University of Sargodha

BS 1st Term/Semester Exam 2020

Subject: Chemistry **Paper: Calculus-I (MATH:311)**

Maximum Marks:

Time Allowed: 2:30 Hours

Note: Objective part is compulsory. Attempt any four questions from subjective part.

Objective Part (Compulsory)

Q. No. 1 Write short answers of the following in 2-3 lines each on your answer sheet. (2*1

i. Define Derivative of a function.

ii. State Taylor's Theorem.

iii. Integrate $\int \frac{\cos\pi/2}{x^2}dx$.

v. Find $\lim_{x\to 1}\frac{x^5-2x^3+1}{x^3-1}$.

v. Find the derivative of the function $y = Sin(tan2x)$.

i. Find the local maximum and minimum values of f if $f(x) = x^4 - 2x^2 + 3$.

i. Find $\lim_{x\to 2} f(x)$ when $f(x) = [x]$.

i. Find the average rate of change of the function $f(x) = x^3 + 1$ on the interval $[2,3]$.

x. If $\lim_{x\to 4}\frac{f(x)-5}{x-2} = 1$, then find $\lim_{x\to 4} f(x)$.

x. What do you meant by continuity of a function?

ci. Find the domain of $f(x) = \sqrt{4-\sqrt{x}}$.

cii. Evaluate $\int e^{6x}\,dx$.

ciii. Differentiate $y = (\ln x)^{\sin x}$ with respect to x.

xiv. Find the Maclaurin series of $f(x) = \cos x$.

xv. Find the intervals on which $f(x) = 2x^3 + 3x^2 - 36x$ is increasing or decreasing.

cvi. Find the second derivative of $y = 5x^4 - 3x^3 + 8$

Subjective Part (4*12)

Q. No. 2 Find the slope of the tangent to the curve $y = \frac{1}{\sqrt{x}}$ at the point where $x = a$ and a equations of the tangent lines at points (1,1) and (4, 1/2).

Q. No. 3 Evaluate $\int \sqrt{1+x^2}\; x^5\,dx$.

Q. No. 4 Evaluate $\int_0^2 |2x-1|dx$.

Q. No. 5 Find y'' by implicit differentiation $\sqrt{x} + \sqrt{y} = 1$.

Q. No. 6 Find position of particle if $a(t) = t^2 - 4t + 6$, $S(0) = 0$, $S(1) = 20$.

Q. No. 7 Differentiate $y = (\mathrm{Tan}\,x)^{Cotx} + (Cotx)^{\mathrm{Tan}\,x}$.

University Of Sargodha

BS 1st Semester Examination2018

Subject: I.T

Course: Basic Electronics (Phy: 2210)

Time allowed: 2:30 hours

Maximum Marks: 80

Objective Part (Compulsory)

Q.1 Attempt all questions. Each question has equal marks (2x16=32)

(i) Why cells are connected in series and parallel combination?
(ii) Define silicon controlled rectifier?
(iii) Define transistor. How it is biased for normal operation?
(iv) Define proportional current formula for a parallel circuit?
(v) What is behaviour of semiconductor at 0K?
(vi) What is net charge on P-type and N-type material?
(vii) What is difficulty in testing weather tungsten filament lamp obeys ohm law or not?
(viii) In a semiconductor material why electrons are more mobile than holes?
(ix) What is the resistance of a resistor having yellow, violet, orange and silver bands respectively?
(x) Differentiate between step up and step down transformer.
(xi) What is the effect of temperature on resistance of a resistor?
(xii) Draw symbols for a PNP and NPN transistor.
(xiii) What is a rheostat? Give its common use.
(xiv) Differentiate between regulated and unregulated power supply?
(xv) Define permeability of a magnetic material?
(xvi) How optical fiber communication is different from electronic communication?

Subjective Part: (12x4=48)

Attempt any four questions. All questions carry equal marks.

Q.2 (a) Define capacitor and its capacitance. Discuss the factors controlling the capacitance of a Capacitor. (6)

(b) Discuss behaviour of capacitor when connected in parallel. (6)

Q.3 (a) What is a transformer? Give its principle and types on the basis of construction. (6)

(b A power transformer has 100 primary turns and 600 secondary turns. If primary voltage is 120volt and full load primary current is 12 Amp, find

i) secondary voltage V2 (2+2)

University of Sargodha

BS 1st Semester, Final Term Exam 2018

Subject: I. T **Course: Basic Electronics (PHY: 2210)**

ne Allowed: 2:30 Hours **Maximum M**

te: Objective part is compulsory. Attempt any four questions from subjective part.

Objective Part (Compulsory)

. Write short answers of the following in 2-3 lines each. (2*
(i) Define a linear resistor? Draw its V-I curve?
(ii) Find resistance value and tolerance rate of blue-white-gold-silver?
(iii) What is the effect of doping on width of depletion layer?
(iv) Draw schematic energy band diagram of a P-type extrinsic semiconductor?
(v) What is Zener breakdown in reverse biased P-N junction?
(vi) Do pure semiconductors obey ohms law?
(vii) Draw symbols of an air-core and an iron-core inductor.
(viii) Why optical fibres are better than metallic wires?
(ix) What are thermally generated charge carriers?
(x) In a transistor why emitter is heavily doped? and collector is lightly doped.
(xi) Describe a circuit which provides continuously varying potentials?
(xii) What is the behavior of semi conductor at zero degree Kelvin?
(xiii) Define capacitance of a capacitor and its unit.
(xiv) What should be the features of outside protection provided to an optical fiber?
(xv) Ten resistors each having resistance 1/R are connected in parallel. What is their resistance?
(xvi) What is LED?

Subjective Part: (12*4)

(a) How P-N junction diode is forward and reverse biased? Draw VI characteristic c
Junction diode.
(b) What are intrinsic semiconductors? What is their behaviour at 0K and at room te
(i.e. 300K) What is their response to electric field.
involved in photomultiplier tube

School

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University of Sargodha

BS 1st Term/Semester Examination 2020

Subject: Information Technology Paper: Calculus & Analytical Geometry (MATH-101)

Time Allowed: 02:30 Hours Maximum Marks: 80

Note: Objective part is compulsory. Attempt any three questions from subjective part.

Objective Part (Compulsory)

(16*2)

Q.1. Write short answers of the following in 2-3 lines each on your answer sheet.

i. Find the domain and range of $f(x)=1+x^2$.

ii. Solve the inequality $8-3x\geq 5$.

iii. Evaluate $\lim_{x\to 0}\frac{\tan 2x}{x}$.

iv. Find $\frac{dy}{dx}$ if $y=(\sin x+\cos x)\sec x$.

v. Find an anti derivative of x^4+3.

vi. Find the derivative of exponential function.

vii. Let $\mathbf{u}=(0,-1)$ and $\mathbf{v}=(-2,0)$, then find the magnitude of vector $\mathbf{u}-\mathbf{v}$.

viii. Find the angle between the vectors $\mathbf{u}=3\mathbf{i}+\mathbf{j}-\mathbf{k}$ and $\mathbf{v}=2\mathbf{j}-\mathbf{k}$.

ix. Find $\mathbf{u}\times\mathbf{v}$ if $\mathbf{u}=\mathbf{j}+\mathbf{k}$ and $\mathbf{v}=-4\mathbf{i}+\mathbf{k}$.

x. Find the foci and directrix of the parabola $y^2=2x+1$.

xi. Convert the point $\left(\sqrt{3},\frac{\pi}{4}\right)$ into cartesian coordinates.

xii. Write the formula of $Coshx$.

xiii. Write the formula of derivative of $Sinh^{-1}x$.

xiv. Write the equation of ellipse in polar coordinates.

xv. Five examples of two transcendental numbers.

xvi. Check the convergence of the series $\sum_{n=1}^{\infty}\frac{1}{n^2}$.

Subjective Part (3*16)

Q.2. a) Find the length and direction of $\mathbf{u}\times\mathbf{v}$ and $\mathbf{u}\times\mathbf{v}$, if $\mathbf{u}=2\mathbf{i}+3\mathbf{j}$ and $\mathbf{v}=-\mathbf{i}+\mathbf{j}$.

b) Find the foci and vertices and sketch the graph of $\frac{x^2}{9}+\frac{y^2}{8}=1$.

Q.3. a) For what values of a, m and b, the function

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

is continuous.

b) Evaluate the integral

$$\int_0^{\pi/4}\tan x\sec^2 x\,dx.$$

Q.4. a) Find $\frac{dy}{dx}$ if $x=\frac{1}{t}$, $y=\sqrt{t}e^{-t}$.

b) Find the extreme values of the function x^3-2x+4, and where they occur?

Q.5. a) Find the area of the regions enclosed by $y=2x$, $y=0$ and $x=1$.

b) Find the area of a triangle determined by the points $P(1,-1,2)$, $Q(2,0,-1)$ and $R($

Q.6. a) Find the derivative of $f(x)=\tanh(1+e^{2x})$.

b) Show that the area of a circle is πr^2.

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ctivity is 2.12 S/m. What is its resistivity?

University of Sargodha

BS 1st Term/Semester Exam 2020

Subject: Mathematics Paper: Elements of Set Theory & Mathematical Logic (MATH-193) Maximum Marks

Time Allowed: 2:30 Hours

Note: Objective part is compulsory. Attempt any four questions from subjective part.

Objective Part (Compulsory)

Q. No. 1 Write short answers of the following in 2-3 lines each on your answer sheet. (2*

i. What do you meant by Hasse diagram?
ii. What is difference between symmetric and anti-symmetric relations?
iii. State the division algorithm.
iv. Define an integer function.
v. Define G.C.D of two numbers.
vi. Define an equivalence relation and give an example on the set $A=\{1, 2, 3\}$.
vii. Define symmetric closure.
viii. Define partition of a set with example.
ix. Define the term power of continuum.
x. State Schroeder-Burstein theorem.
xi. Let n be finite cardinal number, then $n+N_0=N_0$.
xii. For cardinal numbers α,β,γ, show that $\alpha(\beta+\gamma)=\alpha\beta+\alpha\gamma$.
xiii. Draw Hasse diagram of set $A=\{1,2,3,4,6,8,9,12,24\}$ by the relation "x divides y" and ident
xiv. first, last, maximal and minimal elements.
xv. Define initial segment.
xvi. What is difference between cardinal and ordinal numbers?
xvii. What is difference between first and minimal element.

Subjective Part (4*12)

Q.No.2 If A and B are finite sets, then show that $n(A\cup B)=n(A)+n(B)-n(A\cap B)$.
Q.No.3 Prove that the unit interval $I=[0, 1]$ is not denumerable.
Q.No.4 Every infinite set contains a subset which is denumerable.
Q.No.5 Prove that $\mathbb{C}=2^{\aleph_0}$.
Q.No.6 State and prove Cantors theorem.
Q.No.7 Show that the argument is valid $p\to q, \neg q\vdash p$.

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BS 1st Term Examination 2019

Subject: S.E/C.S/I.T Paper: Programming Fundamentals (CMP-2122)

Maximum Marks: 60

Time Allowed: 2:30 Hours

Note: Objective part is compulsory. Attempt any three questions from subjective part.

Objective Part (Compulsory) (12*2)

Q.1. Write short answers of the following in 2-3 lines each on your answer sheet.

i. What is **preprocessor** directive?
ii. Write three rules of **declaring an identifier** in C program.
iii. Differentiate **for** and **while** loop?
iv. What are **primitive data** types? Shortly discuss one of them.
v. Evaluate the expression: 8+12-4*2*(5-1)-1)
vi. What is difference b/w **prefix** & **postfix** operators?
vii. What is meant by **fatal error**?
viii. Difference b/w **Prototype** and **definition** of a function.
ix. What is the purpose of **getch()** ?
x. Differentiate 1-D array and 2-D array.
xi. What is a **pointer**?
xii. In file-processing why a programmer use **fgets** and **fputs** functions in C program.

Subjective Part (3*12)

Q.2. Write a program to calculate the **net pay** of an employee. Input the **basic pay**, **pass** the basic pay to the **user defines** function **PayCalculate ()**, **calculate the net pay** and **return** to main function. Calculate the net pay of an employee:

- **House rent** is 45% of the basic.
- **Medical allowance** is 5% of basic pay if basic pay **is greater** than Rs.4000/-. It is 7% of basic pay if the basic pay is **less or equal** than Rs.4000/-.
- **Conveyance allowance** is Rs.91/-.If basic pay is **less than or equal** Rs.4000/-.It is Rs.153/-if the basic pay is **more than** Rs.4000/-.
- Net pay is calculated by **adding basic pay**, **medical allowance**, **conveyance allowance** and **house rent**.

Q.3. Write a program that stores 10 values in an array of type integer. The array and its size is passed to the user define function that finds the sum of all those values which are less than the average of all values of the array. The sum is displayed by the main function.

Q.4. Write a program that accepts two integer numbers from the user. Pass these numbers to user define function as arguments. The function calculate their **multiplication** by using **recursion**. **Hint** (multiply (int a, int b); where **a** and **b** are both positive integers, but you can only use the + or – operators for completion of this task.

Q.5. Write a program that create a structure **Person** which represents fields by float **income**, integer **taxRate** and float **PaidTax**. Define one structure variable of Person, inputs **incomes** and **tax rate** of Person from the user. Program calculate paid tax of person and then pass structure variable to user define function **ShowRecord(Person)**. The function print the record of person on the screen.

Q.6. Assuming that a text file named **Book.txt** contains some text written into it, write a function named **CopyLower ()**, that reads the file **Book.txt** and create a new file named **newbook.txt** contains all words from the file **Book.txt** in **lowercase**. (Hint **tolower ()** function converts the uppercase letter in C/C++ to the corresponding lowercase letter).

University of Sargodha

BS 1st Semester Exam 2019

Subject: Mathematics Paper: Calculus-I (MATH-191)

Time Allowed: 2:30 Hours **Maximum M**

Objective Part (Compulsory)

Q.1) Give short answers of the following questions

1. Find $\lim_{x\to\infty}\sqrt{x^2+3}-x$.
2. Prove that $\lim_{x\to\infty}\frac{|x|}{x}$ does not exist.
3. Evaluate $\lim_{x\to-1}[[x]]$, where $[[x]]$ is greatest integer function.
4. What is (ϵ,δ) definition of limit.
5. Find equation of the tangent line to the parabola $y=x^2$ at the point P(1,1).
6. Differentiate $y=\frac{x^2}{1+x^3}$ at $(1,\frac{1}{2})$
7. Find $f'(x)$ if $f(x)=\sqrt{\sin x}$
8. Compare the values of Δy and dy if $y=x^3+x^2-2x+1$ and x changes from 2 to
9. Differentiate $y=x^{\tan x}$.
10. State Roll's theorem.
11. What is the difference between local and absolute maximum values of a function.
12. What are critical points of a function?
13. What is first derivative test?
14. What are vertical asymptote of a function?
15. What is a continuous function?
16. Why the function $f(x)=|x|$ is not differentiable?

Subjective part (4x 12)

Attempt any 4 questions

Q.2) Find where the function $f(x)=3x^4-4x^3-12x^2+5$ is increasing and where it

Q.3) Prove the statement using the (ϵ,δ) definition of limit.

$$\lim_{x\to 2}(x^2+2x-7)=1$$

Q.4) Suppose that a ball is dropped from the upper observation deck of CN tower 45
ground.

(a) What is the velocity of the ball after 5 seconds?
(b) How fast is the ball traveling when it hits the ground?

Q.5) Find y' if $x^3+y^3=6xy$. Find the tangent to the folium of Descarte $x^3+y^3=$
At what point in the first quadrant is the tangent line horizontal?

Q.6) State and prove Mean value theorem.

Q.7) Use the mid point rule with $n=5$ to approximate $\int_1^2\frac{1}{x}dx$. Explain by drawing
function.

1281

University of Sargodha

BS 1st Term Examination 2013

Subject: Computer Science Paper: Introduction to ICT (ICT-101)

Time Allowed: 1.30 Hours Maximum

Objective Part Compulsory

3×10

Q. 1: Answer the following question briefly

i. What is file manager?
ii. What is wireless access point?
iii. Define Bridge
iv. What is Router?
v. Define database
vi. FAT stands for
vii. What are smart cards?
viii. What is primary key?
ix. Define flow chart
x. What is software license?
xi. Define internet security risks
xii. What is ethics in computing?
xiii. Write names for any two storage devices.
xiv. Write names for any two output devices
xv. Write names of any two application software's.
xvi. WAN stands for?

Subjective Part

3×1

Attempt any three questions out of five

Q2. What are output devices? Explain any three in detail.

Q3. What is system unit? Explain ports, connectors, buses, in detail.

Q4. What is the role of internet in the society? Explain its disadvantages in detail.

Q5. What is database management system? Explain multi dimensional and web databases in

Q6. What is ICT? Explain communication devices in detail.

University of Sargodha

BS 1st Term Examination 2017

Subject: Computer Science/Software Engineering/Information Technology

Paper: Calculus & Analytical Geometry (Math-2213)

Time Allowed: 2:30 Hours **Maximum Marks:**

Note: **Objective part is compulsory. Attempt any four questions from subjective part.**

Objective Part (Compulsory) (16*2)

Q.1. Write short answers of the following questions each in 2-3 lines.

i. Evaluate $\lim_{x\to\infty} x\sin\frac{1}{x}$.

ii. If $|x|\le 1$, then find the values of x.

iii. Solve the inequality $4(x-1)<5(x-2)$.

iv. Find the third derivative of $y=5x^4-2x^3+8+0$.

v. What is the slope of vertical line?

vi. Whether the function $y=\frac{x^2}{x^2-1}$ is even or odd or not.

vii. Find the domain and range of $y=\sqrt{x-1}$.

viii. What is difference between odd and even functions?

ix. If $y=\sin^2(\pi x-2)$, then find $\frac{dy}{dx}$.

x. Discuss the function $f(x)=x^3$ is either increasing or decreasing or not.

xi. Find the radius and center of the circle $x^2+y^2+4x-4y+4=0$.

xii. Evaluate $\int_0^{\pi/2}\cos x dx$.

xiii. Find the equation of tangent line at $(0,b)$ with slope x.

xiv. If $f(x)=\sqrt{x}$, then find $f'(25)$.

xv. Evaluate $\lim_{x\to 5}\frac{x-5}{\sqrt{x}-\sqrt{5}}$.

xvi. Evaluate $\int_{-1}^{1}|x|dx$.

Subjective Part (4*12)

Q.2. Find the area of the region bounded by the parabola $y=2-x^2$ and the line $y=-x$.

Q.3. Find the extreme values of $f(x)=2x^3-15x^2+36x-10$.

Q.4. Evaluate $\int\frac{\cos\sqrt{\theta}}{\sqrt{\theta}\sin^3\sqrt{\theta}}d\theta$.

Q.5. Evaluate the integral $\int\frac{x}{1+x^4}dx$.

Q.6. If $y=\left(\sin^{-1}x\right)^2$, then prove that $\left(1-x^2\right)y''-xy'-2=0$.

Q.7. Evaluate $\int x^2\tan^{-1}xdx$.

