PUNJAB TECHNICAL UNIVERSITY
JALANDHAR

Max. Marks: 90 **Time: 90 Mins.**

Entrance Test for Enrollment in Ph.D. Programme

Important Instructions

- ***Fill all the information in various columns, in capital letters, with blue/black ball point pen.***
- ***Use of calculators is not allowed. Use Blue/Black ball point pen for attempting the questions.***
- ***All questions are compulsory. No negative marking for wrong answers.***
- ***To attempt a question, make a tick mark (√) at the right option/answer.***
- ***Each question has only one right answer.***
- ***Questions attempted with two or more options/answers will not be evaluated.***

Subject *(Engg./Arch./Pharm./Mgmt./Sciences)* **APPLIED SCIENCE**

Discipline / Branch **MCA**

Name .....

Father's Name .....

Roll No. ..... Date : **10-07-2010**

Signature of Candidate .....

Signature of Invigilator .....

Q. 1 Printer resolution is measured by the number of _____.

(a) characters per second (cps)

(b) dots per inch (dpi)

(c) pages per minute (ppm)

(d) spots per centimeter (spc)

Q. 2 Who is original developer of Linux, the free Unix clone on the PC?

(a) Bill Gates

(b) Richard Stallman

(c) Dennis Ritchie

(d) Linus Torvalds

Q. 3 Recursive procedures are implemented by

(a) Queues

(b) Stacks

(c) Linked lists

(d) Strings

Q. 4 On a disk drive, seek time is:

(a) The time to seek out the next sector

(b) The time required to move the access arm to the proper cylinder

(c) The time waiting for data to show up under the read/ write heads

(d) All of the above

Q. 5 What is the difference between a Virus and a Worm?

(a) A worm is bigger in size

(b) A virus attaches itself to another file, while a worm exists independently

(c) A virus can replicate, a worm can't

(d) A virus can damage data, a worm can't

Q. 6 What is the difference between an Internet and Intranet?

(a) Internet is used to access worldwide information via computers & modems and Intranet is used to access information within a particular environment.

(b) Intranet is used to access worldwide information via computers & modems and Internet is used to access information within a particular environment.

(c) Intranet is more global compared to Internet.

(d) Internet and Intranet ate the same.

Q. 7 What does ISP stand for?

(a) International Service Protocol

(b) Internal Service Port

(c) Internet Service Provider

(d) Internet Search Program

Q.8 Using the HDD as an extension of RAM is a feature of

(a) Virtual memory

(b) Cache memory

(c) Direct Memory Access (DMA)

(d) Virtual Reality

Q.9 _____ is a term used in computer science to describe the techniques involved in writing a compiler (or assembler) in the target programming language, which it is intended to compile.

(a) Bootstrapping

(b) Cross-compiler

(c) Lex

(d) Syntax Analyzer

Q.10 Pattern of connections between the devices on a network.

(a) Topology

(b) LAN

(c) WAN

(d) Internet

Q.11 The industry standard programming language for expressing data access and manipulation in relational databases is called:

(a) 4GL

(b) ORACLE

(c) SQL

(d) COBOL

Q.12 Which of the following lists is in increasing order of magnitude?

(a) mega, kilo, giga, tera

(b) kilo, mega, giga, tera

(c) kilo, tera, mega, giga

(d) mega, tera, giga, kilo

Q.13 Which of the following companies developed Acrobat Reader?
(a) Microsoft
(b) Apple
(c) Adobe
(d) Google

Q.14 Which one of the following statements is false?
(a) Accessing memory on Hard Drive is faster than accessing memory from RAM
(b) RAM is an example of a volatile storage device
(c) A Hard Drive typically has a larger storage capacity than RAM
(d) A Hard Drive is used for mass storage

Q.15 Which of the following hardware components can't be used to create a network?
(a) Dial-up Modem
(b) USB Cable
(c) Router
(d) Ethernet card

Q.16 Which of the following statements about TCP/IP is false?
(a) TCP/IP is a pair of protocols that are used to transfer packets from one machine to another using the Internet
(b) IP defines network addresses and is used for routing packets
(c) TCP converts packets from analog to digital and digital to analog
(d) IP stands for Internet Protocol

