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END TERM EXAMINATION

FIRST SEMESTER [BCA] NOVEMBER-DECEMBER-2018

Paper Code: BCA-101 **Subject: Mathematics-I**

Time: 3 Hours **Maximum Marks: 75**

Note: Attempt any five questions including Q.no.1 which is compulsory.

Q1 (a) Evaluate the determinant of the matrix $\begin{vmatrix} \frac{1}{a} & a^2 & bc \\ \frac{1}{b} & b^2 & ca \\ \frac{1}{c} & c^2 & ab \end{vmatrix}$.

(b) Use Cramer's rule to sole the system of equations
$x + y + z + 1 = 0; ax + by + cz + d = 0; a^2x + b^2y + c^2z + d^2 = 0$

(c) Find the maximum value of $y = \left(\frac{1}{x}\right)^x$

(d) Evaluate $\int cosmx.cosnx\, dx, when\ (i) m \neq n\ (ii) m = n.$

(e) Evaluate $\lim_{x\to 0}\left(ex^{\frac{1}{x}} + 1\right)$, if it exists.

UNIT-I

Q2 (a) Show that the vectors
$x_1 = (1, 2, 4), x_2 = (2, -1, 3), x_3 = (0, 1, 2)\ and\ \ x_4 = (-3, 7, 2)$ are linearly dependent and find the relation between them.

(b) Find the eigen values and eigen vectors of $A = \begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$

Q3 (a) Given $A = \begin{bmatrix} 1 & 2 & -1 \\ 0 & 1 & -1 \\ 3 & -1 & 1 \end{bmatrix}$ find adj(A) by using Cayley-Hamilton theorem.

(b) Find the rank of the matrix A $= \begin{bmatrix} 2 & 3 & -1 & -1 \\ 1 & -1 & -2 & -4 \\ 3 & 1 & 3 & -2 \\ 6 & 3 & 0 & -7 \end{bmatrix}$

UNIT-II

Q4 (a) Discuss the continuity of the function
$f(x) = \frac{xe^{1/x}}{1+e^{1/x}}, when\ x \neq 0, f(0) = 0$

(b) Solve $\lim_{x\to 0}\left(\frac{(1+x)^{\frac{1}{x}} - e + \frac{e^x}{2}}{x^2}\right)$

Q5 (a) Discuss the continuity of the function
$f(x) = \begin{cases} \frac{sinx}{x} & if\ x < 0 \\ (x+1), & if\ x \geq 0 \end{cases}$

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(b) Evaluate $(i)\ \lim_{x\to 0}\frac{(1+x^n-1)}{x}$ $\lim_{x\to 0}\frac{\log(\tan^2 2x)}{\log(\tan^2 x)}$

UNIT-III

Q6 (a) Verify Lagrange's Mean value Theorem for $f(x) = 2x^2 - 7x + 10, 2 \le x \le 5$

(b) Expand *logx* in powers of (x-1) by Taylor's theorem and hence find the value of $\log_e (1.1)$.

Q7 (a) *if* $y = e^{m\cos^{-1}x}$, *show that* $(1-x^2)\,y_{n+2} - (2n+1)\,xy_{n+1} - (n^2+m^2)\,y_n = 0$ and calculate $y_n(0)$.

(b) find all the asymptotes of the curve

$$y^3 + 4xy^2 + 4x^2y + 5y^2 + 15xy + 10x^2 - 2x + 1 = 0$$

UNIT-IV

Q8 (a) Prove that $(m,n) =$

(b) (*i*)*Evaluate* $\int_0^{2a} x^{3/2}(2a-x)^{1/2}\,dx$ (ii) *Evaluate* $\int_0^2 x(8-x^3)^{1/3}\,dx$.

Q9 (a) If $I_n = \int_0^{\pi/4} \tan^n x\,dx$, show that $I_n + I_{n-2} = \frac{1}{n-1}$.

(b) Evaluate $\int \tan^{-1}\left(\frac{2x}{1-x^2}\right)dx$.

