.**  
**SECOND SEMESTER THEORY EXAMINATION, 2018-19**  
**KEE- 201**  
**ELECTRICAL ENGINEERING**

**Time: 3 Hours**

**Max. Marks: 100**

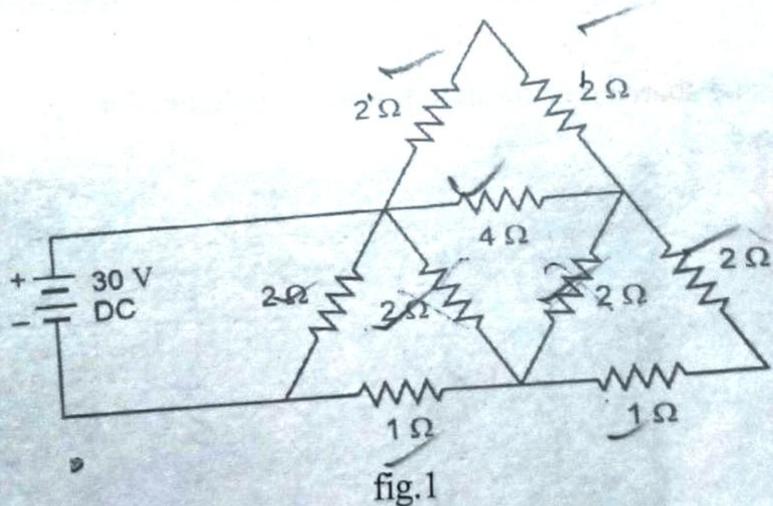
Note:

- Attempt all questions. All questions carry equal marks.
  - Be precise in your answer. In case of numerical problem assume data whenever not provided.

1. Attempt any ***FOUR*** parts of the following: [4×5]

a. State and prove Thevenin's theorem. Show with example, how this theorem can be usefully employed in the circuit analysis.

5 b) Determine the current supplied by the source in the circuit shown in fig.1



c. Write the statement of Norton's theorem and find the current in  $1\ \Omega$  resistance in the given circuit as shown in fig2.

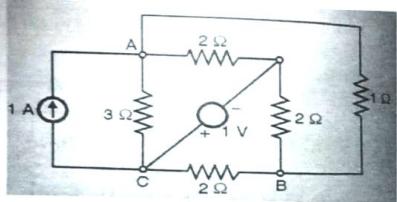


fig.2.

- d. Determine the current through  $5\Omega$  and  $4\Omega$  resistance using nodal analysis as shown in fig 3.

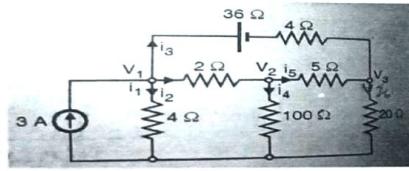


fig.3

- e. Using source transformation find the voltage  $V$  in the circuit shown in fig.4

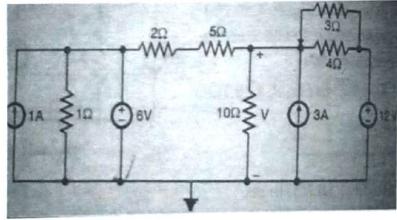


fig.4

2

f. Define the following with suitable examples:

- (i) Unilateral and Bilateral element
- (ii) Active and Passive element
- (iii) Kirchhoff's laws

2. Attempt any TWO parts of the following: 2×10]

- a. (i) What you understand by quality factor? Derive the expression for quality factor.  
(ii) Define the bandwidth of a series resonant circuit and derive the relation among the resonant frequency, quality factor and bandwidth.
- b. A voltage  $V(t) = 150\sin(1000t)$  is applied across a series R-L-C circuit where  $R=40\Omega$ ,  $L=0.13H$ , and  $C=10\mu F$ . Compute the following:
  - (i) RMS value of steady state current.
  - (ii) RMS voltage across the inductor.
  - (iii) RMS voltage across the capacitor.
  - (iv) Draw the complete phasor diagram showing all voltage components.
  - (v) Determine the reactive power supplied by the source.

c. For the circuit shown in Fig.5, determine

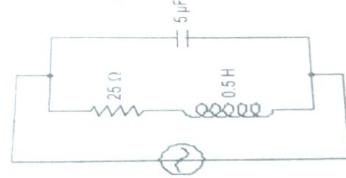


Fig.5

- (i) Resonant frequency
- (ii) Total impedance of the circuit at resonance.
- (iii) Bandwidth
- (iv) Quality factor.

3

**3.** Attempt any **TWO** parts of the following: [2×10]



4. Attempt any **TWO** parts of the following: [2×10]

- a. Explain the working principle of dc shunt wound generators. A shunt generator has an induced e.m.f of 254V. When generator is loaded, the terminal voltage is 240V. Neglect the armature reaction, find the loaded current if the armature resistance is  $0.04 \Omega$  and field circuit resistance is  $24\Omega$ .

b. Discuss the principle of operation of synchronous motor and also explain the methods of starting the synchronous motor.

c. Describe the construction and working principle of three phase induction motor. Draw the torque- slip characteristic of the above. Why this motor cannot operate on synchronous speed.

5. Attempt any **TWO** parts of the following: [2×10]

- a. Describe the various types of wires or cables usually used in internal wiring of building.
  - b. What do you understand by earthing? Why is it necessary to earth electrical installation? Draw out a neat sketch for earthing by GI pipes.
  - c. Explain the construction of Lead - Acid batteries. Write the chemical reaction during charging and discharging of Lead - Acid batteries and also draw the charging and discharging curves.

(Following Roll No. to be filled by candidate)

Roll No.

1 8 0 4 3 2 0 0 1 6

**B. TECH.****FIRST SEMESTER THEORY EXAMINATION, 2018-19****KAS-103****MATHEMATICS - I****Time: 3 Hours****Max. Marks: 100**

Note:

- Attempt all questions. All questions are of equal marks.

1. Attempt any **Four** parts of the following: [4×5]

a. If  $N = \begin{bmatrix} 0 & 1+2i \\ -1+2i & 0 \end{bmatrix}$  is a matrix, then show that  $(I-N)(I+N)^{-1}$  is a unitary matrix.

b. Find the inverse of the following matrix by applying elementary row transformations and verify the result

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

c. State Rank Nullity theorem for matrix. Verify this theorem for the following matrix

$$\begin{bmatrix} 1 & 2 & -1 & 4 \\ 2 & 4 & 3 & 5 \\ -1 & -2 & 6 & -7 \end{bmatrix}$$

d. Test the consistency of the following system of equations and solve them (if consistent)

$$3x + 3y + 2z = 1; x + 2y = 4; 10y + 3z = -2; 2x - 3y - z = 5$$

e. Find the characteristic equation of the matrix  $A$  and hence find  $A^4$ , where

$$A = \begin{bmatrix} 3 & 1 & 1 \\ -1 & 5 & -1 \\ 1 & 1 & 3 \end{bmatrix}$$

f. Diagonalize the matrix  $A = \begin{bmatrix} 3 & 1 \\ 1 & 3 \end{bmatrix}$ .

2. Attempt any **Four** parts of the following:

a. Discuss the differentiability of the following functions

$$f(x) = \begin{cases} x^2, & x < -2 \\ 4, & -2 \leq x \leq 2 \\ x^2, & x > 2 \end{cases}$$

b. Give the geometrical interpretation of Lagrange's Mean Value Theorem. Find a point on the parabola  $y = (x+2)^2$  where the tangent is parallel to the chord joining  $(-2,0)$  and  $(0,4)$ .

c. Find  $n^{\text{th}}$  derivative of  $\frac{x^3}{x^2-1}$ . Hence compute  $\frac{d^5}{dx^5}\left(\frac{x^3}{x^2-1}\right)$  at  $x=0$ .

d. If  $y = \sin \log(x^2 + 2x + 1)$ , then prove that

$$(x+1)^2 y_{n-2} + (2n+1)(x+1)y_{n-1} + (n^2 + 4)y_n = 0.$$

e. Find the envelope of all circles which are described on the double ordinates of the parabola  $y^2 = 4ax$  as diameter.

f. Trace the curve  $yx^2 = 4a^2(2a-y)$ .