Q.17 Given that the ASCII code for the letter 'A' is 65, what are the codes for the word "BAD"?
(a) 67 65 66
(b) 66 65 68
(c) 66 65 67
(d) 67 66 68

Q.18 What does CSS stand for?
(a) Cascading Style Strings
(b) Cascading String Sheets
(c) Cascading Style Syntax
(d) Cascading Style Sheets

Q.19 Which one of the following means of communication is synchronous?
(a) Discussion via email
(b) Discussion thread on a forum
(c) Series of blog posts
(d) Discussion via chat (instant messaging)

Q.20 Which of the following is not true of an LL(1) parser?
(a) It parses top-down.
(b) It discovers a left-most derivation.
(c) It is also called a shift-reduce parser.
(d) It parses left-to-right.

Q.21 The output of a lexical analyzer is:
(a) Intermediate code
(b) A stream of tokens
(c) A parse tree
(d) Key words

Q.22 What do SQL, QBE & DBMS stand for?
(a) Structured Query Language, Query by Example and Database Management System
(b) System Query Language, Query by Example and Database Management System
(c) System Query Language, Query by Execution and Database Management Structure
(d) Structured Query Language, Query by Example and Database Management Structure

Q.23 Which one of the following statements about image formats is false?
(a) GIF is a lossless method that is good for diagrams, but can only represent a limited number of colors
(b) Vector graphics can be scaled to any size without loss in quality, but bitmaps lose quality when they are scaled up.
(c) PNG is a lossy method that is good for diagrams, but it can also be used for Photographs
(d) JPEG is a lossy method that is good for photographs, but not as good for diagrams

Q.24 How much memory is required to represent an image that is 4 pixels wide and 4 pixels high and uses 4 colors?
(a) 12 bits
(b) 4 bits
(c) 64 bits
(d) 32 bits

Q.25 How many different numbers can be represented by 5 bits?
(a) 24
(b) 40
(c) 16
(d) 32

Q.26 Which of the following statements best describes a blog?
(a) A blog is a web site that is used for political movements by giving people a voice
(b) A blog is a web site in which posts are made in chronological order
(c) A blog is a web site that allows people to work together collaboratively
(d) A blog is a web site that is easy to use and shares information with the public

Q.27 A superkey is any key that uniquely identifies each ____ uniquely.

(a) Entity
(b) Object in a table
(c) Table
(d) Structure in a table

Q.28 A relational operator that allows for the combination of information from two or more tables is known as the ____ operator.
(a) Selection
(b) Projection
(c) Join
(d) Difference

Q.29 In a relationship, when a primary key from one table is also defined in a second table, the field is referred to as a ____ in the second table.
(a) Combined key
(b) Redundant field
(c) Primary key
(d) Foreign key

Q.30 When the DBMS translates logical requests into commands that physically locate and retrieve the requested information, it is fostering data ____.
(a) Integrity
(b) Independence
(c) Inconsistency
(d) Mining

Q.31 If a table, *sales*, has a column filled with all the names of the Indian states and you want to find all states that have an "P" somewhere in its name, you can do that via this SQL command:
(a) Select * from sales where state like '%P%';
(b) Select * from sales where state = '%P%';
(c) Select * from sales where state like 'P%';
(d) Select * from sales where state = 'P';

Q.32 The hierarchical database model depicts a set of ____ relationships.
(a) M:1
(b) 1:1
(c) 1:M
(d) M:N

Q.33 The ERD is used to graphically represent the ____ database model.

(a) Condensed
(b) Physical
(c) Logical
(d) Conceptual

Q. 34 Which UNIX command you can use to list lines 101-200 in a file 'FILE.TXT'?

(a) head – n 100 FILE.TXT | tail –n 200
(b) tail – n 200 FILE.TXT | head –n 100
(c) head – n 200 FILE.TXT | tail –n 100
(d) tail – n 100 FILE.TXT | head –n 200

Q.35 The output produced by the UNIX command *grep '^[0-9]*$' FILE* consists of
(a) All lines in FILE that contain at least one digit
(b) All lines in FILE that are composed entirely of digits
(c) All lines in FILE that contain at least one character that is not a digit
(d) All lines in FILE that contain no digits