University of Sargodha

BS 1st Term Examination 2017

Subject: Computer Science/Software Engineering/Information Technology

Paper: Calculus & Analytical Geometry (Math: 2213)

Time Allowed: 2:30 Hours **Maximum Marks: 80**

Note: **Objective part is compulsory. Attempt any four questions from subjective part.**

Objective Part (Compulsory)

Q.1. Write short answers of the following questions each in 2-3 lines. (16*2)

i. Evaluate $\lim_{x\to\infty} x\sin\frac{1}{x}$.

ii. If $|x|\le 1$, then find the values of x.

iii. Solve the inequality $4(x-1)<5(x-2)$.

iv. Find the third derivative of $y=5x^4-3x^2+8x+20$.

v. What is the slope of vertical line?

vi. Whether the function $y=\frac{1}{x^2}$ is even or odd or not.

vii. Find the domain and range of $y=\sqrt{x-1}$.

viii. What is difference between odd and even functions?

ix. If $y=\sin^2(\pi x-2)$, then find $\frac{dy}{dx}$.

x. Discuss the function $f(x)=x^3$ is either increasing or decreasing or not.

xi. Find the radius and center of the circle $x^2+y^2+4x-4y+4=0$.

xii. Evaluate $\int_0^{\pi/2}\cos x\,dx$.

xiii. Find the equation of tangent line at $(0,6)$ with slope 4.

xiv. If $f(x)=\sqrt{x}$, then find $f'(25)$.

xv. Evaluate $\lim_{x\to 5}\frac{x-5}{\sqrt{x}-\sqrt{5}}$.

xvi. Evaluate $\int_{-2}^{2}|x|\,dx$.

Subjective Part (4*12)

Q.2. Find the area of the region bounded by the parabola $y=2-x^2$ and the line $y=-x$.

Q.3. Find the extreme values of $f(x)=2x^3-15x^2+36x-10$.

Q.4. Evaluate $\int_0^{\pi/2}\frac{\sin x\cos x}{\sqrt{1+\sin^2 x}}dx$.

Q.5. Evaluate the integral $\int\frac{x}{1+x^4}dx$.

Q.6. If $y=\sqrt{\sin^{-1}x}$, then prove that $(1-x^2)y_2-xy_1-\frac{1}{4}y=0$.

Q.7. Evaluate $\int\tan^{-1}x\,dx$.

University of Sargodha

BS 1st Semester Examination 2016

Subject: Mathematics **Paper: Calculus-I (Math: 101)**

Time Allowed: 2:30 Hours **Maximum Marks:**

Objective Part (Compulsory)

Q.1. Write short answers of the following in 2-3 lines each. (2*16)

(i)	Explain why the limit $\lim_{x\to 0}\frac{x}{\|x\|}$ does not exist.
(ii)	If $y = u^2 + 2$ and $u = 2x - 1$, then find $\frac{dy}{dx}$.
(iii)	Find the limit $\lim_{x\to 0} x\sin(\frac{1}{x})$.
(iv)	Find the average value of $f(t) = 3t^2 - t^3$ over the interval $-1 \leq$
(v)	Does the curve $y = x^4 - 2x^2 + 2$ have any horizontal tangents? If so where?.
(vi)	$\int_0^1 \sqrt{x^2 - 2x + 1}dx$.
(vii)	Find the derivatives of all orders of the function $y = \frac{x^4}{3} - \frac{3x^3}{2} - x$.
(viii)	If $x^2 + xy - y^2 = 4$, then find $\frac{dy}{dx}$.
(ix)	Find the linearization of $f(x) = \sqrt{1+x}$ at $x = 0$.
(x)	Find $\frac{d}{dx}\int_a^x \cos(2\pi u)du$.
(xi)	Evaluate $\lim_{x\to 0}\frac{x-\sin x}{x^3}$.
(xii)	Find the intervals on which the function $f(x) = x^3 + 12x - 24$ is increasing.
(xiii)	Find $\int x^{\frac{1}{2}}\sin(x^{\frac{3}{2}} + 1)dx$.
(xiv)	Find y if $\frac{dy}{dx} = 2y^2$, $y(1) = -1$.
(xv)	Find $\frac{dy}{dx}$ if $y^2 = x^3 + \sin(xy)$.
(xvi)	If the derivative of a function f is $\frac{x^4(x-2)}{x+3}$. Find the critical points of f.

P.T.O.

University of Sargodha

BS 1st Term Examination 2015

[illegible] Computer Science   Paper: Calculus and Analytical Geometry (MATH-[illegible])

Time Allowed: 2:30 Hours   Maximum Marks: 50

Note: Objective part is compulsory. Attempt any three questions from subjective part.

Objective Part (Compulsory)

Q.1 Write short answers of the following in 2-3 lines each on your answer sheet. (16*2)

- i. What is the domain and range of the function $\sqrt{1-x}$?
- ii. Define piecewise –defined function with example.
- iii. What functions have inverses? How do you know if two functions f and g are inverses of one another?
- iv. Define precise definition of limit.
- v. If g(x)=x-7 and f(x)=8x then find $f(g(x+1))$
- vi. State the sandwich theorem.
- vii. Define the Horizontal line test for one –to-one function.
- viii. What are horizontal and vertical asymptotes? Give example.
- ix. Define the linearization of the function at the point.
- x. Differentiate $f(x)=x^{[illegible]}$, $x>0$.
- xi. Define the general power rule for derivatives.
- xii. Define local maximum and local minimum.
- xiii. State the Cauchy mean value theorem.
- xiv. How do find the distance from a point to the line in space?
- xv. Give a geometric description of the points in space $x^2+y^2=4, z=0$.
- xvi. Find parametric equations for line through the point P (-2, 0, 3) and Q (3, 5,-2).

Subjective Part (3*10)

Q.2. (i) Find the vector projection of $\mathbf{u}=6i+2j+3k$ *onto* $\mathbf{v}=i-2j-2k$ and the scalar component of **u** in the direction of **v**.

(ii)Find parametric equations for the line through $P(-3,2,-3)$ and $Q(1,-1,4)$.

Q.3. (i) State and prove **The Mean value theorem.**

(ii)Sketch the graph of the differentiable function $y=f(x)$ that has a local minimum at (1,1) and local maximum at (3,3)

Q.4. (i) Does the curve $y=x^4-2x^2+2$ have any horizontal tangents? If so, where?

(ii) Find the values of a that makes the following function differentiable for all x-values.

$$f(x)=\begin{cases} ax & if\ x<0 \\ x^2-3x & if\ x\geq 0 \end{cases}$$

Q.5. (i)Find the inverse of the function $y=x^2$, $x\geq 0$, expressed as a function of x.

(ii) Using Sandwich theorem, find the horizontal asymptote of the curve $y=2+\frac{\sin x}{x}$.

Q.6. (i) A hot –air balloon ascending at the rate of $12\ ^{ft}/_{sec}$ is at a height 80ft above the ground when a package is dropped. How long does it take the package to reach the ground?

(ii)Find the indefinite integral $\int \frac{\sqrt{t}+t\sqrt{t}}{t^2}\,dt$.

University of Sargodha

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BS 1st Term Examination 2015

Subject: Mathematics Paper: Calculus-I (Math-101)

Maximum Marks: 80

Time Allowed: 2:30 Hours

Note: Objective part is compulsory. Attempt any FOUR questions from subjective part.

Objective Part (16*2)

Q. No. 1

i. What is the difference between exponential and logarithmic functions?

ii. Show that $\lim_{x\to 0}|x|=0$.

iii. Show that $\lim_{x\to 0}x^2\sin\frac{1}{x}=0$.

iv. If $f(x)=\begin{cases}x^2 & \text{if } x \text{ is rational}\\ 0 & \text{if } x \text{ is irrational}\end{cases}$, prove that $\lim_{x\to 0}f(x)=0$

v. What do you mean by the derivative of a function?

vi. Differentiate $y=\sqrt{\sec x^3}$ w.r.t.x.

vii. Find $\frac{dy}{dx}$ when $x=\cos t, y=1+\sin t$ at $t=\frac{\pi}{2}$.

viii. Find $\frac{dy}{dx}$ when $y\sin\frac{1}{y}=1-xy$

ix. Find the intervals on which $f(x)=\sin x+\cos x,\ 0\le x\le 2\pi$ is increasing or decreasing.

x. Find what values of c is the function $cx+\frac{1}{x^2+1}$ increasing on $(-\infty,\infty)$.

xi. A particle is moving with the $v(t)=2t-\sin t,\ s(0)=3$. Find the position of the particle.

xii. State the fundamental theorems of calculus.

xiii. Evaluate $\int x^{\frac{1}{2}}\sin\left(x^{\frac{3}{2}}+1\right)dx$.

xiv. Evaluate $\int_2^4\frac{2\ln x}{x}dx$.

xv. Evaluate $\int\frac{ydy}{\sqrt{1-y^4}}$

xvi. Find equation of tangent line to curve $y^2+y=\frac{2+x}{1-x}$ at point $P(0,1)$.

Subjective Part (4*12)

Q. No. 2 Prove that $\lim_{\theta\to 0}\frac{\sin\theta}{\theta}=1$, where θ is measured in radian.

Q. No. 3 Find the absolute maximum and absolute minimum values of

$$f(x)=xe^{-x/8},\ [-1,4]$$

Q. No. 4 (i) Find $\frac{dy}{dx}$ when $y=\left(1+\cot\frac{1}{x}\right)^{-3}$ (ii) Evaluate $\int\frac{\cos\sqrt{\theta}}{\sqrt{\theta}\sin^2\sqrt{\theta}}d\theta$.

Q. No. 5 (i) Evaluate $\int_{-1}^{1}3x^3\sqrt{x^2+1}dx$ (ii) Evaluate $\int_0^5\frac{\log_3(x+2)}{x+2}dx$

Q. No. 6 Find the area of the region bounded by the curves

$$y=\sin x,\ y=\cos x,\ x=0,\text{ and } x=\pi/2.$$

Q. No. 7 (i) Evaluate $\int\frac{dt}{(t+1)\sqrt{t^2+2t-8}}$ (ii) Find $\frac{dy}{dx}$ when $y=\int_{\sin x}^{1}\sqrt{1+t^3}dt$

University of Sargodha

BS(CS) 1st Term final Exam 2015

Subject: BS(CS) Course: Basic Electronics (PHY-2210)

Time Allowed: 2:30 Hours Maximum Marks: 80

Note: Objective part is compulsory. Attempt any four questions from subjective parts.

Objective Part (16 x 2 = 32)

Q. 1 Write short answers of the following questions in 2-3 lines only

i) What is zero reference level? why we need it during voltage measurements at different points in electric circuits

ii) Differentiate transition capacitance and diffusion capacitance?

iii) Why PIN Photodiodes have faster response than even the P-N Photodiode?

iv) Why we need filters in the electronics circuits?

v) Which factors control the capacitance of the capacitor?

vi) The colour of light emitted by LED depends on what?

vii) What is effect of temperature on barrier voltage?

viii) Why electrons have greater mobility than holes in a semiconductor material?

ix) Distinguish between drift speed and Fermi speed?

x) Explain effect of doping on semiconductor

xi) In an optical fiber why refractive index of core is kept higher than cladding?

xii) Draw symbols of an air-core and ad iron-core inductor?

xiii) Under what condition a transistor can operate in active region.

xiv) Define Solar cell? Draw its symbol.

xv) What are carrier waves?

xvi) What is Amplitude modulation?

Subjective Part. (4 x 12 = 48)

Q. 2(a) Define inductor. Explain Mutual Inductance in detail. (8)

(b) Calculate the inductive reactance offered by a coil of inductance 250μH to radio frequency currents of frequencies (i) 1MHz (ii) 10MHz (4)

Q. 3 Define series circuit? Explain characteristics of a series resistive circuit? (6)

(a) A 12V battery of negligible internal resistance is connected across a parallel combination of 4K, 6K, and 12K resistors. Compute

(i) Combined circuit resistance (ii) Current supplied by the battery

(iii). Power supplied by the battery (6)

Q. 4(a) What is Transformer? Explain principle, construction, working of Transformer (8)

(b) A power transformer has 100 primary turns and 600 secondary turns. If primary voltage is 120V and full load primary current is 12A. Find secondary

(i) Voltage V_2 (ii) current I_2 (4)

Q. 5 What is P-N Junction? Explain Forward and Reverse Voltage Current Characteristics of a P-N junction (12)

Q. 6(a) Explain Transistor biasing for the proper working of a PNP and NPN transistor (6)

(b) Following readings are obtained in transistor circuit of CB Configuration (6)

$I_E = 1mA$, $\alpha = 0.95$

Find the values of I_B and I_C

Q. 7 Define Modulation? Discuss Frequency modulation in detail. (12)

University of Sargodha

BS 1st Term Examination 2019

Subject: Computer Science Paper: Calculus and Analytical Geometry (BS-CS-Alevel)

Time Allowed: 3:00 Hours Maximum Marks: 80

Note: Objective part is compulsory. Attempt any three questions from subjective part.

Objective Part (Compulsory)

Q.1 Write short answers of the following in 2-3 lines each on your answer sheet. (10*2)

i. What is the domain and range of the function $\sqrt{4-x}$.
ii. Define piecewise –defined function with example.
iii. What functions have inverses?How do you know if two functions f and g are inverses of one another?
iv. Define precise definition of limit.
v. If $g(x)=x^2$ and $f(x)=3x$ then find $f\circ g(x^2)$.
vi. State the sandwich theorem.
vii. Define the Horizontal line test for one–to-one function.
viii. What are horizontal and vertical asymptotes? Give example.
ix. Define the linearization of the function at the point.
x. Differentiate $f(x)=x^n,\ x>0$.
xi. Define the general power rule for derivatives.
xii. Define local maximum and local minimum.
xiii. State the Cauchy mean value theorem.
xiv. How do find the distance from a point to the line in space?
xv. Give a geometric description of the points in space $x^2+y^2=4, z=0$.
xvi. Find parametric equations for line through the point P (-2, 0, 3) and Q (3, 5,-2).

Subjective Part (3*16)

Q.2. (i) Find the vector projection of $\mathbf{u}=6\boldsymbol{i}+2\boldsymbol{j}+3\boldsymbol{k}$ **onto** $v=\boldsymbol{i}-2\boldsymbol{j}-2\boldsymbol{k}$ and the scalar component of **u** in the direction of v.
(ii)Find parametric equations for the line through $P(-3,2,-3)$ *and* $Q(1,-1,4)$.

Q.3. (i) State and prove**The Mean value theorem.**
(ii)Sketch the graph of the differentiable function $y=f(x)$ that has a local minimum at (1,1) and local maximum at (3,3)

Q.4. (i) Does the curve $y=x^4-2x^2+2$ have any horizontal tangents? if so, where?
(ii) Find the values of a that makes the following function differentiable for all x-values.

$$f(x)=\begin{cases} ax, & if\ x<0 \\ x^2-3x & if\ x\geq 0 \end{cases}$$

Q.5. (i)Find the inverse of the function$y=x^2,\ x\geq 0$, expressed as a function of x.
(ii) Using Sandwich theorem, find the horizontal asymptote of the curve $y=2+\frac{\sin x}{x}$.

Q.6. (i) A hot –air balloon ascending at the rate of $12\ ^{ft}/_{sec}$ is at a height 80ft above the ground when a package is dropped. How long does it take the package to reach the ground?
(ii)Find the indefinite integral $\int \frac{\sqrt{2}+\sqrt{t}}{t^3}dt$.

University of Sargodha

BS 1st Semester Exam 2019

Subject: Mathematics Paper: Calculus-I (MATH- 101)

Maximum Marks: 80

Time Allowed: 2:30 Hours

Objective Part (Compulsory)

Q.1: Give short answers of the following questions.

1. Find $\lim_{x\to 0}\frac{\sqrt{x+2}-\sqrt{2}}{x}$.
2. Prove that $\lim_{x\to 0}\frac{|x|}{x}$ does not exist.
3. Evaluate $\lim_{x\to 1^-}\frac{x}{[x]}$, where $[x]$ is greatest integer function.
4. What is (ϵ,δ) definition of limit.
5. Find equation of the tangent line to the parabola $y=x^2$ at the point P(1,1).
6. Differentiate $y=\frac{x^2}{1+x^3}$ at $(1,\frac{1}{2})$
7. Find $f'(x)$ if $f(x)=\sqrt{\sin x}$.
8. Compare the values of Δy and dy if $y=x^3+x^2-2x+1$ and x changes from 2 to 2.05.
9. Differentiate $y=x^{\pi}$.
10. State Roll's theorem.
11. What is the difference between local and absolute maximum values of a function.
12. What are critical points of a function?
13. What is first derivative test?
14. What are vertical asymptote of a function?
15. What is a continuous function?
16. Why the function $f(x)=|x|$ is not differentiable?

Subjective part (6 x 12)

Attempt any 6 questions

Q.2) Find where the function $f(x)=3x^4-4x^3-12x^2+2$ is increasing and where it is decreasing.

Q.3) Prove the statement using the (ϵ,δ) definition of limit.

$$\lim_{x\to 2}(x^2+2x-7)=1$$

Q.4) Suppose that a ball is dropped from the upper observation deck of CN tower 450m above the ground.

(a) What is the velocity of the ball after 5 seconds?
(b) How fast is the tall traveling when it hits the ground?

Q.5) Find y' if $x^3+y^3=6xy$. Find the tangent to the folium of Descarte $x^3+y^3=6xy$ at $(3,3)$. At what point in the first quadrant is the tangent line horizontal?

Q.6) State and prove Mean value theorem.

Q.7) Use the mid point rule with $n=8$ to approximate $\int_1^2 \frac{1}{x}dx$. Explain by drawing graph of the function.

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BS 1st Term Examination 2015

Subject: Mathematics Paper: Calculus-I (Math-101)

Time Allowed: 2:30 Hours Maximum Marks: 80

Note: Objective part is compulsory. Attempt any FOUR questions from subjective part.