3. Attempt any **Four** parts of the following:

a. Find the value of  $\left(\frac{\partial^2}{\partial z^2} - \frac{\partial^2}{\partial x \partial y}\right)u$ , where  $u = \frac{1}{\sqrt{4xy-z^2}}$ .

b. If  $u = \sin^{-1} \sqrt{\frac{x^{1/3} + y^{1/3}}{x^{1/2} + y^{1/2}}}$ , then prove that

[4×5]

$$x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2} = \frac{\tan u}{144} (13 + \tan^2 u)$$

c. Expand  $f(x, y) = (2x+y)^3$  in Taylor's series up to the quadratic terms and hence estimate the value of  $f(x, y)$  at  $(1.1, 2.4)$ .

d. Use Lagrange's method of multipliers to find the greatest value of  $u = xyz$  if  $x, y$  and  $z$  are positive real numbers for which  $4x+2y+z=12$ .

e. If  $x = a(u+v)$  and  $y = b(u-v)$  where  $u = r^2 \cos 2\theta$  and  $v = r^2 \sin 2\theta$ , then verify Chain rule for Jacobians.

f. The voltage  $V$  across a resistor is measured with error  $h$  and the resistance  $R$  is measured with error  $k$ . Derive the formula for error in calculating the power  $W = \frac{V^2}{R}$  generated in the resistor in terms of  $h$  and  $k$ . Also find the percentage error in calculating  $W$  if  $V$  can be measured to an accuracy of 0.5% and  $R$  to an accuracy of 1%.

4. Attempt any **Two** parts of the following:

[2×10]

a. (i) Change the order of integration of  $\int_0^1 \int_{\sqrt{x}}^1 e^{x/y} dx dy$  and hence evaluate it.

(ii) Evaluate  $\iint_R x^2 dx dy$  over the region  $R$  bounded by the hyperbola  $xy=16$  and the lines  $y=x$ ,  $y=0$  and  $x=8$  in the first quadrant.

b. (i) Find the area common to the circles  $r=a$  and  $r=\sqrt{2}a \cos \theta$ .

(ii) Find the centre of mass of the plain region bounded by the curves  $y^2 = x$  and  $x = y+2$ .

c. Find the mass of the ellipsoidal solid with surface defined by

$\frac{x^2}{4} + \frac{y^2}{9} + \frac{z^2}{4} = 1$ , the density at any point of the solid  $(x, y, z)$  being  $xy$ .

5. Attempt any **Two** parts of the following: [2×10]

a. (i) Prove that  $\nabla^2 \left[ \nabla \cdot \left( \frac{\mathbf{r}}{r^2} \right) \right] = 2r^{-4}$

(ii) Find the directional derivative of  $\nabla \cdot (\nabla \varphi)$  at the point  $(1, -2, 1)$  in the direction of the normal to the surface  $xy^2z = 3x + z^2$ , where  $\varphi = 2x^3y^2z^4$ .

b. (i) Find the work done by the force  $\mathbf{F} = (2x + y^2)\hat{i} + (3y - 4x)\hat{j}$  in moving the particle from  $(0,0)$  to  $(1,1)$  along the curve  $y = x^2$  and then return back to  $(0,0)$  along the curve  $y^2 = x$ .

(ii) Find the equations of the tangent plane and normal to the surface  $2xz^2 - 3xy - 4x = 7$  at the point  $(1, -1, 2)$ .

c. Verify Gauss Divergence theorem for  $\vec{F} = 4x\hat{i} - 2y^2\hat{j} + z^2\hat{k}$  taken over the region bounded by the surfaces  $x^2 + y^2 = 4$ ,  $z = 0$  and  $z = 3$ .

**B.Tech. (First Year)**  
**First Class Test (Common for All Branches), 2018-19**  
**Mathematics-I (KAS-103)**

**Time:** 1 Hr

**M. Marks:** 15

**Note: Attempt ALL Questions.**

1. Attempt any four parts of the following: [4×2=8]
  - (a) If  $A = \begin{bmatrix} 2+i & 3 & -1+3i \\ -5 & i & 4-2i \end{bmatrix}$ , then examine  $A^\theta A$  for Hermitian or skew-Hermitian.
  - (b) Under what condition the matrix  $A = \begin{bmatrix} \alpha+i\gamma & -\beta+i\gamma \\ \beta+i\delta & \alpha-i\gamma \end{bmatrix}$  is unitary?
  - (c) If  $A, B$  are two  $n$ -rowed orthogonal square matrices, then prove that  $AB$  and  $BA$  are also orthogonal.
  - (d) Find the rank of  $A = \begin{bmatrix} 1 & 1 & -1 & 1 \\ -1 & 1 & -3 & -3 \\ 1 & 0 & 1 & 2 \\ 1 & -1 & 3 & 3 \end{bmatrix}$  by reducing it into normal form.
  - (e) Find the values of  $a$  and  $b$  for which the rank of matrix  $\begin{bmatrix} 1 & -1 & 0 & 0 \\ 0 & 2 & -1 & 0 \\ 0 & a & 1 & 0 \\ -1 & 1 & b & -1 \end{bmatrix}$  is equal to 3.
  - (f) Show that every square matrix can be expressed uniquely as a sum of symmetric and skew-symmetric matrix.
2. Attempt any two parts of the following: [2×3.5=7]
  - a. Apply elementary transformation to find the inverse of  $A = \begin{bmatrix} 1 & 1 & 1 & 1 \\ -2 & 1 & -1 & -2 \\ -4 & -2 & -3 & 1 \\ 1 & 1 & 1 & 0 \end{bmatrix}$
  - b. Test the consistency of the following system and find the solution (if consistent)  
 $x + 2y + z = 2; 3x + y - 2z = 1; 4x - 3y - z = 3; 2x + 4y + 2z = 4.$
  - c. Find the values of  $k$  for which the following system of equations have solution. Also find the non-trivial solution.  
 $4x + 9y + z = 0; kx + 3y + kz = 0; x + 4y + 2z = 0.$

(Following Roll No. to be filled by candidate)

Roll No.

1 8 0 4 3 1 3 0 3 1

B. TECH.

SECOND SEMESTER THEORY EXAMINATION, 2018-19

KAS- 204

PROFESSIONAL ENGLISH

Time: 3 Hours

Max. Marks: 100

Note:

- Attempt all questions. All questions carry equal marks.
- Assume missing data suitably.

1. Attempt any **FOUR** parts of the following: [4×5]

- a. Write features of technical writing?
- b. What are the basic requirements of a good sentence?
- c. What is an agenda? Briefly describe its features.
- d. What is noise in communication?
- e. Define synonyms and antonyms with five examples each.

2. Attempt any **TWO** parts of the following: [2×10]

- a. Explain "root word" with five examples.
- b. Describe structure of a business letter.
- c. Explain meaning of following prefix with example-  
de, dis , en , ex, anti, auto, non, over, out, pro

3. Attempt any **TWO** parts of the following: [2×10]

- a. Explain the term Encoding. Who is the encoder of a message?
- b. Describe role of 'Grapevine' in organizational communication.
- c. How does kinesics enhance the impact of your verbal communication?  
Explain with examples.

- a. Make difference between written and oral communication.
  - b. What are the different types of articles, explain with example
  - c. What are the important types of listening?
5. Attempt any ***Two*** parts of the following:
- a. How will you suggest your friend to improve listening skill?
  - b. Describe different types of tense with example.
  - c. Draw the communication cycle and state the important elements.

**B. TECH.**  
**SECOND SEMESTER THEORY EXAMINATION, 2018-19**  
**KAS- 202**  
**CHEMISTRY**

**Time: 3 Hours**

**Max. Marks: 100**

Note:

- Attempt all questions. All questions carry equal marks.
- Be precise in your answer. In case of numerical problem assume data whenever not provided. Illustrate the answer with suitable sketch.

1. Attempt any **FOUR** parts of the following: [4x]
- a. Write the postulates of Molecular Orbital Theory.
  - b. What are crystal imperfection? Explain the Schottky & Frenkel Defects.
  - c. Explain the structure, properties & applications of Fullerenes.
  - d. What do you understand by Liquid crystalline state? Discuss in brief the classification and application of Liquid Crystals.
  - e. Explain the electrical and mechanical properties of nanoparticles.
2. Attempt any **TWO** parts of the following: [2x]
- a. (i) What is finger print region? Write down the stretching frequencies corresponding to the structural units: OH, CHO & CO.  
(ii) Explain the Radiation sources and sample techniques in spectroscopy.
  - b. (i) Compound  $C_4H_6$  shows IR bands at  $3300$  and  $2100\text{cm}^{-1}$ . Give its structure.  
(ii) Explain the various possible electronic transitions on absorption of ultraviolet-visible light.
  - c. Discuss the principles involved in the Raman spectroscopy. Give some important application of Raman spectroscopy.
3. Attempt any **TWO** parts of the following: [2x]
- a. What is Gibbs phase rule? Discuss the salient features of phase diagrams.