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END TERM EXAMINATION

FIRST SEMESTER [BCA] NOVEMBER-DECEMBER 2018

Paper Code: BCA-103 ***Subject: Technical Communication***

Time: 3 Hours ***Maximum Marks: 75***

Note: Attempt any five questions including Q.no.1 which is compulsory. Select one question from each unit.

Q1 Write short notes on **any five** of the following: **(5x5=25)**

(a) Technical communication
(b) Merits and demerits of written communication
(c) Styles of oral communication
(d) Barriers in Listening
(e) Kinesis
(f) Proxemics

Q2 Enlist and explain main barriers to communication? Provide suitable examples for each type of barrier. **(12.5)**

OR

Differentiate between formal and informal communication. Discuss the general principles governing the same.

Q3 Distinguish between formal and informal reports. What do you think are the salient features of a good report? **(12.5)**

OR

Draft a resume for the post of mechanical engineer in a luxury car manufacturing MNC and enclose it with a cover letter.

Q4 What are the various factors influencing negotiation process. Elucidate the same by providing suitable case study in brief. **(12.5)**

OR

Differentiate between listening and hearing. Enlist and explain various aids to effective listening.

Q5 "For participating in group discussion one requires the right combination of both verbal and non verbal communication skills". Explain. **(12.5)**

OR

Explain the essentials of corporate communication skills. Illustrate your answer.

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END TERM EXAMINATION

FIRST SEMESTER [BCA] NOVEMBER-DECEMBER 2018

Paper Code: BCA-105 ***Subject: Introduction to Programming Language using C***

Time: 3 Hours ***Maximum Marks: 75***

Note: Attempt any five questions including Q.no.1 which is compulsory. Select one question from each unit.

Q1 Write short notes of the following (**Any Five**): **(5x5=25)**

(a) What you mean by pre-increment and post-increment operator? Example with an example.

(b) Differentiate between structure and union. Explain the use of "extern" keyword

(c) Explain the concept of pointer? Define the dynamic memory allocation and its various functions.

(d) Differentiate between static and register storage class in C language.

(e) What is a string? Write program for the concatenation of two strings.

(f) What are preprocessor directives? from which symbol do they start?

UNIT-I

Q2 (a) Explain while loop and do-while loop with an example. Elaborate Difference between them. **(4.5)**

(b) Write a program to find the largest number among the three numbers. **(8)**

Q3 (a) Explain the Switch statement, Break statement, and Continue statement with an example **(6)**

(b) Write a program to find the factorial of a number using recursion. **(6.5)**

UNIT-II

Q4 (a) What do you mean by pointer? How pointer variables are initialized? Write a note on pointer arithmetic with a proper example in C language. **(6.5)**

(b) Write a program to find the out maximum number in array using pointer. **(6)**

Q5 (a) Explain the array of pointers to functions with suitable example. **(4.5)**

(b) Write the difference between call by value and call by reference with suitable example. **(8)**

UNIT-III

Q6 (a) Explain the concept of structure. Write a C program to stores the information (name, roll, Branch, dept., and marks) of 10 students using structures. Find who has topped in the class. **(12.5)**

Q7 Write a short note on each. **(12.5)**

(i) How to pass a structure to a function? (ii) Bit fields

(iii) Automatic storage classes (iv) File handling

UNIT-IV

Q8 (a) Write a program to compare two strings where they are identical or not. **(4.5)**

(b) Explain the following inbuild functions. **(8)**

(i) Strlen() (ii) Strcat() (iii) Strlwr() (iv) Strupr()

Q9 (a) Write a Program to find the largest and smallest word in a string. **(4.5)**

(b) Explain the following header files. **(8)**

(i) Stdlib.h (ii) Ctype.h (iii) Math.h (iv) Process.h

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END TERM EXAMINATION

FIRST SEMESTER [BCA] NOVEMBER-DECEMBER 2018

Paper Code: BCA-107 ***Subject: Introduction to Computers & IT***

Time: 3 Hours ***Maximum Marks: 75***

Note: Attempt any five questions including Q.no.1 which is compulsory. Select one question from each unit.