Objective Part (16*2)

Q. No. 1

i. What is the difference between exponential and logarithmic functions?

ii. Show that $\lim_{x\to 0} |x| = 0$

iii. Show that $\lim_{x\to 0} x^2 \sin\frac{1}{x} = 0$

iv. If $f(x) = \begin{cases} x^2 & \text{if } x \text{ is rational} \\ |x| & \text{if } x \text{ is irrational} \end{cases}$, prove that $\lim_{x\to 0} f(x) = 0$

v. What do you mean by the derivative of a function?

vi. Differentiate $y = \sqrt{\tan x^2}$ w.r.t.x.

vii. Find $\frac{dy}{dx}$ when $x = \cos t, y = 1 + \sin t$ at $t = \frac{\pi}{2}$

viii. Find $\frac{dy}{dx}$ when $y \sin\frac{1}{y} = 1 - xy$

ix. Find the intervals on which $f(x) = \sin x + \cos x$, $0 \le x \le 2\pi$ is increasing or decreasing.

x. Find what values of c is the function $cx + \frac{1}{x^2+1}$ increasing on $(-\infty, \infty)$

xi. A particle is moving with the $v(t) = 2t - \sin t$, $s(0) = 3$. Find the position of the particle.

xii. State the fundamental theorems of calculus.

xiii. Evaluate $\int x^{15} \sin(x^8 + 1)dx$.

xiv. Evaluate $\int_1^4 \frac{2\ln x}{x} dx$

xv. Evaluate $\int \frac{xdx}{\sqrt{1-x^4}}$.

xvi. Find equation of tangent line to curve $y^2 + y = \frac{2+x}{1-x}$ at point $P(0,1)$

Subjective Part (4*12)

Q. No. 2 Prove that $\lim_{\theta\to 0} \frac{\sin\theta}{\theta} = 1$, where θ is measured in radian.

Q. No. 3 Find the absolute maximum and absolute minimum values of

$$f(x) = xe^{-x/8}, \quad [-1, 4].$$

Q. No. 4 (i) Find $\frac{dy}{dx}$ when $y = \left(1 + \cot\frac{t}{2}\right)^{-2}$ (ii) Evaluate $\int \frac{\cos\sqrt{\theta}}{\sqrt{\theta}\sin^2\sqrt{\theta}} d\theta$

Q. No. 5 (i) Evaluate $\int_{-1}^{0} 3x^2\sqrt{x^3+1}dx$ (ii) Evaluate $\int_2^3 \frac{\log_2(x-2)}{x-2} dx$

Q. No. 6 Find the area of the region bounded by the curves

$y = \sin x$, $y = \cos x$, $x = 0$, and $x = \pi/2$.

Q. No. 7 (i) Evaluate $\int \frac{dt}{(t+1)\sqrt{t^2+2t-8}}$ (ii) Find $\frac{dy}{dx}$ when $y = \int_{\sin x}^{1} \sqrt{1+t^2} dt$.

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BS 1st Term Examination 2019

Subject: S.E.C S.I.T Paper: Programming Fundamentals (CMP-2122)

Maximum Marks: 60

Time Allowed: 2:30 Hours

Note: Objective part is compulsory. Attempt any three questions from subjective part.

Objective Part (Compulsory) (12*2)

Q.1. Write short answers of the following in 2-3 lines each on your answer sheet.

i. What is **preprocessor** directive?
ii. Write three rules of **declaring an identifier** in C program.
iii. Differentiate **for** and **while** loop?
iv. What are **primitive data** types? Shortly discuss one of them.
v. Evaluate the expression: 8+2-4*2*(5-1)-1)
vi. What is difference b/w **prefix** & **postfix** operators?
vii. What is meant by **fatal error**?
viii. Difference b/w **Prototype** and **definition** of a function.
ix. What is the purpose of **getch()** ?
x. Differentiate 1-D array and 2-D array.
xi. What is a **pointer**?
xii. In file-processing why a programmer use **fgets** and **fputs** functions in C program.

Subjective Part (3*12)

Q.2. Write a program to calculate the **net pay** of an employee. Input the **basic pay**, **pass** the basic pay to the **user defines** function **PayCalculate ()**, **calculate the net pay** and **return** to main function. Calculate the net pay of an employee.

- **House rent** is 45% of the basic.
- **Medical allowance** is 5% of basic pay if basic pay **is greater** than Rs.4000/-. It is 7% of basic pay if the basic pay is **less or equal** than Rs.4000/-.
- **Conveyance allowance** is Rs.91/-.If basic pay is **less than or equal** Rs.4000/-.It is Rs.153/-if the basic pay is **more than** Rs.4000/-.
- Net pay is calculated by **adding basic pay**, **medical allowance**, **conveyance allowance** and **house rent**.

Q.3. Write a program that stores 10 values in an array of type integer. The array and its size is passed to the user define function that finds the sum of all those values which are less than the average of all values of the array. The sum is displayed by the main function.

Q.4. Write a program that accepts two integer numbers from the user. Pass these numbers to user define function as arguments. The function calculate their **multiplication** by using **recursion**. **Hint** (multiply (int a, int b); where **a** and **b** are both positive integers, but you can only use the + or – operators for completion of this task.

Q.5. Write a program that create a structure **Person** which represents fields by float **income**, integer **taxRate** and float **Paidtax**. Define one structure variable of Person, inputs **incomes** and **tax rate** of Person from the user. Program calculate paid tax of person and then pass structure variable to user define function **ShowRecord(Person)**. The function print the record of person on the screen.

Q.6. Assuming that a text file named **Book.txt** contains some text written into it, write a function named **CopyLower ()**, that reads the file **Book.txt** and create a new file named **newbook.txt** contains all words from the file **Book.txt** in **lowercase**. (Hint **tolower ()** function converts the uppercase letter in C/C++ to the corresponding lowercase letter).

University of Sargodha

BS 1st Term Examination 2018

Subject: Mathematics Paper: Calculus-I (Math:101)

Time Allowed: 2:30 Hours **Maximum Marks: 80**

(New Scheme)

Note: Objective part is compulsory. Attempt any four questions from subjective part.

Objective Part (Compulsory)

Q.1. Write short answers of the following in 2-3 lines each. (2*16)

i. Evaluate $\lim_{x\to\infty}(x-\ln x)$.

ii. Evaluate $\frac{f(x)-f(1)}{x-1}$, if $f(x)=\frac{x+2}{x+1}$.

iii. Evaluate $\lim_{x\to 1}\frac{x^2+x-2}{x^3-x}$.

iv. Find an equation of tangent line to the curve $f(x)=\sqrt{x}$ at the point $(1,1)$.

v. Find the critical numbers of the function $f(x)=x^{3/5}(4-x)$.

vi. Find the absolute maximum value of $f(x)=12+4x-x^2$ on $[0,5]$.

vii. What is the difference between concave upward and concave downward?

viii. Find the derivative of the function $f(x)=\int_0^x\sqrt{1+t^2}\,dt$.

ix. State the First Fundamental Theorem of Calculus.

x. Find $\frac{dy}{dx}$ when $x=\cos t, y=1+\sin t$ at $t=\frac{\pi}{2}$.

xi. Find the domain and range of $f(x)=\sqrt{9-x^2}$.

xii. Find dy when $y=\cos\left(\sqrt{x}\right)$.

xiii. Evaluate the integral $\int\frac{(\ln x)^2}{x}dx$.

xiv. Evaluate $\lim_{x\to\infty}x\sin\frac{1}{x}$ without using L' Hospital's Rule.

xv. Evaluate $\int_{-1}^{1}3x^2\sqrt{x^3+1}dx$.

xvi. Evaluate $\int\frac{\cos\sqrt{\theta}}{\sqrt{\theta}\sin^2\sqrt{\theta}}d\theta$.

Subjective Part (4*12)

2. State and prove the Roll's Theorem.

3. Find $\frac{dy}{dx}$ when $y=\left(1+\cot\frac{x}{2}\right)^{-2}$.

4. Evaluate $\int_0^3\frac{\log_3(x+3)}{x+3}dx$.

Prove that $\int_a^b t^2dt=\frac{b^3-a^3}{3}$ by using Riemann sum.

Evaluate $\int\frac{dt}{(t+1)\sqrt{t^2+2t-8}}$.

Evaluate $\int x^3\tan^{-1}x\,dx$.

University of Sargodha

BS 1st Term Examination 2016

Subject: Computer Science **Paper: Programming Fundamental (CMP-2122)**

Time Allowed: 2:30 Hours **Maximum Marks: 60**

Note: **Objective part is compulsory. Attempt any four questions from subjective part.**

Objective Part (Compulsory)

Q.1. Write short answers of the following questions in 2-3 lines only (12*2=24)

i. Evaluate the expression 50 / (6 + (8 - 4) * 2) + 15

ii. Write the name of two escape sequences and their functions.

iii. Give one example of implicit and explicit type casting?

iv. Is the following statement valid or invalid? Give reason whatever the case may be.

```
int 2abc = 6 ;
```

v. What does the following code display?

```
int p = 10, q = 3, r = -2;
if ((p+q) < 14 && (r < q - 3))
        printf("%d\n", r + 3);
else
printf("%d\n", p - 2);
```

vi. What is scope and life time of a static variable?

vii. Differentiate between while and do while loop?

viii. If ptr is a pointer to int, and i and j are variables of int, What is wrong in the statement?

```
ptr = &(i + j);
```

ix. What is the output?

```
int i , sum = 0;
for (i = 10, i >= 2; I = I + 2)
sum += i;
printf("%d", sum);
```

x. Is statement

```
int arr[5];
arr[] = {1,2,3,4,5};
```

valid? If it is wrong, write the correct statement.

xi. Declare an int variable and pointer to int in a single statement.

xii. Write a prototype of a function that passes an int-value, an int reference and returns a double value.

Subjective Part (4 * 9 = 36)

Q # 2: Write a program that accepts 10 integer values from user in an array and passes array to a function. The function finds the greatest value of the array and returns it to main() that displays the value.

Q # 3: Write a program declares a structure **Student** with data member rollno and age. Create two variables of structure, accept values and find the average age of these two students and display the average age.

Q # 4: Write a program that displays the sum of first four terms of the series.

$$\frac{1}{2!}+\frac{2}{3!}+\frac{3}{4!}+\frac{4}{5!}$$

Q # 5: Write a program to display the following pattern

```
5 4 3 2 1
5 4 3 2
5 4 3
5 4
5
```

Q # 6: Write a program that accepts a number from user and passes it to a function that determines whether the number is prime or composite. The result is displayed by main function.

Q # 7: Write a program that inputs obtained marks from a student, calculates the percentage(assuming total marks are 1100) and displays the grade. The grade should be calculated according to the following criterion.

Percentage	Grade
More than or equal 80	A+
Between 70 (inclusive) and 80	A
Between 60 (inclusive) and 70	B
Between 50 (inclusive) and 60	C
Between 40 (inclusive) and 50	D
Between 33 (inclusive) and 40	E
Less than 33	F

University of Sargodha

BS 1st Term Examination 2015

Subject: BS CS

Paper: Calculus & Analytical Geometry
(MATH-2213) (New Scheme)

Time Allowed: 2.30 Hours

Maximum marks: 80

Objective part (Compulsory)

Q.No.1 Write short answer of the following questions. (16*2=32)

1. Find the center and radius whose equation is given $x^2+y^2+4x-4y+4=0$
2. Convert into standard form of ellipse of the following equation $3(x-1)^2-6=2(y+2)^2$.
3. What is the slope of the vertical line?
4. Prove that $\cos(x-\pi/2)=\sin x$.
5. Find the domain and rang of $y=\sqrt{|x|}$
6. Prove that $\sin(x-\pi/2)=\cos x$.
7. If $y=\frac{1}{\sqrt{x-1}}$ then "y" is an increasing function or decreasing function.
8. Determine the function is even, odd and neither? $y=\sec x-\tan x$.
9. Define periodic function and if $y=\cos x$ then find its periodicity.
10. Solve the inequality $\frac{1}{5}(x-1)<\frac{1}{4}(x-2)$.
11. Evaluate $\lim_{x\to 9}\frac{\sqrt{x}-3}{x-9}$
12. What is domain of the following: $y=\begin{cases}-x-2, & -2\le x\le -1\\ x, & -1<x\le 1\\ -x+2, & 1<x\le 2\end{cases}$
13. If $f(z)=\frac{1-z}{2z}$, then slope of this curve at point $x=\sqrt{2}$.
14. What is range of the following: $y=\begin{cases}x-2, & -2\le x\le -1\\ x, & -1<x\le 1\\ -x+2, & 1<x\le 2\end{cases}$
15. Find second derivative of $f(x)=5x^4-3x^3+8$
16. Find $\frac{dy}{dx}$ of the function $\sqrt{xy}=1$.

Subjective Part

Attempt any three out of five questions (3*16=48)

Q.No.2 An arbitrary triangle with sides a, b and c. Opposite angles are A, B and C respectively. Find c if $a=2$, $b=3$, and $C=\frac{\pi}{4}$.

Q.No.3 Find the limit of the following $\lim_{x\to 0}\frac{x+x\cos x}{\sin x\cos x}$.

Q.No.4 Find the equation for the line that is tangent and normal to the curve at the given point $x+\sqrt{xy}-6$ at $(4,1)$.

Q.No.5 Integrate the following: $\int\frac{3+\sec^2 x+\sin x}{\tan x}dx$

Q.No.6 Find $\frac{d^2y}{dx^2}$ by implicit differentiation of $y^2=1-\frac{2}{x}$.

Subject: Software Engineering **Paper: Basic Electronics (Phy-2210)**

Time Allowed: 2:30 Hours **Maximum Marks: 80**

Note: Objective part is compulsory. Attempt any four questions from subjective parts.

Objective Part

Q. 1 Write short answers of the following questions in 2-3 lines only **(16 x 2 = 32)**

1. Define current proportional formula.
2. Differentiate transition capacitance and diffusion capacitance?
3. Prove that $\beta = \frac{\alpha}{1-\alpha}$
4. Why PIN Photodiodes have faster response than even the P-N Photodiode?
5. Why we need filters in the electronics circuits?
6. What is effect of temperature on barrier voltage?
7. Why electrons have greater mobility than holes in a semiconductor material?
8. Give at least three applications of p-n junction photodiode.
9. Write down the significance of inductor, how it respond to a.c?
10. Distinguish between drift speed and Fermi speed?
11. Explain effect of doping on semiconductor
12. In an optical fibre why refractive index of core is kept higher than cladding?
13. Under what condition a transistor can operate in active region.
14. Define Solar cell? Draw its symbol.
15. What are carrier waves?
16. What is Amplitude modulation?

Subjective Part (4 x 12 = 48)

Q. 2 a) Discuss capacitive effects exhibited by P-N junction when they are forward or reverse biased?

(b) The current flowing into base of transistor is 200 μA. Find the collector current and emitter current if β=100

Q.3 (a) Explain Amplitude modulation in detail?

(b) Two capacitors of 0.0003μF and 0.0006μF are connected in series. Find their combined series and parallel capacitance.

Q. 4 (a). Define parallel circuit? Explain characteristics of a parallel resistive circuit?

(b). From fig 1, Find

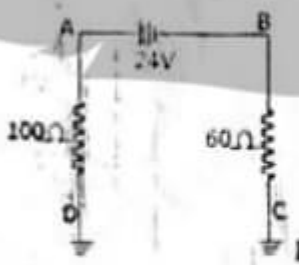

Fig 1

(i) Circuit current

(ii) Potential of point B

(iii) Value of Lowest Potential

Q. 5 What is an Operational Amplifier. Discuss it in detail.

Q. 6 Draw a NPN Transistor circuit in common Base configuration and discuss its input, output characteristics.

Q. 7 Write a note on Shunt capacitor Filter and series Inductor Filter.

University of Sargodha

BS 1st Term/Semester Exam 2020

Subject: I. T Paper: Introduction to ICT (IC-TC-101)

Time Allowed: 2:30 Hours Maximum Marks: 60

Note: Objective part is compulsory. Attempt any three questions from subjective part.

Objective Part (Compulsory)

Q.1. Write short answers of the following in 2-3 lines each. (2*12)

i. What is ISP? Differentiate between tier 1 and tier 2 ISPs?
ii. How do you differentiate between Network and Internet?
iii. What is Http?
iv. What is ROM?
v. How is hardware different from software?
vi. What is pointing device? list down some pointing devices
vii. What are CASE tools?
viii. What is memory access time?
ix. Differentiate between data and information?
x. Differentiate between System bus and data bus?
xi. What is coaxial cable?
xii. What is video conferencing?

Subjective Part (3*12)

Q.2. a) Discuss classification of Computers with the help of examples.
b) Why use Computer Technology in Education? Briefly discuss the uses of Computer in Education.

Q.3. What are different ways to store data. Explain difference between HDD and SSD.
What are communications devices? Explain routers, network switches?
What is malware, explain its different types and precautionary measures to remain safe from malwares.

Q.4. a) Briefly describe Coordinating Tasks and Managing Memory by operating system?
b) What do mean by cloud services?

School

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University of Sargodha

BS 1st Term/Semester Examination 2020

Subject: Information Technology **Paper: Calculus & Analytical Geometry (MATH-101)**

Time Allowed: 02:30 Hours **Maximum Marks: 80**

Note: Objective part is compulsory. Attempt any three questions from subjective part.

Objective Part (Compulsory)

(16*2

Q.1. Write short answers of the following in 2-3 lines each on your answer sheet.

i. Find the domain and range of $f(x)=1+x^2$.

ii. Solve the inequality $8-3x\geq 5$.

iii. Evaluate $\lim_{x\to 0}\frac{\tan 2x}{x}$.

iv. Find $\frac{dy}{dx}$ if $y=(\sin x+\cos x)\sec x$.

v. Find an anti derivative of x^4+3.

vi. Find the derivative of exponential function.

vii. Let $\mathbf{u}=(0,-1)$ and $\mathbf{v}=(-2,0)$, then find the magnitude of vector $\mathbf{u}-\mathbf{v}$.

viii. Find the angle between the vectors $\mathbf{u}=3\mathbf{i}+\mathbf{j}-\mathbf{k}$ and $\mathbf{v}=2\mathbf{j}-\mathbf{k}$.

ix. Find $\mathbf{u}\times\mathbf{v}$ if $\mathbf{u}=\mathbf{j}+\mathbf{k}$ and $\mathbf{v}=-4\mathbf{i}+\mathbf{k}$.

x. Find the foci and directrix of the parabola $y^2=2x+1$.

xi. Convert the point $\left(\sqrt{3},\frac{\pi}{4}\right)$ into cartesian coordinates.

xii. Write the formula of $Coshx$.

xiii. Write the formula of derivative of $Sinh^{-1}x$.

xiv. Write the equation of ellipse in polar coordinates.

xv. Five examples of two transcendental numbers.

xvi. Check the convergence of the series $\sum_{n=1}^{\infty}\frac{1}{n^2}$.

Subjective Part (3*16)

Q.2. a) Find the length and direction of $\mathbf{u}\times\mathbf{v}$ and $\mathbf{u}\times\mathbf{v}$, if $\mathbf{u}=2\mathbf{i}+3\mathbf{j}$ and $\mathbf{v}=-\mathbf{i}+\mathbf{j}$.

b) Find the foci and vertices and sketch the graph of $\frac{x^2}{9}+\frac{y^2}{8}=1$.

Q.3. a) For what values of a, m and b, the function

$$f(x)=\begin{cases}3; & x=0,\\ -x^2+3x+a; & 0<x<1,\\ mx+b; & 1\leq x<2.\end{cases}$$

is continuous.

b) Evaluate the integral

$$\int_0^{\pi/4}\tan x\sec^2 x\,dx.$$

Q.4. a) Find $\frac{dy}{dx}$ if $x=\frac{1}{t}$, $y=\sqrt{t}e^{-t}$.

b) Find the extreme values of the function x^3-2x+4, and where they occur?

Q.5. a) Find the area of the regions enclosed by $y=2x$, $y=0$ and $x=1$.

b) Find the area of a triangle determined by the points $P(1,-1,2)$, $Q(2,0,-1)$ and $R($

Q.6. a) Find the derivative of $f(x)=\tanh(1+e^{2x})$.

b) Show that the area of a circle is πr^2.