- working of Pb acid battery.
- c. (i) What is electrochemical corrosion? Discuss the mechanism in electrochemical corrosion.
- (ii) How can we reduce the rate of corrosion by suitable material selection?

4. Attempt any **TWO** parts of the following:

- a. What is the basic principle of Lime soda process? Explain the process for removal hardness of water.

Calculate the lime and soda needed for softening 40,000 L of water containing the following salts.  $\text{CaSO}_4=13.6 \text{ mg/l}$ ;  $\text{MgCl}_2=10 \text{ mg/l}$ ;  $\text{Ca}(\text{HCO}_3)_2=15.2$ ;  $\text{Mg}(\text{HCO}_3)_2=7.5 \text{ mg/l}$ . Given that the molar mass of  $\text{Ca}(\text{HCO}_3)_2$  is 162,  $\text{Mg}(\text{HCO}_3)_2$  is 146 and that of  $\text{MgCl}_2$  is 95.6 g/mol.

- b. (i) Explain Bomb calorimeter method for determination of net calorific value of solid fuel with proper diagram.

(ii) On burning 0.88g of a solid fuel in a bomb calorimeter, the temperature of 3300 g of water increased from 25.6 to  $28.5^\circ\text{C}$ . Specific heat capacity of water equivalent & latent heat of steam are 388.0g and 580 cal/g respectively. If the fuel contains 1% hydrogen, calculate its net calorific value.

- c. (i) What types of parameters are determined in the proximate analysis of coal? Explain each.

(ii) One gm of a solid coal loses 0.04 gm at  $110^\circ\text{C}$  and then on further heating it loses 0.08 gm residue. 1 gm of the same coal loses 0.1 gm at  $950^\circ\text{C}$ . Calculate fixed carbon percentage.

5. Attempt any **TWO** parts of the following:

- a. Give the formation of reaction, properties and uses of neoprene (Buna-N).

b. How is Grignard reagent prepared? What important precautions be taken for its preparation? Describe their synthetic uses.

- c. Write the short note on any two of the followings:

(i) Biodegradable Polymer, (ii) Conducting Polymer, (iii) Composite Polymer

**B. TECH.**  
**SECOND SEMESTER THEORY EXAMINATION, 2**  
**KAS- 203**  
**MATHEMATICS - II**

**Time: 3 Hours**

Note:

**Max. M**

- Attempt all questions. All questions carry equal marks.
- Be precise in your answer. In case of numerical problem assume values whenever not provided.

**1. Attempt any *FOUR* parts of the following:**

a. Solve  $(D^2 - 3D + 2)y = xe^x + \sin 2x$ ,

b. Show that  $\int_0^{\pi/2} \sqrt{\sin \theta} d\theta \times \int_0^{\pi/2} \frac{d\theta}{\sqrt{\sin \theta}} = \pi$ .

c. Test the convergence of the series  $\frac{2}{1^2+1} + \frac{2^2}{2^2+1} + \frac{2^3}{3^2+1} + \dots$

d. Show that the function  $u = x^3 - 3xy^2$  is harmonic and find corresponding analytic function.

e. Expand  $\frac{1}{(z+1)(z+3)}$  in the regions: (i)  $|z| < 1$  (ii)  $1 < |z| < 3$ .

**2. Attempt any *TWO* parts of the following:**

a. Solve the simultaneous differential equations

$$\frac{d^2x}{dt^2} - 4 \frac{dx}{dt} + 4x = y,$$

$$\frac{d^2y}{dt^2} + 4 \frac{dy}{dt} + 4y = 25x + 16e^t.$$

b. Solve by method of variation of parameters:  $\frac{d^2y}{dx^2} - 2 \frac{dy}{dx} = e^x \sin x$

c. Solve in series the differential equation

3. Attempt any **TWO** parts of the following:

a. Prove that  $\Gamma(m)\Gamma\left(m+\frac{1}{2}\right) = \frac{\sqrt{\pi}}{2^{2m-1}}\Gamma(2m)$

b. Show that if  $l, m, n$  are all positive

$$\iiint x^{l-1} y^{m-1} z^{n-1} dx dy dz = \frac{d' b^m c^n}{8} \frac{\Gamma(l/2) \Gamma(m/2) \Gamma(n/2)}{\Gamma(l/2 + m/2 + n/2 + 1)}$$

where the triple integral is taken throughout the part of the

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1 \text{ which lies in the positive octant.}$$

- c. Find the volume of the tetrahedron bounded by the plane  $\frac{x}{a} + \frac{y}{b} + \frac{z}{c} = 1$  and the co-ordinate planes.

4. Attempt any **TWO** parts of the following:

a. Test the convergence of series:  $i + \frac{3}{7}x + \frac{3.6}{7.10}x^2 + \frac{3.6.9}{7.10.13}x^3 + \dots$

b. Find the Fourier series to represent  $e^{ax}$  in the interval  $-\pi < x < \pi$ .

- c. Find the mobius transformation which maps the points  $z = 1, -1, i, -i$  to the points  $w = i, 0, -i, 1$ .

5. Attempt any **TWO** parts of the following:

a. Evaluate  $\int_0^{2+i} (\bar{z})^2 dz$ , along the real axis from  $z = 0$  to  $z = 2$ ,

along a line parallel to  $y$ -axis from  $z = 2$  to  $z = 2 + i$ .

b. Evaluate the integral  $\int_C \frac{e^{2z}}{(z+1)^2} dz$  around the boundary of the circle  $|z| = 2$ .

$$|z| = 2.$$

c. Evaluate by contour integration:  $\int_0^{2\pi} \frac{d\theta}{a + b \sin \theta}$ , where  $a > |b|$ .

B. TECH.  
 SECOND SEMESTER THEORY EXAMINATION, 2018-19  
 KEE- 201  
 ELECTRICAL ENGINEERING

Time: 3 Hours

Max. Marks:

Note:

- Attempt all questions. All questions carry equal marks.
- Be precise in your answer. In case of numerical problem assume whenever not provided.

1. Attempt any **FOUR** parts of the following: [4]

- a. State and prove Thevenin's theorem. Show with example, how theorem can be usefully employed in circuit analysis.
- b. Determine the current supplied by the source in the circuit shown in fig.1

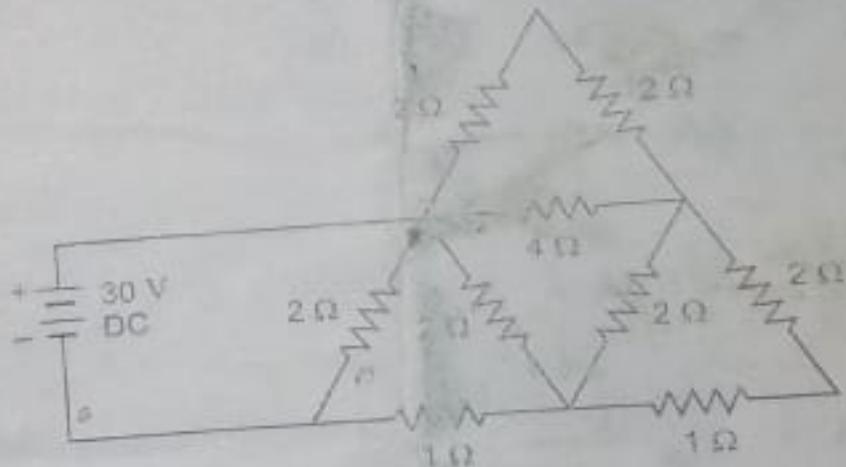


fig.1

- c. Write the statement of Norton's theorem and find the current in resistance in the given circuit as shown in fig2.