Q.36 Which of the following UNIX command will count the lines of all the .c and .h files in the current working directory?
(a) cat *.ch | wc – l
(b) cat *.[c-h] | wc – l
(c) cat *.[ch] | ls – l
(d) cat *.[ch] | wc – l

Q.37 The value of the arithmetic expression P : 40, 16, 8, /, 4, 5, +, *, - written in post-fix notation and using a stack will be:
(a) 11
(b) 22
(c) 33
(d) 44

Q.38 Static storage allocation implements binding _____
(a) At compile time
(b) At run time
(c) Both at compile time and run time
(d) As the program terminates

Q.39 Which of the following is an advantage of interrupt-driven I/O over programmed I/O?
(a) Faster completion of the data transfer
(b) Higher bandwidth availability
(c) Better CPU utilization
(d) Smaller memory requirement

Q.40 Assume that we can buy a 3 GHz computer for Rs 30000 now. According to Moore's Law, how fast would we expect a computer costing Rs 30000 to be in 3 years time?
(a) 3 GHz
(b) 12 GHz
(c) 4 GHz
(d) 6 GHz

Q. 41 When a program is in execution, what action does the processor perform in order to fetch the next instruction?
(a) Pop the address of the instruction from the stack.
(b) Copy the contents of the PC to the MAR.
(c) Look up the address of the instruction in the associated process control block.
(d) Trap to the ISR.

Q. 42 Racing condition in J-K flip-flop is eliminated by
(a) Using S-R flip-flop
(b) Using master-slave J-K flip-flop
(c) Connecting J and K together
(d) Using a latch

Q.43 The incremental model of software development is
(a) A reasonable approach when requirements are well defined
(b) A good approach when a working core product is required quickly
(c) The best approach to use for projects with large development teams.
(d) A revolutionary model that is not used for commercial products.

Q.44 Which of the following is not one of the principles of good coding?
(a) Create unit tests before you begin coding
(b) Create a visual layout that aids understanding
(c) Keep variable names short so that code is compact
(d) Write self-documenting code, not program documentation

Q.45 Which of following is <u>not</u> a UML diagram used creating a system analysis model?
(a) Activity diagram
(b) Class diagram
(c) Data flow diagram
(d) State diagram

Q.46 Cohesion is a qualitative indication of the degree to which a module
(a) Can be written more compactly
(b) Focuses on just one thing
(c) Is able to complete its function in a timely manner
(d) Is connected to other modules and the outside world

Q.47 Polymorphism reduces the effort required to extend an object system by
(a) Coupling objects together more tightly
(b) Enabling a number of different operations to share the same name
(c) Making objects more dependent on one another
(d) Removing the barriers imposed by encapsulation

Q.48 A decision table should be used
(a) To document all conditional statements
(b) To guide the development of the project management plan
(c) Only when building an expert system
(d) When a complex set of conditions and actions appears in a component

Q.49 What is the normal order of activities in which traditional software testing is organized?

A) Integration testing
B) System testing
C) Unit testing
D) Validation testing

(a) A, D, C, B
(b) B, D, A, C
(c) C, A, D, B
(d) D, B, C, A

Q.50 The cyclomatic complexity metric provides the designer with information regarding the number of

(a) Cycles in the program
(b) Errors in the program
(c) Independent logic paths in the program
(d) Statements in the program

Q.51 In SDRAM, what does the S represent?

(a) SIMM
(b) Synchronous
(c) Speedy
(d) Symmetric

Q.52 Direct memory access (DMA) enables the system to run background applications without interfering with the ____.

(a) CPU
(b) IO/MEM
(C) RAM
(d) ROM

Q.53 What is the purpose of *endl* in C++ I/O?