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ctivity is 2.12 S/m. What is its resistivity?

University of Sargodha

BS 1st Term Examination 2016

Subject: Computer Science **Paper: Programming Fundamental (CMP-2122)**

Time Allowed: 2:30 Hours **Maximum Marks: 60**

Note: **Objective part is compulsory. Attempt any four questions from subjective part.**

Objective Part (Compulsory)

Q.1. Write short answers of the following questions in 2-3 lines only (12*2=24)

i. Evaluate the expression 50 / (6 + (8 - 4) * 2) + 15

ii. Write the name of two escape sequences and their functions.

iii. Give one example of implicit and explicit type casting?

iv. Is the following statement valid or invalid? Give reason whatever the case may be.

```
int 2abc = 6 ;
```

v. What does the following code display?

```
int p = 10, q = 3, r = -2;
if ((p+q) < 14 && (r < q - 3))
        printf("%d\n", r + 3);
else
printf("%d\n", p - 2);
```

vi. What is scope and life time of a static variable?

vii. Differentiate between while and do while loop?

viii. If ptr is a pointer to int, and i and j are variables of int, What is wrong in the statement?

```
ptr = &(i + j);
```

ix. What is the output?

```
int i , sum = 0;
for (i = 10, i >= 2; I = I + 2)
sum += i;
printf("%d", sum);
```

x. Is statement

```
int arr[5];
arr[] = {1,2,3,4,5};
```

valid? If it is wrong, write the correct statement.

xi. Declare an int variable and pointer to int in a single statement.

xii. Write a prototype of a function that passes an int value, an int reference and returns a double value.

Subjective Part (4 * 9 = 36)

Q # 2: Write a program that accepts 10 integer values from user in an array and passes array to a function. The function finds the greatest value of the array and returns it to main() that displays the value.

Q # 3: Write a program declares a structure **Student** with data member rollno and age. Create two variables of structure, accept values and find the average age of these two students and display the average age.

Q # 4: Write a program that displays the sum of first four terms of the series.

$$\frac{1}{2!}+\frac{2}{3!}+\frac{3}{4!}+\frac{4}{5!}$$

Q # 5: Write a program to display the following pattern

```
5 4 3 2 1
5 4 3 2
5 4 3
5 4
5
```

Q # 6: Write a program that accepts a number from user and passes it to a function that determines whether the number is prime or composite. The result is displayed by main function.

Q # 7: Write a program that inputs obtained marks from a student, calculates the percentage(assuming total marks are 1100) and displays the grade. The grade should be calculated according to the following criterion.

Percentage	Grade
More than or equal 80	A+
Between 70 (inclusive) and 80	A
Between 60 (inclusive) and 70	B
Between 50 (inclusive) and 60	C
Between 40 (inclusive) and 50	D
Between 33 (inclusive) and 40	E
Less than 33	F

BS Term System, 1st Term Exam 2013

Subject: Computer Science Course: Introduction to Computing CMP100

Time Allowed: 2:30 Hours Maximum Marks: 60

Note: Section-I is compulsory. Attempt any four questions from section-II.

Section-I Objective Part

Q.NO.1 Write short answers of the following questions in 2-3 lines only. (12*2=24)

1. What is the largest positive number one can represent in 5-bit 2's Complement code?
2. What is the difference between operating system and system software?
3. Convert 1010 from 2's complement to Decimal.
4. What is the difference between Compiler and interpreter?
5. Convert F4H to decimal if the number is (a) unsigned , (b) signed?
6. Convert the signed number 11111111B to decimal.
7. Define Artificial Intelligence?
8. Differentiate between web browser and Search engine?
9. What do you mean by network topology?
10. Briefly describe the working of NIC card?
11. What is the difference between software engineering and system engineering?
12. Define Information Technology?

Subjective Part (9×4=36)

2. Explain the applications of Computer Graphics in problem solving.
3. Define Software engineering? Explain different elements of Software engineering?
4. Elaborate the different functions of Operating systems?
5. Define programming language? Also differentiate between Low level and assembly language?
6. Write an algorithm to find sum of first 20 odd integers. Also draw its flow diagram?
7. Define Computer ethics, Intellectual property rights; also pinpoint the IT code of conduct for computer use?

University of Sargodha

BS 1st Term Examination 2018.

Subject: Computer Sc./Software Engineering

Paper: Programming Fundamentals (CMP:2122)

Maximum Marks: 60

Time Allowed: 2:30 Hours

Note: **Objective part is compulsory. Attempt any three questions from subjective part.**

Objective Part (Compulsory)

(2*12)

Q.1. Write short answers of the following in two lines only.

i. What is relationship between array and pointer?

ii. What is associativity of an operator? Write name of right associative operator.

iii. Evaluate the expression 21 / (7 + (8 - 4 + 6) - 2) + 2 * 3;

iv. What is implicit type casting? Give an example.

v. Consider following declaration statement.

```
int  *ptr, a = 6;
```

Is following statements valid? Give reasoning.

```
ptr = a;
```

vi. What is scope and life time of a static variable?

vii. Differentiate between while and do while loop?

viii. Considering ptr is a pointer to int, and i a variables of float, is following statement true? Give reason.

```
ptr = &i ;
```

ix. What is the output?

```
int i , p = 1;
for (i = 2; i <= 6; i = i + 2)
p *= i;
printf("%d", p);
```

x. **int a [5];**

Is statement

a[] = {11,22,33,44,55};

valid? Give reason.

xi. Declare an int array and pointer to int in a single statement.

xii. Write a prototype of a function that passes an int array, an int reference and returns a float value.

Subjective Part (3*12)

Q.2. Write a program that accepts 10 integer values from user in an array and passes array and its size to a function. The function makes the odd values stored in the array 2-times (i.e. multiply all odd of the array by 2). The updated array is displayed by main().

Q.3. Write a program declares a structure **student** with data member name(c-string) and cgpa (float). Create three variables of **student**, accept values from keyboard and display name of the student getting highest cgpa among three.

Q.4. Write a program that accepts a value in main function and passes that number to a function that calculates the factorial of the number and returns to the main function which displays the factorial. (Use while loop to calculate factorial)

Q.5. Write a program that accepts two int values from user and pass their pointers to a function. The function swaps the values of the variables by using their pointer. The swapped values are displayed by main.

Q.6. Write a program that accepts a string from user and pass it to a user-defined function named revstring(). The function reverses the string which is then displayed by main().

For example.

Accepted String is **TERMINOLOGY**

Reversed String is **YGOLONIMRET**

Note: Don't use any built-in function to reverse the string.

UNIVERSITY OF THE PUNJAB

First Semester 2015

Examination: B.S. 4 Years Programme

Roll No. .....

PAPER: Calculus (IT)-I

Course Code: MATH-131 / MTH-11392

TIME ALLOWED: 2hrs. & 30 mins.

MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet Provided.

Sort Question

Q.02 [20]

(a) Solve $\frac{dy}{dx} + 3y = 3x^2e^{-3x}$

(b) Express the equation $xy = a$ in polar coordinates.

(c) Evaluate $\int_{\sqrt{2}}^{-2} \frac{\sec^2(\sec^{-1}x)dx}{x\sqrt{x^2-1}}$

(d) Find $\frac{d^2y}{dx^2}$ if $y = x\sin x - 3\cos x$

(e) State Roll's theorem.

(f) Evaluate $\int_{-1}^{5} |3 - x| dx$

(g) Find absolute extreme values of $f(x) = x^2, -2 \le x \le 1$

(h) Use L'hopital rule to evaluate $\lim_{x \to a}(x - a)\csc\left(\frac{x\pi}{a}\right)$

(i) Evaluate $\int e^x \sin x \, dx$

(j) Find the curve $y = f(x)$ in the xy plane that passes through the point (9,4) and whose slope at each point is $3\sqrt{x}$

Long Question

Q.03 [10]

State Mean Value Theorem and for what values of a, m and b does the function

$$f(x) = \begin{cases} 3 & x = 0 \\ -x^2 + 3x + a & 0 < x \le 1 \\ mx + b & 1 < x \le 2 \end{cases}$$

satisfy the hypothesis of the Mean Value Theorem on the interval [0,2] ?

Q.04 [10]

Find the critical points of $f(x) = 2x^3 - 9x^2 + 12x$. Identify the intervals on which f is increasing and decreasing. Find the function's local and absolute extreme values.

Q.05 [10]

a) Solve the initial value problem $(2xy - 3)dx + (x^2 + 4y)dy = 0, \quad y(1) = 2$

b) Evaluate $\int \frac{1}{x^2 - 4x + 8} dx$

me Allowed: 2:30 Hours

Note: **Objective part is compulsory. Attempt any three questions from subjective part.**

Objective Part (Compulsory)

(2*12)

Q.1. Write short answers of the following in two lines only.

i. What is relationship between array and pointer?
ii. What is associativity of an operator? Write name of right associative operator.
iii. Evaluate the expression 21 / (7 + (8 - 4 + 6) - 2) + 2 * 3;
iv. What is implicit type casting? Give an example.
v. Consider following declaration statement.
int *ptr, a = 6;
Is following statements valid? Give reasoning.
ptr = a;
vi. What is scope and life time of a static variable?
vii. Differentiate between while and do while loop?
viii. Considering ptr is a pointer to int, and i a variables of float, is following statement true? Give reason.
ptr = &i ;
ix. What is the output?

```
int i , p = 1;
for (i = 2; i <= 6; i = i + 2)
p *= i;
printf("%d", p);
```

x. **int a [5];**
Is statement
a[] = {11,22,33,44,55};
valid? Give reason.
xi. **Declare an int array and pointer to int in a single statement.**
xii. **Write a prototype of a function that passes an int array, an int reference and returns a float value.**

Subjective Part (3*12)

Q.2. Write a program that accepts 10 integer values from user in an array and passes array and its size to a function. The function makes the odd values stored in the array 2-times (i.e. multiply all odd of the array by 2). The updated array is displayed by main().

Q.3. Write a program declares a structure **student** with data member name(c-string) and cgpa (float). Create three variables of **student**, accept values from keyboard and display name of the student getting highest cgpa among three.

Q.4. Write a program that accepts a value in main function and passes that number to a function that calculates the factorial of the number and returns to the main function which displays the factorial. (Use while loop to calculate factorial)

Q.5. Write a program that accepts two int values from user and pass their pointers to a function. The function swaps the values of the variables by using their pointer. The swapped values are displayed by main.

Q.6. Write a program that accepts a string from user and pass it to a user-defined function named revstring(). The function reverses the string which is then displayed by main().
For example.
Accepted String is **TERMINOLOGY**
Reversed String is **YGOLONIMRET**
Note: Don't use any built-in function to reverse the string.

University of Sargodha

BS 1st Term Examination 2016

Subject: Software Engineering **Paper: Calculus & Analytical Geometry (Math-2213)**

Time Allowed: 2:30 Hours **Maximum Marks: 80**

Note: **Objective part is compulsory. Attempt any three questions from subjective part.**

Objective Part (Compulsory)

Q. No. 1 **Write short answer of the following questions each in 2-3 lines. (16*2=32)**

i. Find the radius and center of the circle $x^2+y^2+4x-4y+4=0$.
ii. What is the slope of horizontal line?
iii. Whether the function $y=\frac{x}{x^2-1}$ is even or odd.
iv. Evaluate $\lim_{x\to 0}\frac{\sin x}{\sin 2x}$.
v. If Differentiate $y=(\sin x+\cos x)\sec x$ with respect to x.
vi. If $f(x)=x-1$ and , find $g(f(1/2))$.
vii. Find the derivative of $\sin x$ at $x=\frac{\pi}{2}$.
viii. Evaluate $\int_0^{\pi}\sin x dx$.
ix. If $x^{-2}y=2$, then what is the slope of this curve at $x=-2$.
x. If $f(x)=\sqrt{x}$, then find $f'(4)$.
xi. Evaluate $\lim_{x\to 2}\frac{x-2}{\sqrt{x}-\sqrt{2}}$.
xii. Find $\int xe^x dx$.
xiii. Evaluate $\int_{-2}^{1}|x|dx$.
xiv. What do you meant by conics?
xv. Solve the inequality $4(x-1)<5(x-2)$.
xvi. Find the third derivative of $y=5x^4-3x^3+8\pm 0$

Subjective Part (3*16)

Q. No. 2 Find the equation for the tangent to the curve at the point defined by the given value o t. Also find $\frac{d^2y}{dx^2}$, where $x=\cos t, y=\sqrt{3}\cos t, t=\frac{2\pi}{3}$.

Q. No. 3 Find the extreme values of $f(x)=2x^3-15x^2+36x-10$.

Q. No. 4 If $y=(\sin^{-1}x)^2$, then prove that $(1-x^2)y_2-xy_1-2=0$.

Q. No. 5 State and prove the Mean Value Theorem.

Q. No. 6 Evaluate the integral $\int\frac{x}{1+x^4}dx$

University of Sargodha

1426

BS 1st Semester, Final Term Exam 2018

Subject: I. T Course: Basic Electronics (PHY: 2210)

Time Allowed: 2:30 Hours **Maximum Marks: 80**

Note: Objective part is compulsory. Attempt any four questions from subjective part.

Objective Part (Compulsory)

Q.1. Write short answers of the following in 2-3 lines each. (2*16)

(i) Define a linear resistor? Draw its V-I curve?
(ii) Find resistance value and tolerance rate of blue-white-gold-silver?
(iii) What is the effect of doping on width of depletion layer?
(iv) Draw schematic energy band diagram of a P-type extrinsic semiconductor?
(v) What is Zener breakdown in reverse biased P-N junction?
(vi) Do pure semiconductors obey ohms law?
(vii) Draw symbols of an air-core and an iron-core inductor.
(viii) Why optical fibres are better than metallic wires?
(ix) What are thermally generated charge carriers?
(x) In a transistor why emitter is heavily doped? and collector is lightly doped.
(xi) Describe a circuit which provides continuously varying potentials?
(xii) What is the behavior of semi conductor at zero degree Kelvin?
(xiii) Define capacitance of a capacitor and its unit.
(xiv) What should be the features of outside protection provided to an optical fiber?
(xv) Ten resistors each having resistance 1/R are connected in parallel. What is their equivalent resistance?
(xvi) What is LED?

Subjective Part: (12*4)

Q.2. (a) How P-N junction diode is forward and reverse biased? Draw VI characteristic curve for PN Junction diode. (8)
(b) What are intrinsic semiconductors? What is their behaviour at 0K and at room temperature (i.e. 300K) What is their response to electric field. (4)

Q.3. (a) What is photomultiplier tube? Write theory involved in photomultiplier tube. (6)
(b) A 12 volt battery of negligible internal resistance is connected across a parallel combination of 4K, 6K and 12K resistors. Compute
i) combined circuit resistance (2)
ii) Current supplied by the battery (2)
iii) Power supplied by the battery (2)

Q.4. (a) What is rectification? Which characteristic of a diode is used in rectification? Explain its types. (8)
(b) How pulsating dc can be converted in to pure dc by using an inductor filter? (4)

Q.5. (a) Explain input and output characteristics of a NPN transistor in common emitter configuration. (8)
(b) Prove that $\alpha = \beta/1+\beta$ (4)

Q.6. (a) What is a transformer? How it works (core type transformer)? What is voltage transformation ratio? What is condition for ideal transformer? (8)
(b) A power transformer has 100 primary turns and 600 secondary turns. If primary voltage is 120volt and full load primary current is 12 Amp, find
i) secondary voltage V2
ii) Secondary Current I2 (2+2)

Q.7. (a) Define modulation, Demodulation and carrier wave? There are how many methods of Modulation? Why frequency modulation is advantageous as compared to amplitude modulation? (8)
(b) Explain structure of an optical fibre with the help of a diagram. (4)

University of Sargodha

29406

BS 1st Term/Semester Exam 2020

Subject: IT/SE Paper: Applied Physics (PHY-101)

Maximum Marks: 80 Time Allowed: 2:30 Hours

Note: Objective part is compulsory. Attempt any three questions from subjective part.

Objective Part (Compulsory)

Q.1. Write short answers of the following in 2-3 lines each. (2*16)

i. A 12 V battery of negligible resistance is connected across a parallel combination of **4K**, **6K** and **12K** resistor. Determine how much current is supplied by the battery.

ii. What is total resistance in a circuit if resistors are connected in parallel?

iii. Calculate the inductive reactance offered by a coil of inductance **250 μH** to radio-frequency currents of frequency **10 MHz**.

iv. For intrinsic Germanium the conductivity is **2.12 S/m**. What is its resistivity?

v. What is the capacitance of a parallel plate capacitor of plate area **0.01 m²** and thickness **0.01 m**?

vi. Two capacitors of **0.0003μF** and **0.0006μF** are connected in series. Find their total capacitance.

vii. What is difference between photovoltaic cell and solar cell?

viii. A sinusoidal alternating current having a frequency of **50** Hz has the peak value of 10A. What is the value of current after **1/300** second from zero?

ix. How SCR (silicon controlled rectifier) works.

x. Draw the forward and reverse characteristic of a diode.

xi. A silicon diode passes a current of **1 mA** at **1V**.Determine the bulk resistance.

xii. What is the difference between diode and Zener diode?

xiii. A full wave rectifier supplies the load of **1kΩ**. The ac voltage applied to the diodes is **200-0-200 V_{rms}**. If the diode resistance is neglected calculate average dc voltage and average dc current.

xiv. .What is modulation index of an FM having a carrier swing of 100 kHz and the modulating signal of 5 kHz?