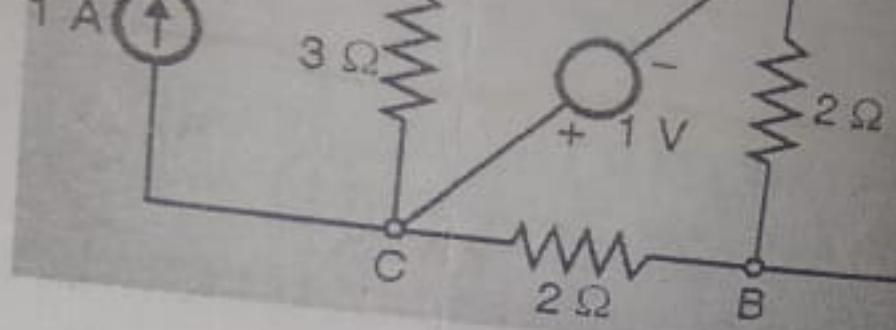


fig2.

- d. Determine the current through  $5\Omega$  and  $4\Omega$  resistance using analysis as shown in fig 3.

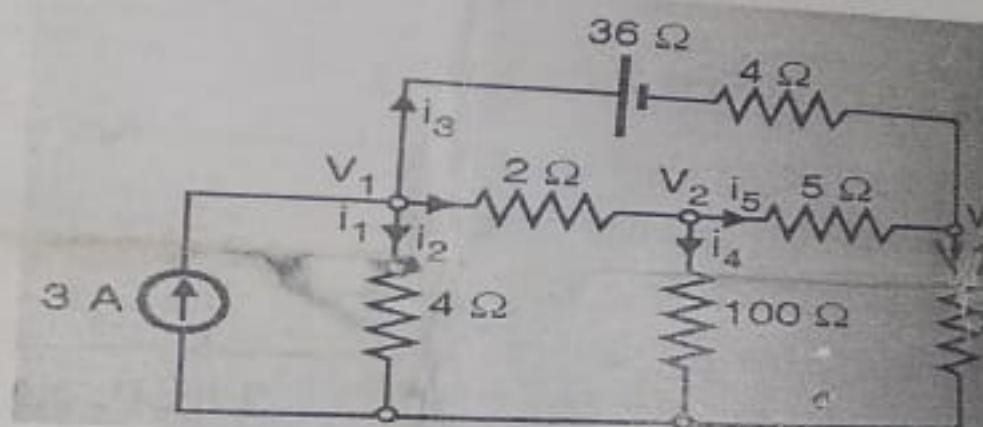


fig.3

- e. Using source transformation find the voltage V in the circuit  
fig.4

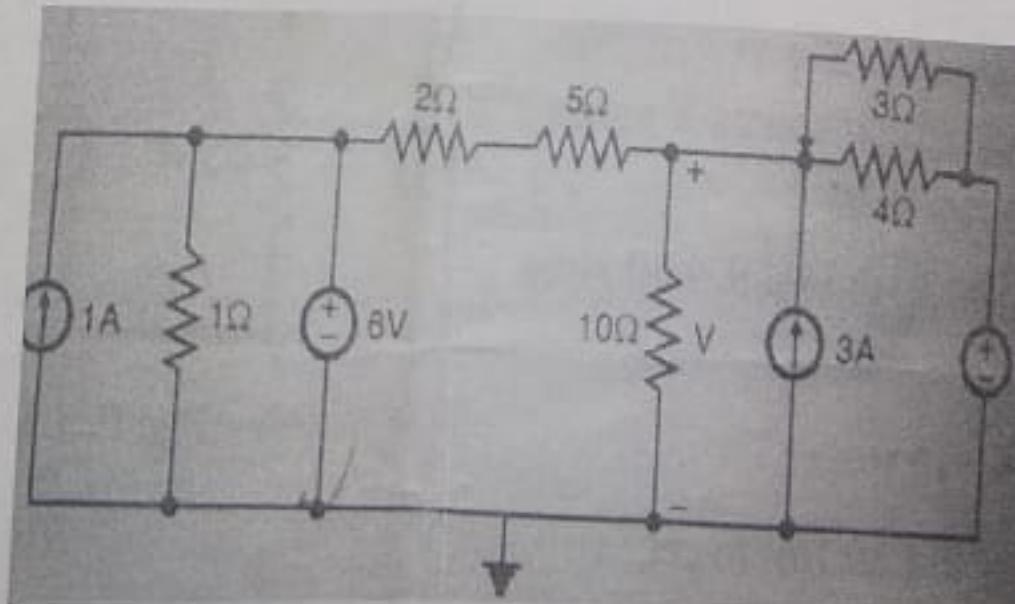


fig.4

- (ii) Active and Passive element  
(iii) Kirchhoff's laws

2. Attempt any **TWO** parts of the following:

- a. (i) What you understand by quality factor? Derive the expression for quality factor.  
(ii) Define the bandwidth of a series resonant circuit and derive the relation among the resonant frequency, quality factor and bandwidth.
- b. A voltage  $V(t) = 150\sin(1000t)$  is applied across a series R-L-C circuit where  $R=40\Omega$ ,  $L=0.13H$ , and  $C=10\mu F$ . Compute the following:  
(i) RMS value of steady state current.  
(ii) RMS voltage across the inductor.  
(iii) RMS voltage across the capacitor.  
(iv) Draw the complete phasor diagram showing all voltage components.  
(v) Determine the reactive power supplied by the source.

- c. For the circuit shown in Fig.5, determine

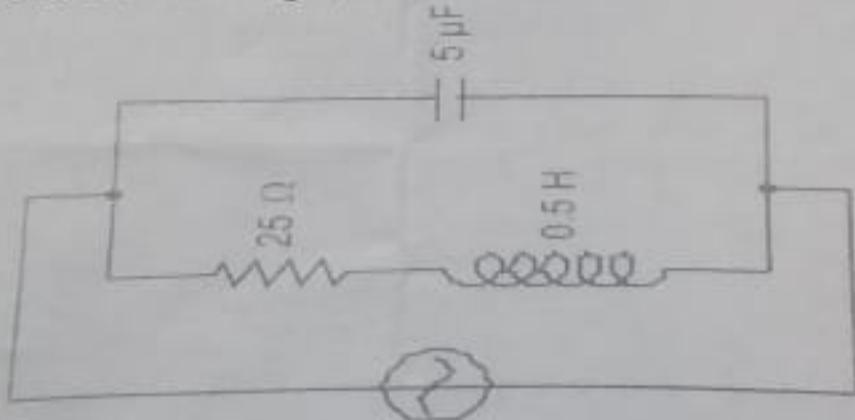


Fig.5

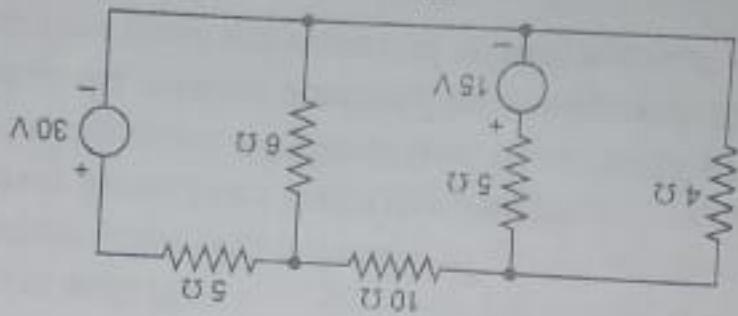
- (i) Resonant frequency  
(ii) Total impedance of the circuit at resonance.  
(iii) Bandwidth  
(iv) Quality factor.

3. Attempt any **TWO** parts of the following:
- Draw and explain the phasor diagrams of a single phase transformer for the following load conditions.
    - Inductive load
    - Capacitive load
  - Explain any two of the following three phase transformer connection with suitable advantage, disadvantages and applications.
    - Star - Star connection
    - Star - Delta connection
    - Delta - Delta connection
    - Delta - Star connection.
  - The maximum efficiency of a 100kVA transformer is 98.40% at 90% full load unity power factor. Calculate the efficiency of a transformer at unity power factor at full load.

4. Attempt any **TWO** parts of the following: [2]
- Explain the working principle of dc shunt wound generators. A generator has an induced e.m.f of 254V. When generator is loaded, terminal voltage is 240V. Neglect the armature reaction, find the load current if the armature resistance is  $0.04\Omega$  and field circuit resistance is  $24\Omega$ .
  - Discuss the principle of operation of synchronous motor and explain the methods of starting the synchronous motor.
  - Describe the construction and working principle of three phase induction motor. Draw the torque-slip characteristic of the above. This motor cannot operate on synchronous speed.