(a) It is used at the end of output statements instead of a semicolon
(b) It instructs the output object to print a newline character, but not to flush its buffer
(c) It instructs the output object to print a newline character and then to flush its buffer
(d) It instructs the output object to flush its buffer and then to print a newline character

Q.54 Every call to a function in C++ is checked by the compiler against the

(a) Parameter list
(b) Variable description
(c) Function prototype
(d) Program prototype

Q.55 Consider the following function in C:

```
sample(int d) {

    if (d == 0) return 0;

    else return d += sample(d – 1);

}
```

When the above function is called with a non-zero positive value, it always returns the value of

(a) d
(b) d – 1
(c) d * (d + 1) / 2
(d) Zero

Q.56 Consider the C program shown below.

```
#include <stdio.h>
#define print(x) printf("%d ", x)

 int x;
 void Q(int z) {
     z += x; print(z);
     }
 void P(int *y) {
     int x = *y+2;
     Q(x); *y = x-1;
     print(x);
     }
 main(void) {
     x = 5;
     P(&x); print(x);
 }
```

The output of this program is
(a) 12 7 6
(b) 22 12 11
(c) 14 6 6
(d) 7 6 6

Q.57 The Painter's algorithm sorts polygons by depth and then paints (scan-converts) each polygon onto the screen starting
(a) the most distant polygon
(b) the most nearest polygon
(c) the middle polygon
(d) large polygons followed by small polygons

Q.58 Simplify the Boolean function

$$B(A+C)+A\overline{B}+B\overline{C}+C$$

(a) A

(b) A + B

(c) AB + BC

(d) A + B + C

Q.59 The decimal equivalent of binary number 0.0111 is:

(a) 4.375
(b) 0.4375
(c) 0.5375
(d) –0.4375

Q.60 _____ is a reversible image compression technique.

(a) GIF
(b) JPEG
(c) MPEG
(d) BMP

Q.61 Suppose an operating system (OS) designer chooses the micro-kernel architecture over the monolithic architecture for implementing an OS. What can be the strongest motivating reason for this choice?

(a) The need for maximum performance
(b) The desire to have a flexible and extensible kernel
(c) Because hardware support exists for micro-kernels on most microprocessors
(d) Need for performance isolation among user-level processes

Q.62 In the context of OS, Maximizing _____and minimizing _____can lead to increased _____.

(a) Predictability, mean response time, rotational latency
(b) Throughput, mean response time, variance of response times
(c) Throughput, variance of response times, transmission time
(d) Seek time, throughput, mean response time

The following information pertains to questions 63-64:

Mergesort and Quicksort could be viewed as applications of a technique called *Divide-and-Conquer*. In this technique we solve a problem by

(i) Dividing it into subproblems,
(ii) Recursively solving the subproblems, and then
(iii) Combining the solutions of the subproblems to get a solution to the original problem.

Q.63 Outside of the time spent in recursive calls, where did Quicksort do its comparisons of keys?

(a) In stage (i).
(b) In stage (iii).
(c) About half in stage (i), and the other half in stage (iii).
(d) Neither stage (i) nor stage (iii) required any comparisons of keys.

Q.64 Outside of the time spent in recursive calls, where did Mergesort do its comparisons of keys?

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(b) In stage (iii).
(c) About half in stage (i), and the other half in stage (iii).
(d) Neither stage (i) nor stage (iii) required any comparisons of keys.

Q.65 Suppose we use a floating-point representation with a sign-bit, a 4-bit exponent in excess 7 notations and a 5-bit normalized fractional mantissa with no hidden bit. Then the largest number that can be represented is:

a) 31×2^{3}
b) 0.31×2^{8}
c) 31×2^{8}
d) 31×2^{13}

Q.66 Which term matches the following definition? The art and science of hiding secret messages within some other form that is usually visible or out in the open for anyone to see if they knew where to look.

(a) Encryption
(b) Digital watermarking
(c) Digital Signature
(d) Steganography

Q.67 Which data structure allows deleting data elements from front and inserting at rear?

(a) Stacks
(b) Queues
(c) Deques
(d) Binary search tree

Q.68 Which of the following best characterizes the difference between imperative and declarative programming languages?

(a) Declarative languages focus on what to do; imperative languages focus on how to do it.
(b) Declarative languages require that all variables be declared explicitly; implementations of imperative languages declare variables implicitly when they first appear.
(c) Imperative languages have lots of early binding, and are usually compiled; declarative languages have lots of late binding, and are usually interpreted.
(d) Imperative languages emphasize problem solving through recursion; declarative languages emphasize problem solving through iteration.

Q.69 Which of the following is TRUE?