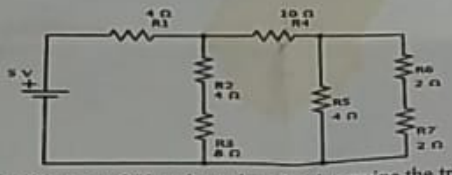
xv. What is op-amp? Give at least two characteristics of ideal op- amplifier.

xvi. Compute the velocity and wavelength of frequency **$f = 0.5x10^{15}$** Hz when travelling through glass having the refractive index of **n = 1.5.**

Subjective Part (3*16)

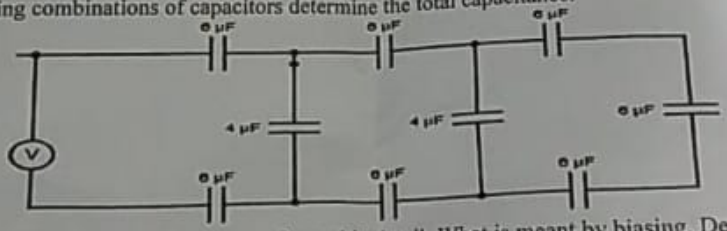
Q.2. a) Draw half wave and Full wave rectifier circuit. Discuss the working of Full-wave Bridge rectifier circuit and determine the average value of the voltage. (8)

b) From the following circuit determine the total resistance, current through each resistor and voltage drop across each resistor. (8)



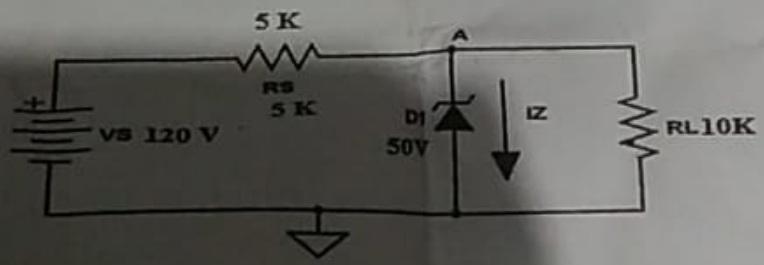
Q.3. a) What are Transformer and its types? How it works, also determine the transformer equation. (8)

b) For the following combinations of capacitors determine the total capacitance. (8)



Q.4. a) How N-type and P-type semiconductors are formed in detail. What is meant by biasing, Describe forward and reve biasing

b) For the circuit shown in Fig. find: (i) the output voltage (ii) the voltage drop across series resistance R_S).



a) Draw different configurations of transistors along with current directions .Also determine the relation between amplification factors.

b) What are different methods of biasing? Discuss Voltage divider bias circuit.

a) What are different methods of modulation? And determine upper side frequency and lower side frequency of modulated carrier wave.

b) An radio signal given by **15sin 2π (2000)t** amplitude-modulates a sinusoidal carrier wave **60sin 2π(100000)t**

2281

University of Sargodha

BS 1st Term Examination 2015

Subject: Computer Science **Paper: Introduction to ICT (ICT-2021)**

Time Allowed: 2:30 Hours **Maximum**

Objective Part- Compulsory

Q. 1: Answer the following question briefly. **2×16**

i. What is file manager?
ii. What is wireless access point?
iii. Define Bridge.
iv. What is Router?
v. Define database.
vi. FAT stands for
vii. What are smart cards?
viii. What is primary key?
ix. Define flow chart.
x. What is software license?
xi. Define internet security risks.
xii. What is ethics in computing?
xiii. Write names for any two storage devices.
xiv. Write names for any two output devices.
xv. Write names of any two application software's.
xvi. WAN stands for?

Subjective Part

Attempt any three questions out of five **3×1**

Q2. What are output devices? Explain any three in detail.

Q3. What is system unit? Explain ports, connectors, buses, in detail.

Q4. What is the role of internet in the society? Explain its disadvantages in detail.

Q5. What is database management system? Explain multi dimensional and web databases in

Q6. What is ICT? Explain communication devices in detail.

University of Sargodha

BS 1st Term Examination 2017

Subject: Mathematics **Paper: Calculus-I (Math:101)**

Time Allowed: 2:30 Hours **Maximum Marks: 80**

Note: **Objective part is compulsory. Attempt any four questions from subjective part.**

Objective Part **(Compulsory)**

Q.1. Write short answers of the following in two lines only.

i. Evaluate $\int_2^4 \frac{2\ln x}{x}dx$.

ii. Evaluate $\int x^{1/3}\sin\left(x^{3/2}+1\right)dx$.

iii. Show that $\lim_{x\to 0} x^2 \sin\frac{1}{x} = 0$.

iv. Find the derivative of $\cos x$ at $x=\pi$.

v. Evaluate $\lim_{x\to\infty}\frac{-2x^3-2x+3}{3x^3+3x^2-5x}$.

vi. What do you meant by the derivative of a function?

vii. Differentiate $y=(\ln x)^{\sin x}$ with respect to x.

viii. A particle is moving with the $v(t)=2t-\sin t$, $s(0)=3$. Find the position of the particle.

ix. State the Fundamental Theorems of Calculus.

x. Find area of the region between the following curve and x-axis; $y=2x-x^2, [0,3]$.

xi. Find y', y'' for $y=\tan x$.

xii. Evaluate $\int_0^{\pi/2}\sin x dx$.

xiii. Evaluate $\int\frac{xdx}{\sqrt{1-x^4}}$.

xiv. Find the equation of tangent line at $(0,a)$ with slope k.

xv. Find $\int x^2 e^x dx$.

xvi. Evaluate $\int_{-2}^{1}|x|dx$.

Subjective Part **(4*12)**

Q. No. 2 Evaluate the integral $\int_{-1}^{2}(x-2|x|)dx$.

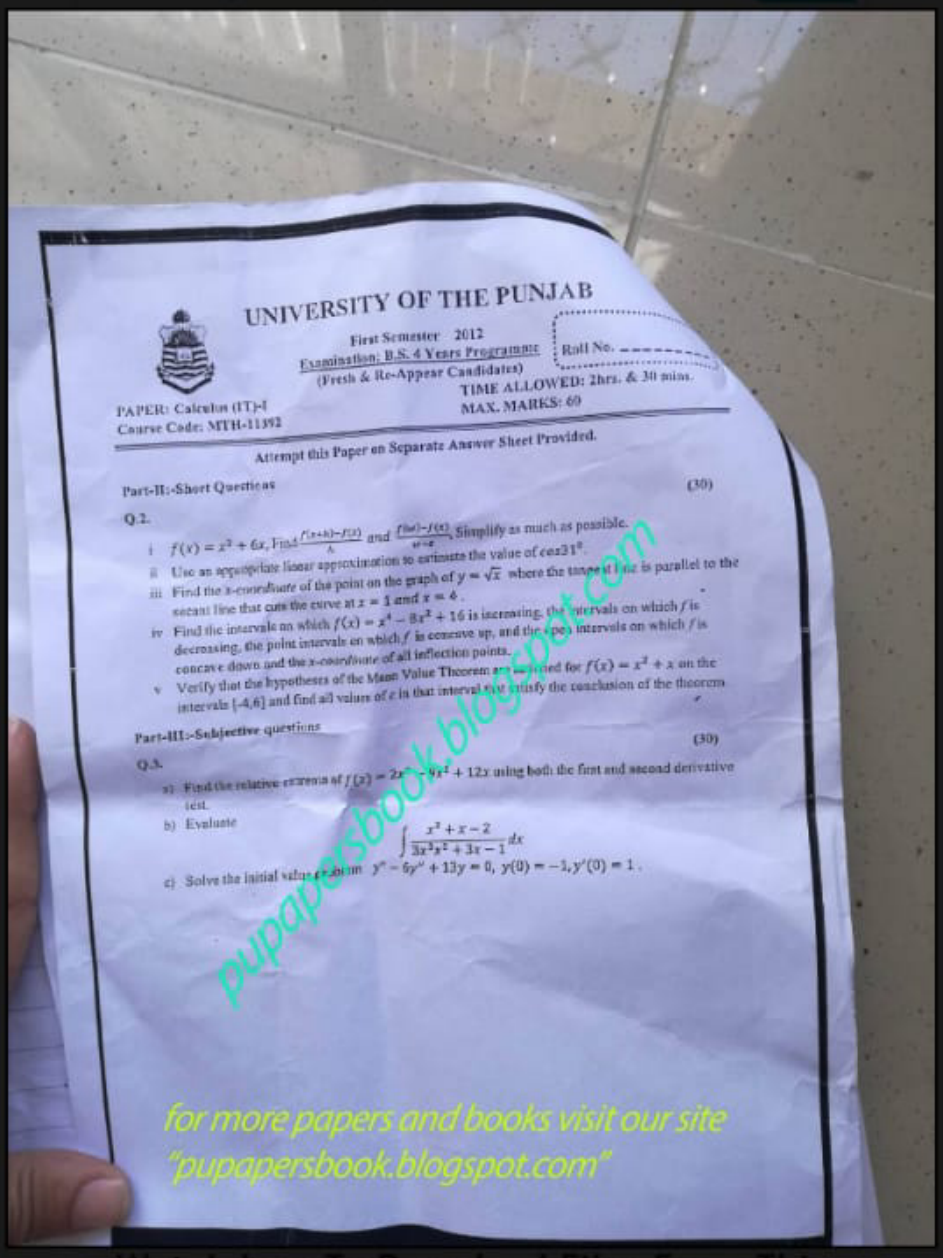
Q. No. 3 Find the extreme values of $f(x)=2x^3-15x^2+36x-10$.

Q. No. 4 Prove that $\lim_{\theta\to 0}\frac{\sin\theta}{\theta}=1$, where θ is measured in radian.

Q. No. 5 Find Maclaurin's series of $f(x)=\ln(x+1)$.

Q. No. 6 Evaluate the integral $\int\frac{dx}{4x^2+4x+2}$.

Q. No. 7 State and prove the Generalized Mean Value Theorem.



UNIVERSITY OF THE PUNJAB

First Semester 2012
Examination: B.S. 4 Years Programme
(Fresh & Re-Appear Candidates)

Roll No. _____

PAPER: Calculus (IT)-I
Course Code: MTH-11392

TIME ALLOWED: 2hrs. & 30 mins.
MAX. MARKS: 60

Attempt this Paper on Separate Answer Sheet Provided.

Part-II:-Short Questions (30)

Q.2.

i $f(x) = x^2 + 6x$. Find $\frac{f(x+h)-f(x)}{h}$ and $\frac{f(w)-f(z)}{w-z}$. Simplify as much as possible.

ii Use an appropriate linear approximation to estimate the value of $\cos 31^\circ$.

iii Find the x-coordinate of the point on the graph of $y = \sqrt{x}$ where the tangent line is parallel to the secant line that cuts the curve at $x = 1$ and $x = 4$.

iv Find the intervals on which $f(x) = x^4 - 8x^2 + 16$ is increasing, the intervals on which f is decreasing, the point intervals on which f is concave up, and the open intervals on which f is concave down and the x-coordinate of all inflection points.

v Verify that the hypotheses of the Mean Value Theorem are satisfied for $f(x) = x^2 + x$ on the intervals $[-4,6]$ and find all values of c in that interval that satisfy the conclusion of the theorem.

Part-III:-Subjective questions (30)

Q.3.

a) Find the relative extrema of $f(x) = 2x^3 - 9x^2 + 12x$ using both the first and second derivative test.

b) Evaluate

$$\int \frac{x^2 + x - 2}{3x^3x^2 + 3x - 1}\,dx$$

c) Solve the initial value problem $y'' - 6y' + 13y = 0,\ y(0) = -1, y'(0) = 1$.

University of Sargodha

BS 1st Term Examination 2019

Subject: Computer Science **Paper: Calculus and Analytical Geometry (MATH-2213)**

Time Allowed: 2:30 Hours **Maximum Marks: 80**

Note: Objective part is compulsory. Attempt any three questions from subjective part.

Objective Part (Compulsory)

Q.1. Write short answers of the following in 2-3 lines each on your answer sheet. (16*2)

i. What is the domain and range of the function $\sqrt{4-x}$.
ii. Define piecewise –defined function with example.
iii. What functions have inverses?How do you know if two functions f and g are inverses of one another?
iv. Define precise definition of limit.
v. If g(x)=x-7 and f(x)=3x then find $f(g(x))$.
vi. State the sandwich theorem.
vii. Define the Horizontal line test for one –to-one function.
viii. What are horizontal and vertical asymptotes? Give example.
ix. Define the linearization of the function at the point.
x. Differentiate $f(x) = x^x,\ x > 0$.
xi. Define the general power rule for derivatives.
xii. Define local maximum and local minimum.
xiii. State the Cauchy mean value theorem.
xiv. How do find the distance from a point to the line in space?
xv. Give a geometric description of the points in space $x^2 + y^2 = 4, z = 0$.
xvi. Find parametric equations for line through the point P (-2, 0, 3) and Q (3, 5,-2).

Subjective Part (3*16)

Q.2. (i) Find the vector projection of $\boldsymbol{u = 6i + 2j + 3k}$ *onto* $\boldsymbol{v = i - 2j - 2k}$ and the scalar component of **u** in the direction of **v**.
(ii)Find parametric equations for the line through $P(-3,2,-3)$ *and* $Q(1,-1,4)$.

Q.3. (i) State and prove**The Mean value theorem.**
(ii)Sketch the graph of the differentiable function $y = f(x)$ that has a local minimum at (1,1) and local maximum at (3,3)

Q.4. (i) Does the curve $y = x^4 - 2x^2 + 2$ have any horizontal tangents? if so, where?
(ii) Find the values of a that makes the following function differentiable for all x-values.

$$f(x) = \begin{cases} ax, & if\ x < 0 \\ x^2 - 3x & if x \geq 0 \end{cases}$$

Q.5. (i)Find the inverse of the function$y = x^2,\ x \geq 0$, expressed as a function of x.
(ii) Using Sandwich theorem, find the horizontal asymptote of the curve $y = 2 + \frac{sinx}{x}$.

Q.6. (i) A hot –air balloon ascending at the rate of $12\ ^{ft}/_{sec}$ is at a height 80ft above the ground when a package is dropped. How long does it take the package to reach the ground?
(ii)Find the indefinite integral $\int \frac{\sqrt{t}+t\sqrt{t}}{t^2}dt$.

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University of Sargodha

BS Term System, 1st Term Exam 2013

Subject: Computer Science **Course: Introduction to Computing** CMP:100

Time Allowed: 2:30 Hours **Maximum Marks: 60**

Note: **Section-I is compulsory. Attempt any four questions from section-II.**

Section-I Objective Part

Q.NO.1 Write short answers of the following questions in 2-3 lines only. (12*2=24)

1. What is the largest positive number one can represent in 5-bit 2's Complement code?
2. What is the difference between operating system and system software?
3. Convert **1010** from 2's complement to Decimal.
4. What is the difference between Compiler and interpreter?
5. Convert F4H to decimal if the number is (a) unsigned , (b) signed?
6. Convert the signed number **11111111B** to decimal.
7. Define Artificial Intelligence?
8. Differentiate between web browser and Search engine?
9. What do you mean by network topology?
10. Briefly describe the working of NIC card?
11. What is the difference between software engineering and system engineering?
12. Define Information Technology?

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Subjective Part (9×4=36)

2. Explain the applications of Computer Graphics in problem solving.
3. Define Software engineering? Explain different elements of Software engineering?
4. Elaborate the different functions of Operating systems?
5. Define programming language? Also differentiate between Low level and assembly language?
6. Write an algorithm to find sum of first 20 odd integers. Also draw its flow diagram?
7. Define Computer ethics, Intellectual property rights; also pinpoint the IT code of conduct for computer use?

University of Sargodha

Course Title: Programming Fundamentals Course Code: CMP-2122

Time:1hr **Marks 20**

Q.1.

- Use for loop to construct a program that displays a pyramid of '*' on the screen. The pyramid should look likethis. [10]

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

Q.2.

- A program that accepts a +ve number and passes it to a function. The function calculates the factorial and returns it back to the main() function. [10]

University of Sargodha

BS 1st Term Examination 2016

Subject: Software Engineering **Paper: Calculus & Analytical Geometry (Math-2213)**

Time Allowed: 2:30 Hours **Maximum Marks: 80**

Note: **Objective part is compulsory. Attempt any three questions from subjective part.**

Objective Part (Compulsory)

Q. No. 1 **Write short answer of the following questions each in 2-3 lines.** **(16*2 =32)**

i. Find the radius and center of the circle $x^2+y^2+4x-4y+4=0$.
ii. What is the slope of horizontal line?
iii. Whether the function $y=\frac{x}{x^2-1}$ is even or odd.
iv. Evaluate $\lim_{x\to 0}\frac{\sin x}{\sin 2x}$.
v. If Differentiate $y=(\sin x+\cos x)\sec x$ with respect to x.
vi. If $f(x)=x-1$ and , find $g(f(1/2))$.
vii. Find the derivative of $\sin x$ at $x=\frac{\pi}{2}$.
viii. Evaluate $\int_0^{\pi}\sin x dx$.
ix. If $x^{-2}y=2$, then what is the slope of this curve at $x=-2$.
x. If $f(x)=\sqrt{x}$, then find $f'(4)$.
xi. Evaluate $\lim_{x\to 2}\frac{x-2}{\sqrt{x}-\sqrt{2}}$.
xii. Find $\int xe^x dx$.
xiii. Evaluate $\int_{-2}^{1}|x|dx$.
xiv. What do you meant by conics?
xv. Solve the inequality $4(x-1)<5(x-2)$.
xvi. Find the third derivative of $y=5x^4-3x^3+8\pm 0$

Subjective Part (3*16)

Q. No. 2 Find the equation for the tangent to the curve at the point defined by the given value o t. Also find $\frac{d^2y}{dx^2}$, where $x=\cos t, y=\sqrt{3}\cos t, t=\frac{2\pi}{3}$.

Q. No. 3 Find the extreme values of $f(x)=2x^3-15x^2+36x-10$.

Q. No. 4 If $y=(\sin^{-1}x)^2$, then prove that $(1-x^2)y''-xy'-2=0$.

Q. No. 5 State and prove the Mean Value Theorem.

Q. No. 6 Evaluate the integral $\int\frac{x}{1+x^4}dx$

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University of Sargodha

BS 1st Term Examination 2018

Subject: Computer Science **Paper: Calculus & Analytic Geometry (MATH:2213)**

Time Allowed: 2:30 Hours **Maximum Marks: 80**

Note: **Objective part is compulsory. Attempt any three questions from subjective part.**

Objective Part (Compulsory)

Q.1. Write short answers of the following in two lines only. (2*16)

i. Solve the inequality $\frac{6}{x-1} \geq 5$

ii. Define constant function

iii. State sandwich theorem

iv. Find the slope of the circle $(x-1)^2+(y-3)^2=2$ at the point $(1,-4)$

v. Define local extreme values

vi. Solve the differential equation $\frac{dr}{dt} = \theta - \pi\sin(\pi\theta), \quad r(0)=0$

vii. Define transcendental function

viii. Evaluate $\int_{-\pi/3}^{0} \sec x \tan x\, dx$

ix. Find the inverse derivative of $g(x)=x-2$ at $x=1$

x. Prove that $\frac{d}{du}(\cosh u) = \sinh u \frac{du}{dx}$

xi. Find $\int \ln x\, dx$

xii. Define Ellipse

xiii. Find the polar equation for the circle $(x+2)^2+(y-3)^2=3$

xiv. Define projection of a vector

xv. Find the area of a triangle with vertices P(1,−1,0) Q(2,1,−2) R(−1,1,2)

xvi. Write two properties of dot product

Subjective Part

Q.2. (a) Find the domain and range of f, g, f+g, f×g 08

If $f(x)=\sqrt{x+1}, \quad g(x)=\sqrt{x-1}$

(b) For what value of 'b' is 08

$$g(x)=\begin{cases} x & x<-2 \\ bx^2 & x\geq -2 \end{cases}$$ Continuous at every x

Q.3. (a) if f has a derivative at $x=c$ then show that f is continuous at $x=c$ 08

(b) Find the absolute extreme for $g(t)=8t-t^2$ at $(-2, 1)$ 08

Q.4. (a) express the solution of initial boundary value problem is an integral 08

$y' = \cot x$ Initial condition $y(1)=5$

(b) Evaluate $\lim_{x\to 0}(1+\frac{x}{2})^{1/x}$ 08

Q.5. (a) Use Simpsons rule for $n=4$ to estimate $\int_1^2 \sqrt{x}\,dx$ compare with exact value of the integral 08

(b) Evaluate the integral $\int \frac{1}{x^2\sqrt{x^2+1}}\,dx$ 08

Q.6. (a) Show that centre of mass of a straight thin strip, rod of constant density is half way between its tow ends. 08

(b) Find the length of the curve $y=\frac{4\sqrt{3}}{2}x^{\frac{3}{2}}-1, \quad 0\leq x\leq 1$ 08

University of Sargodha

BS 1st Semester, Final Term Exam 2015

Subject: I. T **Course: Calculus & Analytical Geometry (Math: 2213)**

Session: 2014-18

Time Allowed: 2:30 Hours **Maximum Marks: 80**

Objective Part **Compulsory** (2*16)

Q.1. Write short answers of the following.

i. Show that $\hat{i}.\hat{j} = \hat{j}.\hat{k} = \hat{k}.\hat{i}$.

ii. Evaluate $\lim_{x \to 6} \frac{x-6}{\sqrt{x}-\sqrt{6}}$

iii. Solve $\lim_{x \to 0} \frac{1-\cos x}{x \sin x}$

iv. Solve $\lim_{x \to 0} \frac{\sqrt{2+x}-\sqrt{2}}{2ax}$

v. Define the continuity of function?

vi. Evaluate $\lim_{x \to \infty} (x - \ln x)$

vii. Define the derivative of function?

viii. Solve $\lim_{x \to 1} \frac{1-\sqrt{x}}{1-x}$

ix. Explain polar coordinate system.

x. Find $f'(t)$ if $f(t) = \cos^2(3\sqrt{x})$.

xi. Replace the polar equation by equivalent cartesian equation $r = \frac{5}{\sin\theta - 2\cos\theta}$

xii. Define the integration and solve $\int \ln x \, dx$

xiii. Solve is $\frac{1}{\sqrt{1-x^2}}$ by trigonometric substitution?

xiv. Define implicit and explicit function?

xv. What is eccentricity of parabola and Ellipse?

xvi. Define the unit and position vectors?