5. Attempt any **TWO** parts of the following: [2]
- Describe the various types of wires or cables usually used in indoor wiring of building.
  - What do you understand by earthing? Why is it necessary to earth an electrical installation? Draw out a neat sketch for earthing by GI pipe.
  - Explain the construction of Lead - Acid batteries. Write the chemical reaction during charging and discharging of Lead - Acid batteries. Also draw the charging and discharging curves.

Figure - 2



Nodal analysis finds the current through  $10\ \Omega$  ohm resistance of the  
and prove the Thevenin's theorem with a suitable example.  
Figure-1

Figure-1

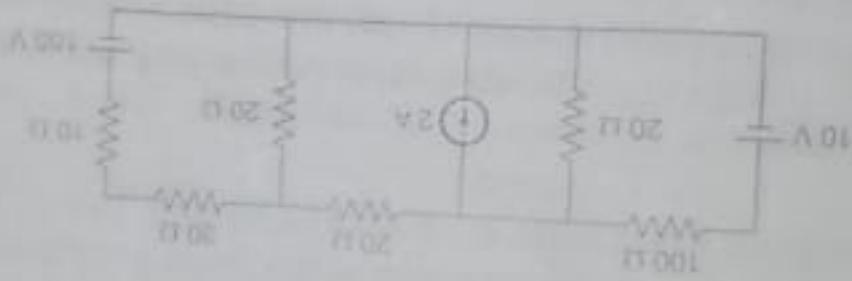


Figure 1.  
Norton's theorem, find the current flowing through  $100\ \Omega$  ohm of  
any FOUR parts of the following: COI  
[4×5]

All questions. All questions carry equal marks.

Max. Marks: 100

### BASIC ELECTRICAL ENGINEERING

KEE-101

01

ST SEMESTER THEORY EXAMINATION, 2019-20

B.TECH.

3 0 4 3 5 1 0 2 3

(Roll No. to be filled by candidate)

KEE 101

of Printed Pages: 04

Derive the expression for star to delta transformation. Three resistances  $10 \text{ ohm}$ ,  $20 \text{ ohm}$ ,  $30\text{ohm}$  are connected in delta. Determine the resistances for an equivalent star connection.

Define the following term with examples.

(i) Unilateral and bilateral network

(ii) Distributed and lumped network

(iii) Active and passive elements

(iv) Lmear and Non Lmear Network

Using superposition theorem finds the current through  $20 \Omega$  of the circuit in Figure 3. All the resistances are in ohms.

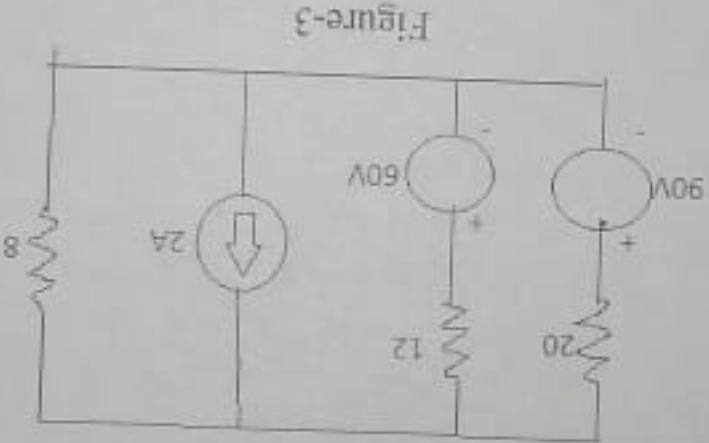


Figure-3

The equation of an alternating current is  $i = 42.42 \sin 628t$ , determine (i) Maximum Value, (ii) Frequency, (iii) Time period [4x5]

CO2

A resistor of  $10\Omega$ , an inductor of  $0.5\text{H}$  and a capacitor of  $10\mu\text{F}$  are connected in series across a  $50\text{V}$ ,  $50\text{Hz}$  supply. Determine (i) current (ii) voltage across each element (iii) power factor. Draw the phasor diagram.

Establish the relation between line voltage and phase voltage in a balanced three phase star connected system.

- f. Define and derive the expression for Q-factor of an RLC series circuit.
- (iii) Apparent power and true power
- (ii) Apparent power and reactive power
- (i) Form factor and power factor

Attempt any **TWO** parts of the following: CO3 [2x10]

- a. A 500 KVA transformer has 2500 watt iron loss and 7500 watt copper loss at full load, calculate its efficiency :

- (i) At full load 0.8 PF lagging  
(ii) At half load unity PF lagging

- b. Explain the working principle and construction of a transformer. Also derive the EMF equation of a transformer.

- c. Explain the various losses taking place in a transformer. Also give the brief idea of an auto transformer.

- a. Explain the principle of operation of a single phase induction motor.

- b. Write the principle of operation of synchronous motor. Give its methods.

- c. Derive the EMF equation of a DC machine. A 230 V dc shunt motor takes 51A at full load. Resistances of armature and field windings are 0.1 ohm and 230 ohm respectively. Determine (i) Field current (ii)

- armature current (iii) Back EMF at full load.  
a. Write short notes on the following:  
5. Attempt any **TWO** parts of the following: CO5 [2x10]
- (i) Miniature Circuit breaker (MCB)  
(ii) Earth Leakage circuit breaker (ELCB)

- b. Three similar coils connected in star, take a total power of 1.5 kW at a power factor of 0.2 lagging from a 3 phase, 400 V 50 Hz supply.
- c. What is importance of earthing? Distinguish between system earthing and equipment earthing. Define the terms earthing electrode and earth resistance.

atrix diagonalizable?

ove that the inverse of orthogonal matrix is also orthogonal matrix.

nd the Eigen Vectors of the matrix  $A = \begin{bmatrix} 0 & 0 & -3 \\ 0 & -2 & 1 \\ -1 & 1 & 2 \end{bmatrix}$ . Is this

d also verify Cayley Hamilton Theorem for the given matrix  $A$ .

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

atrix

Cayley Hamilton Theorem. Find the characteristic equation of

(i) no solution (ii) unique solution (iii) more than one solution.

$$x + y + z = 6, x + 2y + 3z = 10 \text{ and } x + 2y + 2z = 11.$$

or what value of  $\alpha$  and  $\beta$  do the system of equations:

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

transformations

nd the inverse of the following matrix by employing elementary

[4x5]

COI

me missing data suitably.

up all questions. All questions carry equal marks.

Max. Marks: 100

urs

## MATHEMATICS-I

KAS-103

RST SEMESTER THEORY EXAMINATION, 2019-20

B.TECH.

1 9 0 4 3 5 1 0 2 3

(Roll No. to be filled by candidate)

KAS 103

of Printed Pages: 04

If  $f(x,y)$  and  $\phi(x,y)$  are homogeneous functions of  $x, y$  of degree  $p$  and  $q$  respectively and  $u = f(x,y) + \phi(x,y)$ , show that  
degree.

$$\text{Expand } f(x,y) = e^x \sin y \text{ in powers of } x \text{ and } y \text{ as far as terms of third}$$

$$\left( \frac{\partial}{\partial x} + \frac{\partial}{\partial y} \right)^2 u = \frac{(x+y+z)^2}{-9}$$

$$f_u = \log(x^3 + y^3 + z^3 - 3xyz), \text{ Show that}$$

Simplify **FOUR** parts of the following: CO3  
[4×5]

Trace the curve  $x = (y-1)(y-2)(y-3)$ .

[a,b].

Verify Cauchy's mean value theorem for  $f(x) = \sqrt{x}$  and  $g(x) = 1/\sqrt{x}$  in  
interval  $[a, b]$ . The mean value theorem is obtained.  
state Cauchy's mean value theorem. Under what conditions Lagrange's  
parameter.

Find the envelope of semi-cubical parabolas  $y^2 = (x-k)^3$ ,  $k$  being  
discontinuity, if any.

Examine  $f(x)$  for continuity at  $x = 0, 1, 2$ . Also discuss the kind of  
function  $f$  is defined on  $R$  by

$$f(x) = \begin{cases} -x^2, & \text{if } x \leq 0 \\ 5x - 4, & \text{if } 0 < x \leq 1 \\ 4x^2 - 3x, & \text{if } 1 < x < 2 \\ 3x + 4, & \text{if } x \geq 2 \end{cases}$$

$(0) = 2.2^2 4^2 6^2 \cdots (n-2)^2$ ,  $n \neq 2$  for  $n$  being even.  
 $y = (\sin x)^2$ , prove that  $y_n(0) = 0$  for  $n$  being odd and  
functions.