Q1 Write short notes of the following: **(Any Five)** **(5x5=25)**

(a) What is the difference between magnetic tape drives and magnetic disk drives?

(b) Draw the block diagram of computer with various components and discuss their functing in detail.

(c) Describe the various network topologies with examples.

(d) What is an instruction set? Explain the various types of addressing modes.

(e) Discuss the various data transmission modes.

(f) Explain ROM, PROM, EPROM and UVEPROM.

UNIT-I

Q2 (a) Discuss the evolution of computers with the technologies used from first to fifth generation. **(6.5)**

(b) What are the various classification of computers. Explain with examples **(6)**

OR

Q3 (a) Define memory. Explain different types of memory used in computers **(6.5)**

(b) Differentiate between static and dynamic RAM. **(6)**

UNIT-II

Q4 (a) What are functionalities of operating system? Explain in detail. **(6.5)**

(b) "An Algorithm is a step by step procedure to solve a problem". Write an algorithm for decimal to binary conversion. **(6)**

OR

Q5 (a) What is a computer software. Discuss the role of assemblers, compilers, interpreter and linker. **(6)**

(b) What is the difference between low level languages and high level languages? Explain with examples **(6.5)**

UNIT-III

Q6 Evaluate the following: **(12.5)**

(a) Convert 39C8 from base 16 to base 2.

(b) Convert 11101100 from gray to binary

(c) Convert 23 from base 10 to base 8.

(d) Multiply 101101 by 110.

(e) Divide 11010 by 101.

OR

Q7 (a) Differentiate between 1's complement and 2's complement in binary system. Given A=123 and B=55. **(6.5)**

(b) Write short notes on grey and ASCII codes. **(6)**

UNIT-IV

Q8 (a) Discuss the various types of networks with examples? What is the difference between intranet and extranet. **(6.5)**

(b) Discuss client server architecture in detail. **(6)**

OR

Q9 Write Short notes on (**any three**): **(12.5)**

(a) World wide web

(b) FTP

(c) Telnet

(d) HTTP

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END TERM EXAMINATION

FIRST SEMESTER [BCA] NOVEMBER-DECEMBER 2018

Paper Code: BCA-109	*Subject: Physics*
Time: 3 Hours	*Maximum Marks: 75*

Note: Attempt any five questions including Q.no.1 which is compulsory. Select one question from each unit.

Q1 Attempt all parts of following: **(2.5x10)**

(a) State Lemi's theorem and elaborate it with one example.
(b) What is the inertial reference frame? Explain with example.
(c) Write the properties of friction. Why is coefficient of kinetic friction always less than coefficient of static friction?
(d) Suppose a particle moves along x-axis, decide whether the K.E. of particle increase, decrease or remain same if velocity changes –
(i) from -3 m/sec to -2 m/sec (ii) from -2 m/sec to 2 m/sec.
(e) Show that in 1-D elastic collision, the relative velocity of the particle is unchanged in magnitude but is reversed in direction.
(f) State Gauss's law in electrostatics and show that $\Delta.\vec{E} = \rho/\varepsilon_0$, where ρ is charge density.
(g) State Kirchhoff's rule and explain it.
(h) Give the postulates of Bohr's Model.
(i) Write the name of current carriers in semiconductor materials. What is the effect of temperature in intrinsic semiconductors?
(j) Give the working and applications of LED.