Subjective: (16*3=48)

Note: Attempt three questions out of five questions. All questions carrying equal marks.

Q.2. (a) Show that the point $(2,4)$ lies on the curve $x^3 + y^3 - 9xy = 0$. Then find the tangent and normal.

(b) Solve $\int x \sin x \, dx$

Q.3. If $a = 3\hat{i} + 2\hat{j} + 5\hat{k}$ and $b = \hat{i} + \hat{j} + \hat{k}$, find $a \cdot b$ and $b \cdot a$ also show that $a \cdot b = b \cdot a$.

Q.4. Discuss the curve $f(x) = x^3 - 12x + 2$ with respect to concavity, points of inflection, and local maxima and local minima.

Q.5. Use a diagram to explain the meaning of polar coordinates (r, θ) of a point.

Q.6. Let $f(x) = \begin{cases} x, & \text{if } x \text{ is rational} \\ 0, & \text{if } x \text{ is irrational} \end{cases}$. Discuss continuity at $x = 0$.

University of Sargodha

BS 1st Term Examination 2019

Subject: CS/IT/SE **Paper: Introduction to ICT (ICT-2021)**

Time Allowed: 2:30 Hours **Maximum Marks: 80**

Note: Objective part is compulsory. Attempt any four questions from subjective part.

Objective Part (Compulsory)

Q.1. Write short answers of the following in 2-3 lines each on your answer sheet. (16*2)

i. Define Information Technology?
ii. What does information mean?
iii. Define Sender-Receiver model for information transfer?
iv. Define Database Management Systems? Also provide an example?
v. Provide two important differences in human and machine processing of information?
vi. What are the *Buses* in computers?
vii. What do Bays mean in computers?
viii. What is the difference between touch screen and touch sensitive pads?
ix. Give the name of two popular presentation medias?
x. Discuss shortly an example of communication over the telephone network?
xi. What is network model?
xii. How the information is transferred from a human to a machine? Explain it with an example?
xiii. How the information can be organized via databases? Explain it shortly?
xiv. What does data model mean?
xv. Define information management systems along with an example?
xvi. Differentiate small and large scale information systems?

Subjective Part (4*12)

Q.2. Discuss the use of information technology in terms of store, retrieve, transmit and present information.

Q.3. How computers represent and process data? Discuss the representation and processing in detail with steps?

Q.4. How can you use a computer for communication if you are on a network. Also describe the various network communication standards?

Q.5. Explian the hierarchy of data and also discuss the difference between file processing and databases.

Q.6. Discuss the following three terms:
a) Flash memory storage
b) Cloud storage
c) Optical discs

Q.7. What are the possible challenging issues for today's information and communication technologies? Discuss it in detail?

Subject: Information Technology Maximum Marks: 80

Time Allowed: 02:30 hours

Note: Objective part is compulsory. Attempt any three questions from subjective part.

Objective Part (Compulsory) (16*2)

Q.1. Write short answers of the following in 2-3 lines each on your answer sheet.

i. Find the domain and range of $f(x)=1+x^2$.
ii. Solve the inequality $8-3x \geq 5$.
iii. Evaluate $\lim_{x\to 0}\frac{\tan 2x}{x}$.
iv. Find $\frac{dy}{dx}$ if $y=(\sin x+\cos x)\sec x$.
v. Find an anti derivative of x^4+3.
vi. Find the derivative of exponential function.
vii. Let $\mathbf{u}=(0,-1)$ and $\mathbf{v}=(-2,0)$, then find the magnitude of vector $\mathbf{u}-\mathbf{v}$.
viii. Find the angle between the vectors $\mathbf{u}=3\mathbf{i}+\mathbf{j}-\mathbf{k}$ and $\mathbf{v}=2\mathbf{j}-\mathbf{k}$.
ix. Find $\mathbf{u}\times\mathbf{v}$ if $\mathbf{u}=\mathbf{j}+\mathbf{k}$ and $\mathbf{v}=-4\mathbf{i}+\mathbf{k}$.
x. Find the foci and directrix of the parabola $y^2=2x+1$.
xi. Convert the point $\left(\sqrt{3},\frac{\pi}{4}\right)$ into cartesian coordinates.
xii. Write the formula of $Cosh x$.
xiii. Write the formula of derivative of $Sinh^{-1}x$.
xiv. Write the equation of ellipse in polar coordinates.
xv. Five examples of two transcendental numbers.
xvi. Check the convergence of the series $\sum_{n=1}^{\infty}\frac{1}{n^2}$.

Subjective Part (3*16)

Q.2. a) Find the length and direction of $\mathbf{u}\times\mathbf{v}$ and $\mathbf{u}\times\mathbf{v}$, if $\mathbf{u}=2\mathbf{i}+3\mathbf{j}$ and $\mathbf{v}=-\mathbf{i}+\mathbf{j}$.

b) Find the foci and vertices and sketch the graph of $\frac{x^2}{9}+\frac{y^2}{8}=1$.

Q.3. a) For what values of a, m and b, the function

$$f(x)=\begin{cases}3; & x=0,\\ -x^2+3x+a; & 0<x<1,\\ mx+b; & 1\leq x<2.\end{cases}$$

is continuous.

b) Evaluate the integral

$$\int_0^{\pi/4}\tan x\sec^2 x\,dx.$$

Q.4. a) Find $\frac{dy}{dx}$ if $x=\frac{1}{t}$, $y=\sqrt{t}e^{-t}$.

b) Find the extreme values of the function x^3-2x+4, and where they occur?

Q.5. a) Find the area of the regions enclosed by $y=2x$, $y=0$ and $x=1$.

b) Find the area of a triangle determined by the points $P(1,-1,2)$, $Q(2,0,-1)$ and $R(0,2,1)$.

Q.6. a) Find the derivative of $f(x)=\tanh(1+e^{2x})$.

b) Show that the area of a circle is πr^2.

University of Sargodha

BS 1st Term Examination 2015

Subject: Software Engineering **Paper: Programming Fundamentals (CMP-2122)**

Time Allowed: 2:30 Hours **Maximum Marks: 60**

Objective Part. Compulsory

Note: Attempt all questions each question carry equal marks? (2*12=24)

i. What is a **variable**? How to declare a legal variable in C program.
ii. What is the difference between **high level** and **machine level** language?
iii. Differentiate **for** and **while** loop?
iv. How many **main ()** functions are define in a C program, justify your answer.
v. Evaluate the expression. **y = 6 / 2 * 2 + 3 * 5 + 7;**
vi. If **x** is a variable in C then what is difference b/w **x++&++x**?
vii. What is **syntaxerror**?
viii. Difference b/w **Prototype** and **definition** of a function.
ix. Why **break** statement is used in **switch** structure?
x. Why a programmer use **fopen() and fclose()** function in C program?
xi. What is the **structure**?Define syntax of structure.
xii. What is a **pointer**? Write an example of **initialization** of a pointer?

Subjective: (4*9=36)

Note: Attempt any four questions.

Q 2. Write a program to calculate the **net pay** of an employee. Input the **basic pay**, **pass** the basicpay to the **user defines** function **paycalculate ()**, **calculate the net pay** and **return** to main function. Calculate the net pay of an employee:

- **House rent** is 43% of the basic.
- **Medical allowance** is 3% of basic pay if **basic pay is greater than** Rs.7000/-. It is 5% of basic pay if the basic pay is **less or equal** than Rs.7000/-.
- **Conveyance allowance** is Rs.96/-.If basic pay is **less than or equal** Rs.7000/-. It is Rs.193/-if the basic pay is **more than** Rs.7000/-.
- Net pay is calculated by **adding basic pay, medical allowance, conveyance allowance** and **house rent**.

Q 3. Write a program that displays the following output using **nestedloop**.

```
1 2 3 4 5
  2 4 6 8
    3 6 9
      4 8
        5
```

Q 4. Assuming that a text file named **FIRST.txt** contains some text written into it, write a function named **copyupper ()**, that reads the file **FIRST.txt** and create a new file named **SECOND.txt** contains all words from the file **FIRST.txt** in uppercase.(Hint **toupper()** function converts the lowercase letter in C to the corresponding uppercase letter).

Q 5. Write a program that takes 10 elements of array **from the user**. **Find Maximum** element form the array than **Swap the Maximum element with last element of array**. Display array **before and after the swapping.**

Q 6. Write a program that accepts an integer number from the user. Calculate and display its **factorial** by using a **recursive** function.

Q 7. Write a C program that creates a structure **Complex** which represents fields by integers **real** and **imaginary**. Program allows the user to enter the real and imaginary parts of **two complex** numbers. This program calculates the **sum of two complex numbers** which will be entered by the user. Program will **add real parts** and **imaginary parts of complex numbers** and prints the **sum of complex number** on the screen.

University of Sargodha

BS 1st Term Examination 2015

Subject: BS CS — **Paper: Calculus & Analytical Geometry** (MATH-2313) (New Scheme)

Time Allowed: 2.30 Hours — **Maximum marks: 80**

Objective part (Compulsory)

Q.No.1 Write short answer of the following questions. (16*2=32)

1. Find the center and radius whose equation is given $x^2+y^2+4x-4y+4=0$
2. Convert into standard form of ellipse of the following equation $3(x-1)^2+6=2(y+2)^2$.
3. What is the slope of the vertical line?
4. Prove that $\cos(x-\pi/2)=\sin x$.
5. Find the domain and rang of $y=\sqrt{|x|}$
6. Prove that $\sin(x-\pi/2)=-\cos x$.
7. If $y=\frac{1}{\sqrt{x-1}}$ then "y" is an increasing function or decreasing function.
8. Determine the function is even, odd and neither? $y=\sec x-\tan x$.
9. Define periodic function and if $y=\cos x$ then find its periodicity.
10. Solve the inequality $\frac{1}{5}(x-1)<\frac{1}{4}(x-2)$.
11. Evaluate $\lim_{x\to 9}\frac{\sqrt{x}-3}{x-9}$
12. What is domain of the following: $y=\begin{cases}-x-2, & -2\le x\le -1\\ x, & -1<x\le 1\\ -x+2, & 1<x\le 2\end{cases}$
13. If $f(x)=\frac{1-x}{2x}$, then slope of this curve at point $x=\sqrt{2}$.
14. What is range of the following: $y=\begin{cases}x-2, & -2\le x\le -1\\ x, & -1<x\le 1\\ -x+2, & 1<x\le 2\end{cases}$
15. Find second derivative of $f(x)=5x^4-3x^3+8$
16. Find $\frac{dy}{dx}$ of the function $\sqrt{xy}=1$.

Subjective Part

Attempt any three out of five questions (3*16=48)

Q.No.2 An arbitrary triangle with sides a, b and c. Opposite angles are A, B and C respectively. Find c if $a=2$, $b=3$, and $C=\frac{\pi}{4}$.

Q.No.3 Find the limit of the following $\lim_{x\to 0}\frac{x+x\cos x}{\sin x\cos x}$.

Q.No.4 Find the equation for the line that is tangent and normal to the curve at the given point $x+\sqrt{xy}=6$ at $(4,1)$.

Q.No.5 Integrate the following: $\int\frac{3+\sec^2 x+\sin x}{\tan x}dx$

Q.No.6 Find $\frac{d^2y}{dx^2}$ by implicit differentiation of $y^2=1-\frac{2}{x}$.

University of Sargodha

BS 1st Term Examination 2015

Subject: Computer Science **Paper: Functional English (ENG-2411)**

llowed: 2:30 Hours **Maximum Marks: 80**

OBJECTIVE PART COMPULSORY

Write short answers of the following question. (2*16)

1. What is the predicate? Give an example.
2. Give the two usages of "Have to"
3. What are the types of Clause?
4. What is Abstract Noun? Illustrate.
5. Correct the following sentences with respect to tense
   a. One should do his duty.
   b. I had go to college.
6. How Emphatic Pronouns are formed?
7. List the Interrogative Pronouns.
8. Use following two idioms into sentences
   a. Hue and cry
   b. Heart and soul
9. What is subordinate Conjunction?
10. Change the Narration.
    a. She said to me" Do you know me"?
    b. He said to me" What do you eat"?
11. What is intransitive verb? Also exemplify.
12. Give the antonyms of;
    a. Brave
    b. Accept
13. Change the Gender of;
    a. Governor
    b. Actor
14. What is Adverb of manner?
15. Give the Plural of;
    a. Leaf
    b. Focus
16. Write the correct usage of Article "An".

SUBJECTIVE PART

te: Attempt any three Questions. All Questions carry equal marks. (3*16=48)

2. What is an Adverb? Also write the types and usage.
3. What is Interrogative, Relative, Personal and definite Pronoun? How we can use it?
4. Write in detail what is the Article? Name all the articles and their usage with respect to sense.
5. How the tenses are formed? Give the rules of all tenses.
6. [illegible] types and examples.

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BS 1st Term Examination 2019

Subject: CS/IT/SE **Paper: Introduction to ICT (ICT-2021)**

Time Allowed: 2:30 Hours **Maximum Marks: 80**

Note: Objective part is compulsory. Attempt any four questions from subjective part.

Objective Part (Compulsory)

Q.1. Write short answers of the following in 2-3 lines each on your answer sheet. (16*2)

i. Define Information Technology?
ii. What does information mean?
iii. Define Sender-Receiver model for information transfer?
iv. Define Database Management Systems? Also provide an example?
v. Provide two important differences in human and machine processing of information?
vi. What are the *Buses* in computers?
vii. What do Bays mean in computers?
viii. What is the difference between touch screen and touch sensitive pads?
ix. Give the name of two popular presentation medias?
x. Discuss shortly an example of communication over the telephone network?
xi. What is network model?
xii. How the information is transferred from a human to a machine? Explain it with an example?
xiii. How the information can be organized via databases? Explain it shortly?
xiv. What does data model mean?
xv. Define information management systems along with an example?
xvi. Differentiate small and large scale information systems?

Subjective Part (4*12)

Q.2. Discuss the use of information technology in terms of store, retrieve, transmit and present information.

Q.3. How computers represent and process data? Discuss the representation and processing in detail with steps?

Q.4. How can you use a computer for communication if you are on a network. Also describe the various network communication standards?

Q.5. Explain the hierarchy of data and also discuss the difference between file processing and databases.

Q.6. Discuss the following three terms:
a) Flash memory storage
b) Cloud storage
c) Optical discs

Q.7. What are the possible challenging issues for today's information and communication technologies? Discuss it in detail?

University of Sargodha

BS Term System, 1st Term Exam 2013

Subject: Computer Science Course: Introduction to Computing CMP-100

Time Allowed: 2:30 Hours Maximum Marks: 60

Note: Section-I is compulsory. Attempt any four questions from section-II.

Section-I Objective Part

Q.NO.1 Write short answers of the following questions in 2-3 lines only. (12*2=24)

1. What is the largest positive number one can represent in 5-bit 2's Complement code?
2. What is the difference between operating system and system software?
3. Convert 1010 from 2's complement to Decimal.
4. What is the difference between Compiler and interpreter?
5. Convert F4H to decimal if the number is (a) unsigned , (b) signed?
6. Convert the signed number 11111111B to decimal.
7. Define Artificial Intelligence?
8. Differentiate between web browser and Search engine?
9. What do you mean by network topology?
10. Briefly describe the working of NIC card?
11. What is the difference between software engineering and system engineering?
12. Define Information Technology?

Subjective Part (9×4=36)

2. Explain the applications of Computer Graphics in problem solving.
3. Define Software engineering? Explain different elements of Software engineering?
4. Elaborate the different functions of Operating systems?
5. Define programming language? Also differentiate between Low level and assembly language?
6. Write an algorithm to find sum of first 20 odd Integers. Also draw its flow diagram?
7. Define Computer ethics, Intellectual property rights; also pinpoint the IT code of conduct for computer use?

University of Sargodha

BS 1st Term Examination 2019

Subject: S.E/C.S/I.T **Paper: Programming Fundamentals (CMP-2122)**

Time Allowed: 2:30 Hours **Maximum Marks: 60**

Note: Objective part is compulsory. Attempt any three questions from subjective part.

Objective Part (Compulsory)

Q.1. Write short answers of the following in 2-3 lines each on your answer sheet. (12*2)

i. What is **preprocessor** directive?
ii. Write three rules of **declaring an identifier** in C program.
iii. Differentiate **for** and **while** loop?
iv. What are **primitive data** types? Shortly discuss one of them.
v. Evaluate the expression. 8-(2-4*2*(5-1)-1)
vi. What is difference b/w **prefix** & **postfix** operators?
vii. What is meant by **fatal error**?
viii. Difference b/w **Prototype** and **definition** of a function.
ix. What is the purpose of **getch()** ?
x. Differentiate 1-D array and 2-D array.
xi. What is a **pointer**?
xii. In file-processing why a programmer use **fgets** and **fputs** functions in C program.