Examine and prove Leibnitz theorem for the  $n$ th derivative of the product of  
Simplify **FOUR** parts of the following: CO2  
[4×5]

information.

$$\text{Find the rank of a matrix } A = \begin{bmatrix} 2 & 1 & -6 \\ -2 & 2 & -3 \end{bmatrix} \text{ using elementary}$$

a. (i) Find the directional derivative of the function  
 Attempt any **TWO** parts of the following: CO5 [2×10]

and the plane  $\frac{x}{a} + \frac{y}{b} + \frac{z}{c} = 1$ , the density is given by  $\rho = kxyz$ .

(ii) Find the mass of a plate which is formed by the co-ordinate planes  
 $z = 12 + y - x^2$ .

common to the parabolas  $y^2 = x$ ,  $x^2 = y$  and cut off by the surface

c. (i) Find the volume of the cylindrical column standing on the area  
 $r = 1 + \cos \theta$  and outside the parabola  $r(1 + \cos \theta) = 1$ .

(ii) Find by double integration, the area lying inside a cardioids

$$\int_a^0 \int_a^x \frac{y^2 dx dy}{\sqrt{a^2 - a^2 x^2}}.$$

b. (i) Change order of integration and hence evaluate:

$x + 2y + 3z = 6$ . Compute this volume by double integration.

(iii) A pyramid is bounded by the three co-ordinate planes and the plane

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1.$$

a. (i) Evaluate  $\iint (x+y)^2 dx dy$  over the area bounded by the ellipse

CO4 [2×10]

e. If  $u, v$  are the roots of the equation  $(\alpha - x)^2 + (\alpha - y)^2 = 0$  in  $\alpha$ . Find

change in the volume of the balloon.

increased by 0.01 m and the length by 0.05 m, find the percentage  
 length 4 m and is summounted by hemispherical ends. If the radius is

A balloon is in the form of right circular cylinder of radius 1.5 m and

the dimensions of the box requiring least material for its construction.

d. A rectangular box, open at the top, is to have a volume of 32 c.c. Find

$$f(x, y) = \frac{1}{1} \left[ x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2} \right] - \frac{p(p-q)}{q-1} \left[ x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} \right]$$

$$y = x^2$$

where  $C$  is the closed curve of the region bounded by  $y = x$  and  $y = x^2$ . Verify Green's theorem in the plane for  $\oint_C (xy + y^2)dx + x^2dy$ ,

the integral

independent of the path joining points (1,2) and (3,4). Hence evaluate

(ii) Show that the integral  $\int_{(3,4)}^{(1,2)} (xy^2 + y^3)dx + (x^2y + 3xy^2)dy$  is

$\vec{r} = xi + yj + zk$  and  $\vec{a}$  is a constant vector.

(i) Show that  $\vec{a} \times (\nabla \times \vec{r}) = \nabla(\vec{a} \cdot \vec{r}) - (\vec{a} \cdot \nabla)\vec{r}$ , where

surface of the plane  $2x + 3y + 6z = 12$  in the first octant.

(iii) Evaluate  $\iint_S \vec{F} \cdot \vec{n} ds$ , where  $\vec{F} = 18zi - 12j + 3yk$  and  $S$  is the

SECTION-B

- |  |   |     |
|--|---|-----|
| a  | Explain the effect of temperature on electrical conductivity of semiconductor.                          | C01 |
| b  | Define bond order and how does it affect bond length and stability of molecule.                         | C01 |
| c  | Define the terms Chromophores and Auxochromes.  | C02 |
| d  | How will you distinguish between benzene and naphthalene by U.V. spectrometry?                          | C02 |
| e  | How much rust ( $Fe_2O_3 \cdot 3H_2O$ ) will be formed when 100 kg of iron have completely rusted away? | C03 |
| f  | Why does corrosion occur in steel pipe connected to copper?   | C03 |
| g  | Write Dalton's formula for calculation of HCV.  | C04 |
| h  | Write different units of hardness and their relationship.   | C04 |
| i  | With example define the biodegradable polymers.   | C05 |
| j  | What are the monomers of Terylene and SBR.  | C05 |
| SECTION-B  |   |     |
| Attempt any THREE parts of the following<br>[3×10]                       |   |     |
| a Write down the electronic configuration, bond order, magnetic behavior |   |     |

V-CHAINS

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#### ANSWERED

201-542

THIS IS AN OFFICIAL COPY OF THE 1969 EXAMINATION. 2619-20

ALL TECHNIQUES

attempt any THREE parts of the following:

### SECTION-B

- What are the monomers of Terylene and SBR.  
CO<sub>5</sub>
- With example define the biodegradable polymers.  
CO<sub>4</sub>
- Write different units of hardness and their relationship.  
CO<sub>4</sub>
- Write Duolong's formula for calculation of HCV.  
CO<sub>3</sub>
- Why does corrosion occur in steel pipe connected to copper?  
CO<sub>3</sub>
- How much rust ( $Fe_2O_3 \cdot 3H_2O$ ) will be formed when 100 kg of iron have completely rusted away?  
CO<sub>2</sub>
- How will you distinguish between benzene and anthracene by U.V. spectroscopy?  
CO<sub>2</sub>
- Define the terms Chromophores and Auxochromes.  
CO<sub>1</sub>
- Define bond order and how does it affect bond length and stability of molecule.  
CO<sub>1</sub>
- Explain the effect of temperature on electrical conductivity of semiconductor.  
[10×2]
- attempt all parts of the following:  
Max. Marks: 100
- attempt all questions.  
hours

### SECTION-A

CHEMISTRY  
KAS-102

FIRST SEMESTER THEORY EXAMINATION, 2019-20

B.TECH.

1 9 0 4 3 5 1 0 2 3

(Roll No. to be filled by candidate)

KAS 102

Number of Printed Pages: 03

attempt any THREE parts of the following:  
[3×10]

- a. Attempt any **TWO** parts of the following: CO<sub>2</sub> [2×5]
- a. What is Raman Effect? Discuss the principles involved in the Raman spectroscopy. Give some important applications.

- b. Explain the structure, properties and application of fullerenes.
- c. What do you understand by mesomorphic state? Discuss its classification on the basis of change in temperature.
- d. Effects in ionic solid.
- a. What is crystal imperfection? Differentiate Schottky and Frenkel defects.

### SECTION-C

- e. What are Organometallic compounds? Explain the preparation method and applications of Grignard reagent. CO<sub>5</sub>
- f. Calculate the hardness of the water sample. CO<sub>4</sub>
- Given that:  $E^\circ_{Fe/Fe^{+2}} = 0.44V$  and  $E^\circ_{Cu^{+2}/Cu} = 0.337V$
- Demineralization process for softening of hard water. The hardness of 1000 litres of a water sample was completely removed by a zeolite 1.5 gm/litre of NaCl for regeneration. Calculate the hardness of the softener. The zeolite has required 50 litres of NaCl solution containing 0.01M) Cu<sup>2+</sup>
- Compare and contrast the salient features of Zeolite process and Demineralization process for softening of hard water. The hardness of

- Given that:  $E^\circ_{Fe/Fe^{+2}} = 0.44V$  and  $E^\circ_{Cu^{+2}/Cu} = 0.337V$
- Calculate the EMF of a cell at 25°C: Fe | FeSO<sub>4</sub>(1.0M) || CuSO<sub>4</sub> (0.01M) | Cu
- Drive the Nernst Equation for electrochemical cell. CO<sub>3</sub>
- (ii)  $C_6H_5COCH_3$  and  $p\text{-CH}_3C_6H_4COCH_3$
- (i)  $CH_3COCH_3$  and  $C_2H_2$
- What is IR spectroscopy? Describe the fundamental vibrations in IR spectroscopy. How will you distinguish between following pairs of compounds by IR spectroscopy?
- CO<sub>2</sub>
- them in increasing order of bond length.
- CO<sub>1</sub>
- of  $O_2^-$ ,  $O_2^+$ ,  $O_2$  on the basis of molecular orbital theory and arrange

sample.

discuss the possible electronic transitions in the ultraviolet region with

KAS 102

of Printed Pages: 03

apply phase rule for water system. What do understand by the Degree  
freedom of a system?

that is corrosion? Explain sacrificial anodic and impressed cathodic  
protection method for prevention of corrosion.

discuss the scheme of the cell and calculate its EMF at 298K.

two copper rods are placed in copper sulphate solution of  
concentrations 0.1 and 0.01M separately in the formation of cell. Write

the HCV and LCV of a fuel. A 0.72gm of a hydrocarbon fuel  
containing 85% carbon when burnt in a bomb calorimeter increased the  
temperature of water from  $27.3^{\circ}\text{C}$  to  $29.1^{\circ}\text{C}$ . If the calorimeter contains  
50gm of water and its water equivalent is 150gm, calculate the HCV  
and LCV of the fuel.

calculate the amount of lime and soda required for treatment of  
5000 litre of water whose analysis is as follows.