UNIT-I

Q2 (a) Discuss the equilibrium of concurrent forces with examples. A resultant force of 20 N gives a body of mass m an acceleration of 8.0 m/sec², and a body of mass M an acceleration of 24 m/sec². What acceleration will this force cause two masses to acquire if fastened together? **(8)**

(b) Explain the need for automobile seat belts in terms of Newton's first law. A horizontal cable pulls a 200 kg cart along a horizontal track. The tension in the cable is 500 N. Starting from rest, (a) how long will it take the cart to reach a speed of 8 m/sec? (b) How far will it have gone? **(4.5)**

Q3 (a) Explain microscopic basis of friction. Consider an automobile moving along a straight horizontal road with a speed v_0. The driver applies the brakes and brings the car to a halt without skidding. If the coefficient of static friction between tires and road is μ_s, what is the shortest distance in which the automobile can be stopped? **(6)**

(b) Why is roadbed is banked for transportation? Show that angle of banking is $\tan(\theta) = v^2/Rg$, where R is curvature of radius and v is velocity of object. A conical pendulum is formed by attaching a 53 gm pebble to a 1.4 m string. The pebble swings around in a circle of radius 25 cm. What is the speed of pebble? **(6.5)**

UNIT-II

Q4 (a) State and prove work energy theorem. What is the conservative force? The potential energy of a particle undergoing one dimensional motion along the x-axis is $U(x) = \frac{1}{4}cx^4$, c is 8 N/m³. Its total energy at x=0 is 2 Joule, and it is not subject to any non-conservative force. Find (a) the positions where its kinetic energy is zero. (b) the force at this position. **(5)**

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(b) Derive the expression of Gravitational potential energy to bring an object from infinity. How much electrical energy would be used by an elevator lifting a 75 Kg person through a height of 50 m if the elevator system has overall efficiency of 25%? Assume the mass of the empty elevator car is properly balanced by a counterweight. **(7.5)**

Q5 (a) What is completely inelastic collision? Express the kinetic energy of a particle in terms of its mass m and the magnitude of linear momentum P. A block of mass m_1=4 Kg and initial velocity $u_1 = 4\hat{i}$ m/sec makes a 1-D elastic collision with a block of mass m_2=3 Kg at $u_2 = 2\hat{i}$ m/sec. Find their final momentum. **(5.5)**

(b) Derive the expression of the centre of mass of two colliding bodies if the target is initially stationary. An electron collides elastically with Hydrogen atom initially at rest. What percentage of electron's initial kinetic energy is transformed to Hydrogen atom? (The mass of the Hydrogen atom is 1840 times the mass of electron). **(7)**

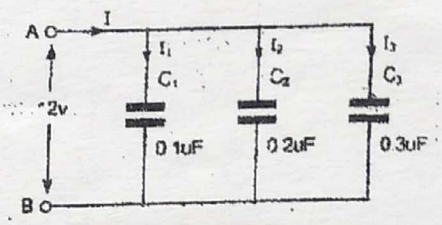
UNIT-III

Q6 (a) What is the source of frictional electricity? Give the properties of electric lines of force. A proton orbits with a speed 294 km/sec just outside a charged sphere of radius 1.13cm. Find the charge on the sphere. (m_p =1.27x10^{-27}Kg, ε_0=8.85x10^{-12} F/m). **(8)**

(b) Derive an expression for electric potential at the axis of ring due to a ring of uniform line charge. **(4.5)**

Q7 (a) What is Slide wire bridge? Explain working principle with a schematic diagram. Compare the slide wire bridge with Wheat stone bridge. **(5)**

(b) What is the effect of dielectric having inserted in parallel plate capacitor? Consider the following give circuit diagram. Answer the following questions. **(7.5)**



(a) Calculate the equivalent capacitance.
(b) Calculate total charges.
(c) Determine charges on individual capacitors

UNIT-IV

Q8 (a) What are the key failures of Thomson's atomic model? Write the conclusions of Rutherford's alpha scattering experiment. **(7.5)**

(b) Thought Silicon an Aluminium have the same atomic density and mass density, the difference in their electrical resistivity is very high. Why? What is meant by potential barrier across a p-n junction? **(5)**

Q9 (a) Indicate on an energy level diagram the conduction band and valence bands, donor and acceptor states. What are positions of Fermi levels for (a) an intrinsic semiconductor (b) a n-type semiconductor (c) a p-type semiconductor. **(6)**

(b) Discuss the working of a PNP transistor as an amplifier in common base configuration. Define the current gain in common base configuration. Derive the expressions for voltage gain and power gain. **(6.5)**

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