Subjective Part (3*12)

Q.2. Write a program to calculate the **net pay** of an employee. Input the **basic pay**, **pass** the basic pay to the **user defines** function **PayCalculate ()**, **calculate the net pay** and **return** to main function. Calculate the net pay of an employee:

- **House rent** is 45% of the basic.
- **Medical allowance** is 5% of basic pay if basic pay **is greater** than Rs.4000/-. It is 7% of basic pay if the basic pay is **less or equal** than Rs.4000/-.
- **Conveyance allowance** is Rs.91/-.If basic pay is **less than or equal** Rs.4000/-.It is Rs.153/-if the basic pay is **more than** Rs.4000/-.
- Net pay is calculated by **adding basic pay**, **medical allowance**, **conveyance allowance** and **house rent**.

Q.3. Write a program that stores 10 values in an array of type integer. The array and its size is passed to the user define function that finds the sum of all those values which are less than the average of all values of the array. The sum is displayed by the main function.

Q.4. Write a program that accepts two integer numbers from the user. Pass these numbers to user define function as arguments. The function calculate their **multiplication** by using **recursion**. **Hint** (multiply (int a, int b); where **a** and **b** are both positive integers, but you can only use the + or – operators for completion of this task.

Q.5. Write a program that create a structure **Person** which represents fields by float **income**, integer **taxRate** and float **Paidtax**. Define one structure variable of Person, inputs **incomes** and **tax rate** of Person from the user. Program calculate paid tax of person and then pass structure variable to user define function **ShowRecord(Person)**. The function print the record of person on the screen.

Q.6. Assuming that a text file named **Book.txt** contains some text written into it, write a functio named **CopyLower ()**, that reads the file **Book.txt** and create a new file named **newbook.t** contains all words from the file **Book.txt** in **lowercase**. (Hint **tolower ()** function converts t uppercase letter in C/C++ to the corresponding lowercase letter).

University of Sargodha

BS 1st Term Examination 2019

Subject: Computer Science / I.T **Paper: Functional English (ENG-2411)**

Time Allowed: 2:30 Hours **Maximum Marks: 80**

Note: Objective part is compulsory. Attempt any three questions from subjective part.

Objective Part (Compulsory)

Q.1. Write short answers of the following in 2-3 lines each on your answer sheet. (16*2)

i. Define the term Grammar.
ii. What is Demonstrative Pronoun? Explain with example.
iii. Differentiate between Exclamation Marks and comma.
iv. What is Interjection?
v. Make a list of regular Verbs.
vi. What do you know about Clause reasons?
vii. Punctuate the following: Hurrah we won the match
viii. Correct the following sentences:
a)A student who I taught is now an officer. b). I cried whom was there
ix. Convert the following into passive voice:
Ali has written a letter. b) Polish my shoes.
x. Give the synonyms of the following:
a)Killed b) Formal.
xi. What is the difference between Apostrophe and inverted comma?
xii. Define WH words?
xiii. Differentiate between Phrase and clause.
xiv. Give antonyms of the following:
a)Spread. b) Upward
xv. Convert the following statement into indirect: "He said, I'm playing cricket".
xvi. What is the difference between present Perfect and past Perfect tense? Give examples.

Subjective Part (3*16)

Q.2. Define Noun? What are types of Noun? Explain with maximum examples.

Q.3. Write a short note on the following:
a) Pronoun b) Adjective

Q.4. What is Tense? Elaborate different types of Tenses with suitable examples.

Q.5. Change the Narration of the following:
i. She said, "I work very hard daily."
ii. He said, "Is this your bike?"
iii. He said to his friend, "Don't talk nonsense."
iv. The pupil said, "I like English teacher."

➢ Punctuate the following sentences.
i. We enjoyed a lot in France everybody had spent great time there
ii. Shazma ali zohaib work best in the morning Ali works in best way
iii. What is your plan about next weekend
iv. Father had to go to hospital he had heart problem
v. Did she understand Why you were tensed yesterday

Q.6. What is an Adverb? Explain the different types of Adverb with maximum examples.

University of Sargodha

BS 1st Term/Semester Examination 2020

Subject: Information Technology **Paper: Calculus & Analytical Geometry (MATH-101)**

Time Allowed: 02:30 Hours **Maximum Marks: 80**

Note: Objective part is compulsory. Attempt any three questions from subjective part.

Objective Part (Compulsory) (16*2)

Q.1. Write short answers of the following in 2-3 lines each on your answer sheet.

i. Find the domain and range of $f(x)=1+x^2$.

ii. Solve the inequality $8-3x\geq 5$.

iii. Evaluate $\lim_{x\to 0}\frac{\tan 2x}{x}$.

iv. Find $\frac{dy}{dx}$ if $y=(\sin x+\cos x)\sec x$.

v. Find an anti derivative of x^4+3.

vi. Find the derivative of exponential function.

vii. Let $\mathbf{u}=(0,-1)$ and $\mathbf{v}=(-2,0)$, then find the magnitude of vector $\mathbf{u}-\mathbf{v}$.

viii. Find the angle between the vectors $\mathbf{u}=3\mathbf{i}+\mathbf{j}-\mathbf{k}$ and $\mathbf{v}=2\mathbf{j}-\mathbf{k}$.

ix. Find $\mathbf{u}\times\mathbf{v}$ if $\mathbf{u}=\mathbf{j}+\mathbf{k}$ and $\mathbf{v}=-4\mathbf{i}+\mathbf{k}$.

x. Find the foci and directrix of the parabola $y^2=2x+1$.

xi. Convert the point $\left(\sqrt{3},\frac{\pi}{4}\right)$ into cartesian coordinates.

xii. Write the formula of $Coshx$.

xiii. Write the formula of derivative of $Sinh^{-1}x$.

xiv. Write the equation of ellipse in polar coordinates.

xv. Five examples of two transcendental numbers.

xvi. Check the convergence of the series $\sum_{n=1}^{\infty}\frac{1}{n^2}$.

Subjective Part (3*16)

Q.2. a) Find the length and direction of $\mathbf{u}\times\mathbf{v}$ and $\mathbf{u}\times\mathbf{v}$, if $\mathbf{u}=2\mathbf{i}+3\mathbf{j}$ and $\mathbf{v}=-\mathbf{i}+\mathbf{j}$.

b) Find the foci and vertices and sketch the graph of $\frac{x^2}{9}+\frac{y^2}{8}=1$.

Q.3. a) For what values of a, m and b, the function

$$f(x)=\begin{cases}3; & x=0,\\ -x^2+3x+a; & 0<x<1,\\ mx+b; & 1\leq x<2.\end{cases}$$

is continuous.

b) Evaluate the integral

$$\int_0^{\pi/4}\tan x\sec^2 x\,dx.$$

Q.4. a) Find $\frac{dy}{dx}$ if $x=\frac{1}{t}$, $y=\sqrt{t}e^{-t}$.

b) Find the extreme values of the function x^3-2x+4, and where they occur?

Q.5. a) Find the area of the regions enclosed by $y=2x$, $y=0$ and $x=1$.

b) Find the area of a triangle determined by the points $P(1,-1,2)$, $Q(2,0,-1)$ and $R(0,2,1)$.

Q.6. a) Find the derivative of $f(x)=\tanh(1+e^{2x})$.

b) Show that the area of a circle is πr^2.

University of Sargodha

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BS 1st Term/Semester Exam 2020

Subject: Computer Science **Paper: Programming Fundamentals (CMP-101)**

Maximum Marks: 60

Time Allowed: 2:30 Hours

Note: Objective part is compulsory. Attempt any three questions from subjective part.

Objective Part (Compulsory)

Q.1: Write short answers of the following in 2-3 lines each on your answer sheet. (12*2)

i. What is Type Casting and its types?
ii. What is Unary Operator? Give two examples.
iii. Which loop is called counter controlled loop and why?
iv. What is the purpose of break in switch statement?
v. What are two types of functions in C++?
vi. Differentiate between pass by Value and pass by Reference?
vii. What is the purpose of function strlen()?
viii. What is dereference operator?
ix. Define Array?
x. What is Function Overloading?
xi. What are Logical Operator? Give example.
xii. What are run-time errors? Give example

Subjective Part (3*12)

Q.2: **a.** Write down a program to calculate the electricity bill. The rates of electricity per unit are as follows

- If the units consumed are <=300, then the cost is Rs. 2 per unit.
- If the units consumed are >300 and <=500, then the cost is Rs. 5 per unit.
- If the units consumed exceed 500 then the cost per unit is Rs.7.

A line rent Rs. 150 is also added to the total bill and a surcharge of 5% extra if the bill exceeds Rs. 2000. Calculate the total bill with all the conditions given above. [8]

b. Write down a function that swaps the value of two integers. [4]

Q.3: **a.** Write down a program that reads 10 elements in an array from user. Print the sum of all elements of array. [8]

b. Differentiate between local and formal parameters. [4]

Q.4: **a.** Write down a program that prints the following pattern? [9]

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

b. What are comments? In how many ways comments can be added in program? [3]

Q.5: **a.** Write down a program that reads a string from user and print no of capital letters in it. [8]

b: Write a program that reads three numbers from user and print the maximum. [4]

Q.6: Write a program that declares a structure Teacher to store **id**(int), **name**(string) and **salary**(double). The program defines an array to store data of five teachers. It inputs five teachers and then display the record of each teacher.

Programming Fundamentals Sargodha University (UOS) Past Papers

University of Sargodha

BS 3rd Term Examination 2015

Subject: Software Engineering Paper: Programming Fundamentals (CMP-2122)

Time Allowed: 2:30 Hours Maximum Marks: 60

Objective Part Compulsory

Note: Attempt all questions each question carry equal marks? (2*12=24)

i. What is a **variable**? How to declare a legal variable in C program.
ii. What is the difference between **high level** and machine level language?
iii. Differentiate **for** and **while** loop?
iv. How many **main** () functions are define in a C program, justify your answer.
v. **Evaluate the expression. y = 6 / 2 * 2 + 3 * 5 + 7;**
vi. If **x** is a variable in C then what is difference b/w **x++&++x**?
vii. What is **syntaxerror**?
viii. Difference b/w **Prototype** and **definition** of a function.
ix. Why **break** statement is used in **switch** structure?
x. Why a programmer use **fopen() and fclose()** function in C program?
xi. What is the **structure**?Define syntax of structure.
xii. What is a **pointer**? Write an example of **initialization** of a pointer?

Subjective: (4*9=36)

Note: Attempt any four questions.

Q 2. Write a program to calculate the **net pay** of an employee. Input the **basic pay**, **pass** the basicpay to the **user defines** function **payculculate ()**. **calculate the net pay** and **return** to main function. Calculate the net pay of an employee:

- **House rent** is 43% of the basic.
- **Medical allowance** is 3% of basic pay if **basic pay is greater than** Rs.7000/- It is 5% of basic pay if the basic pay is **less or equal** than Rs.7000/-.
- **Conveyance allowance** is Rs.96/-.If basic pay **is less than or equal** Rs.7000/- It is Rs.193/-if the basic pay is **more than** Rs.7000/-.
- Net pay is calculated by **adding basic pay, medical allowance, conveyance allowance** and **house rent**.

Q 3. Write a program that displays the following output using **nestedloop**.

```
1 2 3 4 5
  2 4 6 8
    3 6 9
      4 8
        5
```

Q 4. Assuming that a text file named **FIRST.txt** contains some text written into it, write a function named **copyupper ()**, that reads the file **FIRST.txt** and create a new file named **SECOND.txt** contains all words from the file **FIRST.txt** in uppercase.(Hint **toupper()** function converts the lowercase letter in C to the corresponding uppercase letter).

Q 5. Write a program that takes 10 elements of array from the user. **Find Maximum** element form the array than **Swap the Maximum element with last element of array**. Display array **before and after the swapping**.

Q 6. Write a program that accepts an integer number from the user. Calculate and display its **factorial** by using a **recursive** function.

Q 7. Write a C program that creates a structure **Complex** which represents fields by integers **real** and **imaginary**. Program allows the user to enter the real and imaginary parts of **two complex** numbers. This program calculates the **sum of two complex numbers** which will be entered by the user. Program will **add real parts** and **imaginary parts of complex numbers** and prints the **sum of complex number** on the screen.

BS 1st Term Examination 2016 18 BSMath 833

Subject: Mathematics **Paper: Calculus-I (Math-101)**

Time Allowed: 2:30 Hours **Maximum Marks: 80**

Note: **Objective part is compulsory. Attempt any three questions from subjective part.**

Objective Part (Compulsory)

Q. No. 1 Write short answers of the following (2*16)

i. What is the difference between exponential and logarithmic functions?

ii. Show that $\lim_{x\to 0}|x| = 0$

iii. Evaluate $\lim_{h\to 0}\frac{3}{\sqrt{3h+1}+1}$

iv. Evaluate $\lim_{x\to\infty}\frac{-2x^3-2x+3}{3x^3+3x^2-5x}$

v. Find the domain of $f(x)=\sqrt{2-\sqrt{x}}$

vi. Find $\frac{dy}{dx}$ when $x=\cos t, y=1+\sin t$ at $t=\frac{\pi}{2}$.

vii. Find $\frac{dy}{dx}$ when $y\sin\frac{1}{y}=1-xy$.

viii. Find the domain and range of $f(x)=\sqrt{4-x^2}$.

ix. Find dy when $y=\sin\left(\sqrt{x}\right)$

x. Evaluate $\int x^{3/2}\sin\left(x^{3/2}+1\right)dx$.

xi. Evaluate $\int_1^{\sqrt{2}}\left(\frac{u^2}{2}-\frac{1}{u^5}\right)du$.

xii. Evaluate $\int_2^4\frac{2\ln x}{x}dx$.

xiii. Evaluate $\int\frac{e^r}{1+e^r}dr$.

xiv. What do you meant by the derivative of a function?

xv. What do you meant by the continuity of a function?

xvi. Find equation of tangent line to curve $y^2+y=\frac{2+x}{1-x}$ at point $P(0,1)$.

Subjective Part (16*3)

Q. No. 2(a) State and prove the Mean Value Theorem.

(b) Find Taylor series of $f(x)=1/x$ at $a=1$.

Q. No. 3(a) Find $\frac{dy}{dx}$ when $y=\left(1+\cot\frac{x}{2}\right)^{-2}$

(b) Evaluate $\int\frac{\cos\sqrt{\theta}}{\sqrt{\theta}\sin}$

Q. No. 4(a) Evaluate $\int_{-1}^{1}3x^2\sqrt{x^3+1}dx$.

(b) Evaluate $\int_0^3\frac{\log_3(x+\cdot}{x+3}$

Q. No. 5(a) Find the intervals on which f is increasing or decreasing, find the extreme values of the function $f(x)=\sin x+\cos x, 0\le x\le 2\pi$.

(b) Find the area of the region bounded by the parabola $y=2-x^2$ and the line $y=-x$.

Q. No. 6(a) Evaluate $\int\frac{dt}{(t+1)\sqrt{t^2+2t-8}}$

(b) Evaluate $\int x^3\tan^{-1}x dx$

University of Sargodha

BS 1st Term Examination 2018

Subject: Computer Science **Paper: Calculus & Analytic Geometry (MATH:2213)**

Time Allowed: 2:30 Hours **Maximum Marks: 80**

Note: **Objective part is compulsory. Attempt any three questions from subjective part.**

Objective Part (Compulsory)

Q.1. Write short answers of the following in two lines only. (2*16)

i. Solve the inequality $\frac{6}{x-1} \geq 5$

ii. Define constant function

iii. State sandwich theorem

iv. Find the slope of the circle $(x-1)^2+(y-3)^2=2$ at the point $(1,-4)$

v. Define local extreme values

vi. Solve the differential equation $\frac{dr}{dt}=\theta-\pi\sin(\pi\theta), \quad r(0)=0$

vii. Define transcendental function

viii. Evaluate $\int_{-\pi/2}^{0} \sec x \tan x \, dx$

ix. Find the inverse derivative of $g(x)=x-2$ at $x=1$

x. Prove that $\frac{d}{du}(\cosh u)=\sinh u \frac{du}{dx}$

xi. Find $\int \ln x \, dx$

xii. Define Ellipse

xiii. Find the polar equation for the circle $(x+2)^2+(y-3)^2=3$

xiv. Define projection of a vector

xv. Find the area of a triangle with vertices $P(1,-1,0)$ $Q(2,1,-2)$ $R(-1,1,2)$

xvi. Write two properties of dot product

Subjective Part

Q.2. **(a)** Find the domain and range of $f, g, f+g, f\times g$ 08

If $f(x)=\sqrt{x+1}, \quad g(x)=\sqrt{x-1}$

(b) For what value of' b' is 08

$$g(x)=\begin{cases} x & x<-2 \\ bx^2 & x\geq -2 \end{cases}$$ Continuous at every x

Q.3. **(a)** if f has a derivative at $x=c$ then show that f is continuous at $x=c$ 08

(b) Find the absolute extreme for $g(t)=8t-t^2$ at (–2, 1) 08

Q.4. **(a)** express the solution of initial boundary value problem is an integral
$y'=\cot x$ Initial condition $y(1)=5$ 08

(b) Evaluate $\lim_{x\to 0}(1+\frac{x}{2})^{2/x}$ 08

Q.5. **(a)** Use Simpsons rule for $n=4$ to estimate $\int_1^2 \sqrt{x}dx$ compare with exact value of the integral 08

(b) Evaluate the integral $\int \frac{1}{x^2\sqrt{x^2+1}}dx$ 08

Q.6. **(a)** Show that centre of mass of a straight thin strip, rod of constant density is half way between its tow ends. 08

(b) Find the length of the curve $y=\frac{4\sqrt{3}}{2}x^{\frac{3}{2}}-1, \quad 0\leq x\leq 1$ 08

University of Sargodha

BS 1st Term Examination 2018.

Subject: Computer Sc./Software Engineering/Information Technology

Paper: Introduction to Information & Communication Technology (ICT-2021)

Time Allowed: 2:30 Hours **Maximum Marks: 60**

(New Scheme)

Note: Objective part is compulsory. Attempt any three questions from subjective part.

Objective Part (Compulsory)

Q.1. Write short answers of the following in 2-3 lines each. (2*12)

i. How might you evaluate the accuracy of a Web site?
ii. How do Web sites benefit individuals' health care?
iii. What are the omponents of a web address??
iv. What types of media might a person use to enhance a presentation?
v. What are the types of application software used in communications?
vi. How do program instructions transfer in and out of memory?
vii. What are two types of designs of Tablet PCs?
viii. What are the various types of pen input, and what are other types of input for smart phones?
ix. What are two types of wireless printing technology?
x. What is audio resolution, and what are three examples of audio resolutions?
xi. What is the purpose of network attached storage devices?
xii. What is one difference between microfilm and microfiche?

Subjective Part (3*12)

Q.2. Describe four embedded operating systems. What are the uses for each of the four types?
Q.3. What are various network communications standards? Provided detailed answer.
Q.4. What are characteristics of relational, object-oriented, and multidimensional databases?
Q.5. What are the characteristics of a user interface? And what are the key features of widely used graphics and multimedia programs?
Q.6. Write short note on following:

i. Touch sensitive pads
ii. Mobile Printers
iii. Virtual Reality

University of Sargodha

BS 1st Term Examination 2019

Subject: Computer Science **Paper: Calculus and Analytical Geometry (MATH-2213)**

Time Allowed: 2:30 Hours **Maximum Marks: 80**

Note: Objective part is compulsory. Attempt any three questions from subjective part.