$\text{Ca}(\text{HCO}_3)_2 = 40.0 \text{ ppm}$ ,  $\text{Mg}(\text{HCO}_3)_2 = 36.0 \text{ ppm}$ ,  $\text{CaSO}_4 = 34.6 \text{ ppm}$ ,  
 $\text{NaCl} = 27.75 \text{ ppm}$ .

briefly explain the principal, construction and working of lime -soda  
water softener.

What is natural rubber? Discuss preparation and advantages of  
elastomer.

Write the preparation, properties and uses of any two of the following:

(i) Conducting Polymer  
(ii) Composites  
(iii) Glass

Write the short notes on the following:

Suna-S, nylon-6 and nylon-66.

elastomer.

Bundelkhand Institute of Engineering and Technology, Jhunjhunu

CLASS TEST - I

Computer system and Programming in C (KCS-101)

B. Tech (CS) I<sup>st</sup> year

long; 1 hour

Local Banks

Roll No. 18043

All Questions are Compulsory

- (Q 1.) Define computer and what are the application areas of it?

(Q 2.) Describe memory and its type.

(Q 3.) Convert into decimal:  
a)  $(764)_{10}$       b)  $(126)_8$

(Q 4.) Convert into Octal:  
a)  $(246)_{10}$       b)  $(1792)_{10}$

(Q 5.) Convert into binary:  
a)  $(178)_{10}$       b)  $(146)_{10}$

卷之三



# Bundelkhand Institute of Engineering and Technology Jhansi

Time: 1 hr

F.M.: 15

Roll No.: 180431

## Class Test - I

Subject: Professional English (KAS 204)

Student Name: Sandeep Kumar Singh.

$$2 \times 4 = 08$$

### A. Answer any four of the followings:

- a. Read the passage below and correct the underlined error.
- I'm Elena Guedon. I am from Paris France, but now I live in Chicago Illinois. I am divorce. I have one son named Pierre. Pierre is doctor at a large hospital in Chicago. He is planning for get married. His girlfriend Cassie is a surgeon at the hospital. She older than he is. I am older than my ex-husband. So I am worry about Pierre's future. But Pierre is sure that him and Cassie will be happy.

- b. Write the phonetic transcription of the following words.  
receipt, determine, poem, examiner, violin, vowel, adequate, environment  
Write the number of syllables in the words given in Q.A(b) 4
- c. Define any four with suitable examples:  
(i) Blending (ii) Compounding (iii) Acronym (iv) Meronymy (v) homophones  
1
- d. (i) Write two synonyms of: tycoon, appropriate  
(ii) Identify the pairs of homophones from the following clues:  
*One word means permitted; the other means a sum of money*  
*One word means hit, the other is vegetable.*
- e. 2

3.5x2

**B. Answer any two of the following**

- a. Explain the different organs of speech with their function.
- b. Illustrate all the English vowel sounds within its tongue model and write words with the vowel sounds in initial, medial and final position.
- c. Explain the requisites of writing effective sentences.



!!! All The Best !!!

$$0 = 2x + 2y + 2z$$

the values of  $x, y, z$  for which the following system of equations have solution. Also find the non-trivial

$$0 = 2x + 3y + 2z = 1, 4x - 3y - z = 3, 2x + 4y + 2z = 4.$$

(d) Consider the following system and find the solution (if consistent)

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

using two methods

and by two parts of the following

$$\text{is equal to } X = \begin{bmatrix} 1 & 0 & 1 & 1 \\ 0 & 1 & 0 & 0 \\ 0 & 1 & -2 & 0 \\ 0 & 0 & -1 & 1 \end{bmatrix}$$

$$\text{by reducing it into normal form}$$

$$\begin{bmatrix} 1 & 0 & 1 & 1 \\ 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & -1 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

Q. If  $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$  and  $B = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$  then prove that  $AB$  and  $BA$  are also orthogonal

$$\text{Ans: } AB = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}, BA = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$\text{Ans: } AB = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}, BA = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

Q. Answer (5)

Attempt All Questions

### Mathematical I (WAS-103)

First Class Test (Common for All Branches), 2018-19

Blanks (First Year)

# Santoshi Verma

B.Tech. (First Year)  
 First Class Test (Common for All Branches), 2019-20  
 Mathematics-I (KAS-103)

Time: 1 Hr

NOTE: Attempt *ALL* questions.

1. Attempt any **FOUR** parts of the following:  
 (a) If  $A$  and  $B$  are symmetric matrices and commute, then show that  $A^{-1}B^{-1}$  is also symmetric.

(b) If  $A = \begin{bmatrix} 3 & 5+2i & -3 \\ 5-2i & 7 & 4i \\ -3 & -4i & 5 \end{bmatrix}$ , show that  $A$  is a Hermitian matrix and  $iA$  is a skew-Hermitian

(c) Find the values of  $\lambda$  such that the rank of the matrix  $\begin{bmatrix} 1 & 1 & 1 & 1 \\ 1 & 2 & 4 & \lambda \\ 1 & 4 & 10 & \lambda^2 \end{bmatrix}$  is 2.

- (d) Examine the vectors  $(2,2,1), (1,3,1), (1,2,2)$  for linearly dependence or independence. If dependent find the relation between them.  
 (e) For what values of  $b$ , the equations  $x+y+3z=0; 4x+3y+bz=0; 2x+y+2z=0$  has solution.

(f) Test the consistency of the system of equations  $x+y+z=7; x+2y+3z=8; y+2z=6$ .

2. Attempt any **TWO** parts of the following:

- (a) Apply Gauss Jordan method to find the inverse of  $A = \begin{bmatrix} 1 & 1 & 0 & 1 \\ 1 & 1 & 1 & 1 \\ 4 & 4 & 1 & 1 \\ 1 & 0 & 0 & 1 \end{bmatrix}$

(b) Reduce  $\begin{bmatrix} 2 & 0 & -1 & 0 \\ 4 & 1 & 0 & 5 \\ 0 & 1 & 3 & 6 \\ 6 & 1 & -2 & 6 \end{bmatrix}$  into normal form and find its rank.

- (c) For what values of  $k$ , the equations  $kx + y + z = 1; x + ky + z = 1; x + y + kz = 1$  have (i) unique solution, (ii) infinite number of solution, (iii) no solution?

Bundelkhand Institute of Engineering & Technology Jhansi  
Class Test -1  
Electrical Engineering (KEE-101) Branch (EE+EC+CH) Time: - 1

Note: Attempt any five each carry equal marks:

1. Define with examples:

- (a) active and passive network (b) unilateral and bilateral network
- (c) linear and bilinear network

2. Find current through 1 ohm resistor using superposition theorem. (refer fig. 2)

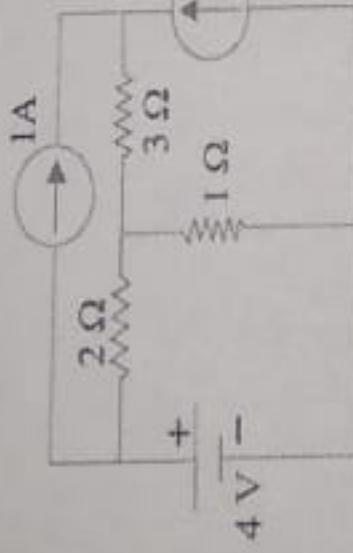


fig. 2

3. using nodal analysis find the current in all the branches of the network given below.(re)  
4. State and prove superposition theorem with example.  
5. derive the expression for delta to star conversion.  
6. two resistors of 4 & 12 ohms are connected in parallel with a series resistor of 5ohm ac voltage source of 80V. calculate the voltage drop in each resistor and current in each branch

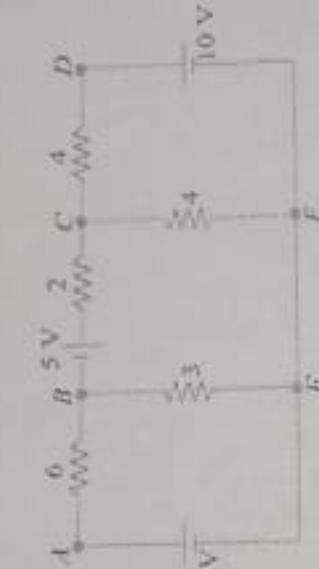


fig. 3

Sankalp  
Bundelkhand Institute of Engineering and Technology, Jhansi

B.Tech (chemical engineering) 1<sup>st</sup> year (Odd Sem.) Session 2019-20  
Chemical Engineering (KAS-102)

Time: 1 hour  
Class Test - 1  
Total Marks: \_\_\_\_\_

Note:

- (1) Attempt all the questions.
- (2) All questions carry equal marks.

Q.1 (a) What are the polymer give their classifications? \_\_\_\_\_  
(b) Write the short note on any four. \_\_\_\_\_

- (1) Nylon-6      (2) Xylon-6,6      (3) Kebler      (4) Bakelite      (5) Poly  
PMMA

Q.2 (a) What is the point defect? Describe the stoichiometric and non-stoichiometric defect with example. \_\_\_\_\_  
(b) Write the short note on graphite and its application. \_\_\_\_\_

(OR)

(c) Describe the MOT. On the basis of MOT explain the paramagnetic molecule. \_\_\_\_\_

Roll No. 

1	9	0	4	3
---	---	---	---	---

Time: 1 Hr

B.Tech. (First Year)  
Second Class Test (Common for All Branches), 2018-19  
Note: Attempt ALL Questions.

1. Attempt any four parts of the following:

(a) Evaluate  $I = \int_{-1}^1 (1+x)^{1/2} (1-x)^{1/2} dx$ .

(b) Evaluate  $\int_0^\infty 2^{-9x^2} dx$  using Gamma function.

(c) Write the Fourier sine series for the function  $f(x) = \begin{cases} x, & 0 < x < \pi \\ 2, & \pi < x < 2\pi \end{cases}$ .

(d) Discuss the analyticity of  $f(z) = |z|^4$  in the complex plane.

(e) Show that the sequence  $\{(-1)^n\}$  does not converge.

(f) Test for convergence or divergence of the infinite series  $2x + \frac{3x^2}{8} + \frac{4x^3}{27} + \dots$ .

2. Attempt any two parts of the following:

- Find the surface area and volume of the solid formed by the revolution of  $x^2 + 4y^2 = 16$  about the  $y$ -axis.
- Obtain the Fourier series expansion of  $f(x) = \begin{cases} x, & -2 < x < 0 \\ 0, & 0 < x < 2 \end{cases}$ . Hence compute  $\sum_{n=1}^{\infty} \frac{1}{n^2}$ .

**B. Tech (First Year), Mathematics- I (KAS- 103)**  
**Second Class Test (CE, ME, IT)**

**Time: 1 Hr**

**1. Attempt any four questions:**

- (a) Using  $\epsilon - \delta$  definition, find a real number  $\delta$  that corresponds to the given  $\epsilon = 0.2$  for the following limit

$$\lim_{x \rightarrow 7} \sqrt{x+2} = 3.$$

- (b) If  $f'(x) = \frac{1}{3-x^2}$ ,  $f(0) = 1$ . Find the interval in which  $f(1)$  lies.  
 (c) Give the statement of Rolle's theorem and describe it geometrically.  
 (d) Check the validity of Cauchy's mean value theorem for the functions  $f(x) = x^4$  and  $g(x) = x^2$  on  $[1, 2]$ .  
 (e) Find the  $n^{\text{th}}$  derivative of  $e^x \sin^3 x$ .

$$(f) \text{ If } y = x^2 e^x, \text{ then show that } \frac{d^n y}{dx^n} = \frac{1}{2} n(n-1) \frac{d^2 y}{dx^2} - n(n-2) \frac{dy}{dx} + \frac{1}{2} (n-1)(n-2)y$$

**2. Attempt any two questions:**

- (a) Find the envelope of the family of straight lines  $\frac{x}{a} + \frac{y}{b} = 1$ , where  $a$  and  $b$  are connected by the relation

- (b) Show that the function  $f$  defined by

$$f(x) = \begin{cases} x^2 \cos\left(\frac{1}{x}\right) & ; x \neq 0 \\ 0 & ; x = 0 \end{cases}$$

is differential at  $x=0$  but  $f'(x)$  is not continuous at  $x=0$

- (c) Define the following:

Curvature, Radius of curvature, Envelope, Evolute and Involute

**Max. Marks**

**(4X2=8)**

## Class test 2

### Engineering Physics

### CE+ ME+IT Branch

**Note: Attempt All Question**

1. State the Postulates of Special Theory of Relativity and derive the expression for Lore Transformation. 3
2. Explain briefly construction, working and Energy diagram of Ruby Laser. 3
3. Explain Michelson-Morley experiment and discuss the outcomes. 3
4. The refractive index of the core of w step index is 1.46 and the refractive index difference between the core and cladding of the fibre is 2%. Estimate  
1) Numerical Aperture  
2) the critical angle at core Cladding interface within the fibre. 3
5. Calculate the amount of work to be done to increase the speed of an electron from 0.6 C to C  
(Given that rest energy of electron 0.5 MeV)

BUNDELKHAND INSTITUTE OF ENGINEERING AND TECHNOLOGY		
Department of Computer Science and Engineering		
Class Test- 2		
CSE, IT, ME, and CE (First year)	Programming for Problem Solving (KCS101)	Max Time
Max Marks: 15	Max	

Attempt any Three Questions. All questions will carry equal marks.

1. (a) Explain various Loop Control Statements and differentiate them with the help of suitable examples  
 (b). Write a program to display sum of series  $1+1/2+1/3+1/4+\dots\dots\dots\dots\dots\dots\dots+1/n$ .
2. (a) Write a program to swap two numbers using functions  
 (b) Justify the need of parameter passing concept in function. How can we implement this concept?
3. (a) Write a program to find factorial of a number using Recursion functions.  
 (b)

```

int x = 0;
for ( ; ; )
{
    if (x++ == 4)
        break;
    continue;
}
printf("x=%d\n", x);
      
```

 What will be printed when the sample code above is executed?

4. (a) Write a program to calculate the sum and average of elements of an array with size n?  
 (b) Explain the any five type string handling function with example?  
 \*\*\*\*BEST OF LUCK\*\*\*\*

B.Tech (1st Year), II CT  
KAS-102 (Engineering chemistry)

SECTION-A

**NOTE:** Attempt any four questions. (4x2)

1. What is absorption spectrum?
2. Distinguish between atomic and molecular spectra?
3. Why do metal corrode?
4. What do you understand by hardness of water?
5. What do you mean by zeolite?
6. Write the applications of IR spectra.

SECTION-B

**NOTE:** Attempt any two questions. (3.5x2)

1. Describe the principal and complete procedure of zeolite process treatment of water; write limitations, advantages and disadvantages?
2. Explain four methods for prevention of corrosion.



# Bundelkhand Institute of Engineering and Technology

Class Test - II

Subject: Professional English (KAS - 204)

Student Name:

Roll No.:

**A. Answer any four of the following:**

Differentiate between

- i. general & technical communication
- ii. skimming and scanning style of reading
- iii. inductive and deductive style of writing
- iv. active and passive thinking
- v. conversation and dialogues

**B. Answer any two of the following:**

- i. Explain the characteristics of technical writing? Why are simplicity and essential than sonorous and figurative style in technical writing? Explain.
- ii. What are features of kinesics in presentation? How are these non-verbal necessary as verbal strategies?
- iii. What are the paralinguistic features of presentation strategies? How modulation improve articulation.

## Class Test -2 Basic Electrical Engineering (KEE-201)

For Branch (CE+[ME+CS+IT])

**Attempt any Three. Each carry equal marks**

1. Define Quality Factor. Derive the expression for Quality factor and condition for resonance.
2. Establish the relation between line voltage and phase voltage in case of three phase star connection phasor diagram.
3. What is transformer? Explain the working principle of transformer. Also derive the expression for efficiency.
4. What are the losses occurring in a transformer. Derive the condition for maximum efficiency.

What are the characteristics of technical writing? Why are simple words more essential than sonorous and figurative style in technical writing? Explain.

ii.