Objective Part (Compulsory)

Q.1. Write short answers of the following in 2-3 lines each on your answer sheet. (16*2)

i. What is the domain and range of the function $\sqrt{4-x}$.
ii. Define piecewise –defined function with example.
iii. What functions have inverses?How do you know if two functions f and g are inverses of one another?
iv. Define precise definition of limit.
v. If g(x)=x-7 and f(x)=3x then find $f(g(x))$.
vi. State the sandwich theorem.
vii. Define the Horizontal line test for one –to-one function.
viii. What are horizontal and vertical asymptotes? Give example.
ix. Define the linearization of the function at the point.
x. Differentiate $f(x) = x^x,\ x > 0$.
xi. Define the general power rule for derivatives.
xii. Define local maximum and local minimum.
xiii. State the Cauchy mean value theorem.
xiv. How do find the distance from a point to the line in space?
xv. Give a geometric description of the points in space $x^2 + y^2 = 4, z = 0$.
xvi. Find parametric equations for line through the point P (-2, 0, 3) and Q (3, 5,-2).

Subjective Part (3*16)

Q.2. (i) Find the vector projection of $u = 6i + 2j + 3k$ *onto* $v = i - 2j - 2k$ and the scalar component of **u** in the direction of **v**.
(ii)Find parametric equations for the line through $P(-3,2,-3)$ *and* $Q(1,-1,4)$.

Q.3. (i) State and prove**The Mean value theorem.**
(ii)Sketch the graph of the differentiable function $y = f(x)$ that has a local minimum at (1,1) and local maximum at (3,3)

Q.4. (i) Does the curve $y = x^4 - 2x^2 + 2$ have any horizontal tangents? if so, where?
(ii) Find the values of a that makes the following function differentiable for all x-values.

$$f(x) = \begin{cases} ax, & if\ x < 0 \\ x^2 - 3x & if x \geq 0 \end{cases}$$

Q.5. (i)Find the inverse of the function$y = x^2,\ x \geq 0$, expressed as a function of x.
(ii) Using Sandwich theorem, find the horizontal asymptote of the curve $y = 2 + \frac{\sin x}{x}$.

Q.6. (i) A hot –air balloon ascending at the rate of $12\ ^{ft}/_{sec}$ is at a height 80ft above the ground when a package is dropped. How long does it take the package to reach the ground?
(ii)Find the indefinite integral $\int \frac{\sqrt{t}+\sqrt[3]{t}}{t^2}\,dt$.

University of Sargodha

Course Title: Programming Fundamentals Course Code: CMP-2122

Time:1hr Marks 20

Q.1.

- Use for loop to construct a program that displays a pyramid of '*' on the screen. The pyramid should look likethis. [10]

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

Q.2.

- A program that accepts a +ve number and passes it to a function. The function calculates the factorial and returns it back to the main() function. [10]

University of Sargodha

BS 1st Term Examination 2018.

Subject: Computer Sc./Software Engineering/Information Technology

Paper: Introduction to Information & Communication Technology (ICT-2021)

Time Allowed: 2:30 Hours **Maximum Marks: 60**

(New Scheme)

Note: Objective part is compulsory. Attempt any three questions from subjective part.

Objective Part (Compulsory)

Q.1. Write short answers of the following in 2-3 lines each. (2*12)

i. How might you evaluate the accuracy of a Web site?
ii. How do Web sites benefit individuals' health care?
iii. What are the omponents of a web address??
iv. What types of media might a person use to enhance a presentation?
v. What are the types of application software used in communications?
vi. How do program instructions transfer in and out of memory?
vii. What are two types of designs of Tablet PCs?
viii. What are the various types of pen input, and what are other types of input for smart phones?
ix. What are two types of wireless printing technology?
x. What is audio resolution, and what are three examples of audio resolutions?
xi. What is the purpose of network attached storage devices?
xii. What is one difference between microfilm and microfiche?

Subjective Part (3*12)

Q.2. Describe four embedded operating systems. What are the uses for each of the four types?
Q.3. What are various network communications standards? Provided detailed answer.
Q.4. What are characteristics of relational, object-oriented, and multidimensional databases?
Q.5. What are the characteristics of a user interface? And what are the key features of widely used graphics and multimedia programs?
Q.6. Write short note on following:

i. Touch sensitive pads
ii. Mobile Printers
iii. Virtual Reality

University of Sargodha

BS 1st Term Examination 2018

Subject: CS / IT / SE
Time Allowed: 2:30 Hour

Paper: Basic Electronics (PHY-2210)
Maximum Marks: 80

Note: Objective part is compulsory. Attempt any three questions from subjective part.

Objective Part

Q1. Write Short answer of the following on your answer sheet. **(2*16=32)**

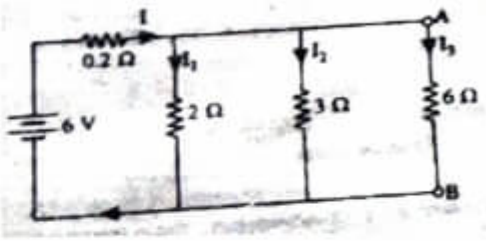
A. Define rectification? Name its types?
B. Write the causes of Fiber losses?
C. Can a transformer operate on DC?
D. Define dielectric strength of a medium?
E. What is Zener breakdown?
F. What are passive circuit elements?
G. What is the important feature of parallel circuits over series circuit?
H. Find resistance value and tolerance rate of blue-white-gold-silver?
I. What is the effect of temperature on barrier voltage?
J. What are draw backs of ICS?
K. What is ideal diode?
L. Differentiate between linear and non-linear devices?
M. What is the effect of doping on width of depletion layer?
N. Why is Silicon preferred to Germanium for semi-conductor devices?
O. What is the behavior of semi-conductor at zero degree Kelvin?
P. Do pure semi-conductors obey Ohm's law?

Subjective: (3 * 16=48)

Q2. a). Describe the working of a potentiometer.

b) find the values of following questions with respect to given diagram

I. Branch currents.
II. Current and power supplied by the battery
III. Current and power supplied by the battery if an accidental short occurs between points A and B.



Q3. a. Define transformer? Give principal and working of core type transformer?

b. A power transformer has 100 primary turns and 600 secondary turns. If the primary voltage is 120 Volt and full load primary current is 12 A. Find secondary voltage and secondary current?

Q4. Explain input and output characteristics of NPN transistor in CB configuration?

Q5. a. Define rectification? Explain half wave rectification with the help of single diode?

b. What is light emitting diode? Give its construction and working?

Q6. Define Fiber Optics? What is the structure of Optical Fibers? Also define the classification of Optical Fiber?

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PAPER: Calculus (IT)-I
Course Code: MATH--131

TIME ALLOWED: 2hrs. & 30 mins.
MAX. MARKS: 50

Attempt this Paper on Separate Answer Sheet Provided.

Short Question

Q.02 (a) Solve $\frac{dy}{dx} + 3y = e^{-2x}$ [20]

(b) Find the rectangular coordinates of the points whose polar coordinates are:
(0,-a)

(c) Evaluate $\int_{\sqrt{2}}^{-2} \frac{sec^2(sec^{-1}x)dx}{x\sqrt{x^2-1}}$

(d) Find $\frac{d^2y}{dx^2}$ if $y = xsinx - 3cosx$

(e) State Roll's theorem

(f) Evaluate $\int_0^{\pi} \sqrt{1+cos4x}\, dx$

(g) Define relative minima and relative maxima of a function

(h) Evaluate $\lim_{x\to\infty} \frac{x-2x^2}{3x^2+5x}$

(i) Evaluate $\int e^x cosx\, dx$

(j) Find the curve $y = f(x)$ in the xy plane that passes through the point (9,4) and whose slope at each point is $3\sqrt{x}$

Long Question

Q.03 State Mean Value Theorem and for what values of a, m and b does the function [10]

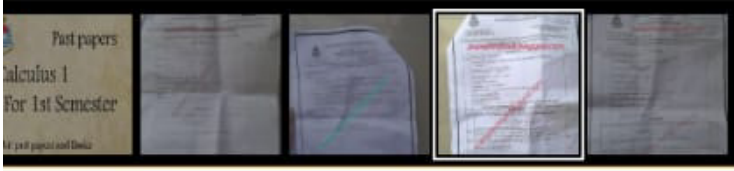
$$f(x) = \begin{cases} 3 & x = 0 \\ -x^2 + 3x + a & 0 < x < 1 \\ mx + b & 1 \le x \le 2 \end{cases}$$

satisfy the hypothesis of the Mean Value Theorem on the interval $[0,2]$?

Q.04 Find the critical points of $f(x) = x^{\frac{1}{3}}(x-4) = x^{\frac{4}{3}} - 4x^{\frac{1}{3}}$. Identify the intervals on which f is increasing and decreasing. Find the function's local and absolute extreme values. [10]

Q.05 a) Solve the initial value problem $y'' + 6y' + 9y = 0$, $y(0) = 2$ $y'(0) = -5$. [10]

b) Evaluate $\int \frac{(x^2+x-2)}{3x^3-x^2-3x-1} dx$



BS Term System, 1st Term Exam 2013

Subject: Computer Science **Course: Calculus (MTH-101)**

Time Allowed: 2:30 Hours **Maximum Marks: 80**

Note: Section-I is compulsory. Attempt any four questions from section-II. Attempt all questions on your answer book.

Section-I Objective Part

Q.1. Write short answers of the following in two or three lines. (16*2 = 32)

(i) Evaluate $\lim_{x\to 1}\frac{x^n-1}{x-1}$.

(ii) Find the body's acceleration at the end points of the interval $[0,2]$ if the position of the body at any time t is $s = t^3 - 3t + 2$.

(iii) Evaluate the integral $\int_{-2}^{1}|x|dx$

(iv) Find slope of the curve $y = \frac{1}{x}$ at $x = a$.

(v) Define continuity of a function at $x = x_0$.

(vi) Find the intervals in which the function $f(x) = x^3 + 12x - 24$ is increasing.

(vii) Evaluate $\int x^3 \sin x^4 dx$.

(viii) Find $\frac{dy}{dx}$ for $x = \tan y$.

(ix) If $\int_0^2 f(x)dx = 10$ and $\int_0^7 f(x)dx = 7$, then find $\int_2^7 f(x)dx$.

(x) Find critical points of the function f whose derivative is $\frac{x^2(x-3)}{x+2}$.

(xi) Find the average rate of change of $f(t) = 2 + \cos t$ over the interval $[-\pi, \pi]$.

(xii) Define critical point of a function.

(xiii) If $y = \tan u$, $u = v - \frac{1}{v}$ and $v = \ln x$, then find $\frac{dy}{dx}$.

(xiv) Find the equation of tangent to the curve $y = x^3 - 4x + 1$ at the point $(2,1)$.

(xv) Evaluate $\int_0^4 \frac{1}{\sqrt{x+1}}$.

(xvi) Evaluate $\int \sec(\frac{1}{3})dx$.

Section-II (Subjective Part)

Q. 2 (a) Let

$$f(x) = \begin{cases} x^2 - 1, & \text{if } x \le 3 \\ \sqrt{x+7}, & \text{if } x > 3 \end{cases}$$

Find $\lim_{x\to 3} f(x)$, $\lim_{x\to 3^+} f(x)$ and $\lim_{x\to 3} f(x)$ 6

(b) Find the slope of the graph of $y = x^2 + 1$ at the point $(2,5)$ and use it to find the equation of the tangent line to $y = x^2 + 1$ at $x = 2$. 6

Q.3 (a) Show that the function $f(x) = |x|$ is not differentiable at $x = 0$. 6

(b) Find $\frac{dy}{dx}$ if $y = \frac{1+\cos(x^2)}{1-\cos(x^2)}$ 6

Q. 4 (a) At what point(s) is the tangent line to the curve $y^3 = 2x^2$ perpendicular to the line $4x - 3y + 1 = 0$? 6

(b) Find $\frac{dy}{dx}$ if $x = \frac{3at}{1+t^3}$, $y = \frac{3at^2}{1+t^3}$. 6

Q. 5 (a) Find the local linear approximation of $f(x) = \frac{1}{\sqrt{1-x}}$ at $x_0 = 0$. 6

(b) Evaluate the integral $\int [\sin(\sin\theta)]\cos\theta d\theta$. 6

Q. 6 (a) Find the total area between the curve $y = 1 - x^2$ and the x-axis over the interval $[0,2]$. 6

(b) Find the volume of the solid that is obtained when the region under the curve $y = \sqrt{x}$ over the interval $[1,4]$ is revolved about the x-axis. 6

Q. 7 (a) Let $y = \sqrt{4 - x^2}$, $-1 \le x \le 1$. Find the area of the surface generated by revolving the given curve about x-axis. 6

(b) Find the exact length of the curve $y = 3x^{\frac{1}{3}}$ from $x = 1$ to $x = 8$. 6

BS Term System, 1st Term Exam 2013

Subject: Computer Science **Course: Calculus (MTH-101)**

Time Allowed: 2:30 Hours **Maximum Marks: 80**

Note: Section-I is compulsory. Attempt any four questions from section-II. Attempt all questions on your answer book.

Section-I Objective Part

Q.1. Write short answers of the following in two or three lines. **(16*2 = 32)**

(i) Evaluate $\lim_{\theta \to 1} \frac{\theta^4 - 1}{\theta - 1}$.

(ii) Find the body's acceleration at the end points of the interval $[0, 2]$ if the position of the body at any time t is $s = t^3 - 3t + 2$.

(iii) Evaluate the integral $\int_{-3}^{2} |x| dx$

(iv) Find slope of the curve $y = \frac{1}{x}$ at $x = a$.

(v) Define continuity of a function at $x = x_0$.

(vi) Find the intervals in which the function $f(x) = x^3 + 12x - 24$ is increasing.

(vii) Evaluate $\int x^3 \sin x^4 dx$.

(viii) Find $\frac{dy}{dx}$ for $x = \tan y$.

(ix) If $\int_0^6 f(x)dx = 10$ and $\int_0^4 f(x)dx = 7$, then find $\int_4^6 f(x)dx$.

(x) Find critical points of the function f whose derivative is $\frac{x^4(x-2)}{x+3}$.

(xi) Find the average rate of change of $f(t) = 2 + \cos t$ over the interval $[-\pi, \pi]$.

(xii) Define critical point of a function.

(xiii) If $y = \tan u$, $u = v - \frac{1}{v}$ and $v = \ln x$, then find $\frac{dy}{dx}$.

(xiv) Find the equation of tangent to the curve $y = x^3 - 4x + 1$ at the point $(2, 1)$.

(xv) Evaluate $\int_0^8 \frac{1}{\sqrt[3]{x+1}}$.

(xvi) Evaluate $\int \sec(\frac{t}{3})dx$.

Section-II (Subjective Part)

Q. 2 (a) Let

$$f(x) = \begin{cases} x^2 + 1, & \text{if } x \leq 3 \\ \sqrt{x + 7}, & \text{if } x > 3 \end{cases}$$

Find $\lim_{x \to 3^-} f(x)$, $\lim_{x \to 3^+} f(x)$ and $\lim_{x \to 3} f(x)$ — 6

(b) Find the slope of the graph of $y = x^2 + 1$ at the point $(2, 5)$ and use it to find the equation of the tangent line to $y = x^2 + 1$ at $x = 2$. — 6

Q.3 (a) Show that the function $f(x) = |x|$ is not differentiable at $x = 0$. — 6

(b) Find $\frac{dy}{dx}$ if $y = \frac{1+\csc(x^2)}{1-\cot(x^2)}$ — 6

Q. 4 (a) At what point(s) is the tangent line to the curve $y^2 = 2x^3$ perpendicular to the line $4x - 3y + 1 = 0$? — 6

(b) Find $\frac{dy}{dx}$ if $x = \frac{3at}{1+t^3}$, $y = \frac{3at^2}{1+t^3}$. — 6

Q. 5 (a) Find the local linear approximation of $f(x) = \frac{1}{\sqrt{1-x}}$ at $x_0 = 0$. — 6

(b) Evaluate the integral $\int [\sin(\sin\theta)] \cos\theta d\theta$. — 6

Q. 6 (a) Find the total area between the curve $y = 1 - x^3$ and the x-axis over the interval $[0, 2]$. — 6

(b) Find the volume of the solid that is obtained when the region under the curve $y = \sqrt{x}$ over the interval $[1, 4]$ is revolved about the x-axis. — 6

Q. 7 (a) Let $y = \sqrt{4 - x^2}$, $-1 \leq x \leq 1$. Find the area of the surface generated by revolving the given curve about x-axis. — 6

(b) Find the exact length of the curve $y = 3x^{\frac{1}{3}}$ from $x = 1$ to $x = 8$. — 6

University of Sargodha

BS 1st Term/Semester Exam 2020

Subject: L T **Paper: English Composition & Comprehension (ENGL-101)**

Time Allowed: 2:30 Hours **Maximum Marks: 80**

Note: Objective part is compulsory. Attempt any three questions from subjective part.

Objective Part (Compulsory)

Q.1. Write short answers of the following in 2-3 lines each on your answer sheet. (2*16)

i. Underline the Noun Phrase in the following sentences.
   a) All the kids were sleeping.
   b) The boy in the blue jeans says he'll do it.
ii. What is abstract noun? Explain with example.
iii. What is the difference between gerund and participle?
iv. Explain the different types of Sentences.
v. Differentiate between Quotation marks and Question marks.
vi. Define clause complex.
vii. What is Intransitive verb? Give example.
viii. Punctuate the following sentences:
   a). In the morning we got up and got ready for work.
   b) I hope you will be here he said.
ix. Point out the tenses in the following
   a). She has not been to Rome.
   b). Had you arrived?
x. Differentiate between sentence and clause.
xi. Give the synonyms of following
   a). Succinct
   b). Tantamount
xii. Give Indirect speech of the following.
   i) He said "I write a letter".
   ii) Mr. David said "I want to meet your parents".
xiii. Differentiate between articles "a", "an" and "the". Give two examples each.
xiv Differentiate between compound and complex sentences.
xv. Give passive voice of the following
   i) The Professor teaches the students.
   ii) John washes the dishes.
xvi. Give examples of preposition and interjection.

Subjective Part (3*16)

Q.2. Write a short note on the following:
a). Countable and uncountable noun b). Adverb
c). Aspect d). Finite verb and non-finite verb

Q.3. What is clause? Discuss its different types in detail.
Q.4. Define Phrase. Explain different types of phrases with examples.
Q.5. Write a detail note on Punctuation marks? Discuss each with examples.
Q.6. Change the narration in following:
(I). He said "Stop". (II). Boys said, "We cannot play today."
(III).The teacher said, "Boys, I shall give you a test in English today." (IV). His wife said
you know that my servant maid stole our money?" (V) The stranger said to the lady," H
been to Delhi? " (VI). He says, "I am a good player." (VII).Her brother said to her, "
should I bring for you when I return from Bombay?" (VIII).The cobbler said," How stup