(a) Light Pen would not work with a LCD
(b) Good graphics programming makes use of floating-point calculations
(c) The major components of an LCD are cathodes, anodes, gas cells, and glass plates
(d) Persistence is used to turn the electron beam on and off

Q.70 Which of the following statements is false?

(a) An algorithm that is $O(n^2)$ always perform more work than an algorithm of order O(n).
(b) Logic gates have only one output.
(c) Using sequential search, the number of comparisons that are needed in the best case to locate a name in the list of n names will be 1.
(d) Transistors are constructed from materials called semiconductors.

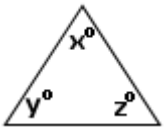
Q.71 If the last four letters of the word 'CONCENTRATION' are written in reverse order followed by next two in the reverse order and next three in the reverse order and then followed by the first four in the reverse order, counting from the end, which letter be eighth in the new arrangement?

(a) N
(b) T
(c) E
(d) R

Q.72 In a family, a couple has a son and a daughter. The age of father is three times of his daughter and age of the son is half of his mother. The wife is 9 years younger to her husband and the brother is seven years older than his sister. What is the mother's age?

(a) 40
(b) 45
(c) 50
(d) 60

Q.73



In the figure above, if the angles x, y and z are integers such that x < y < z, then the least and the greatest possible values of x + z are
(a) 59 and 81
(b) 59 and 135
(c) 91 and 178
(d) 120 and 135

Q.74 Find the next number in the series

1, 2, 6, 24, (----).

(a) 60
(b) 95
(c) 120
(d) 150

Q. 75 Successive discounts of 20% and 15% is equal to a single discount of …

(a) 35%
(b) 34%
(c) 33%
(d) 32%

Q.76 The average of the first four of five numbers is 40 and that of the last four numbers is 60. The difference of the last and the first number is:

(a) 400
(b) 200
(c) 40
(d) 80

Q.77 Sumit traveled the first 2 hours of his journey at 40 mph and the remaining 3 hours of his journey at 80 mph. What is his average speed for the entire journey?

(a) 60 mph
(b) 56.67 mph
(c) 53.33 mph
(d) 64 mph

Q.78 A boatman goes 2 km against the current of the stream in 1 hour and goes 1 km along the current in 10 minutes. How long will it take to go 5 km in stationary water?

(a) 40 minutes
(b) 1 hour
(c) 1 hour 15 minutes
(d) 1 hour 30 minutes

Q. 79 "illness" is related to "cure" in the same way as "grief" is related to:

(a) Happiness

(b) Ecstasy

(c) Remedy

(d) Consolation

Questions 80-82

<u>Directions</u>: Each of the following questions consists of a pair of capitalized words followed by four choices lettered (a) to (d). The capitalized words bear some meaningful relationship to each other. Choose the lettered pair of words whose relationship is most similar to that expressed by the capitalized pair.

Q.80 INSOMNIA : SLEEP ::
(a) Dyslexia : Read
(b) Hyperactivity : Move
(c) Malnutrition : Eat
(d) Hemophilla : Bleed

Q. 81 PARRY : QUESTION
(a) Confront : Dread
(b) Hurl : Insult
(c) Shirk : Duty
(d) Return : Affection

Q. 82 YAWN : BOREDOM
(a) Anger : Madness
(b) Dream : Sleep
(c) Smile : Amusement
(d) Impatience : Rebellion

Questions 83 –87 are based on the following:

Super-Teck employees with top-level security clearance use complicated passwords on their computers. Each password consists only of combinations of the following symbols (#, $, %, &, *). Passwords must also meet the following requirements:

- ✓ **A password must have at least three symbols but no more than five.**
- ✓ **Passwords do not need to use different symbols, unless otherwise specified below.**
- ✓ **All passwords must begin with the symbol #.**
- ✓ **The symbol & may not be the last symbol in a password.**
- ✓ **If * is the last symbol in a password, then the password must also contain at least one &.**
- ✓ **If $ is the second symbol in a password, then $ must also be the last symbol.**
- ✓ **The symbol # can only appear once in a password.**

Q.83 Which of the following is a possible password?
(a) #, %, %, $
(b) #, &, #, &
(c) #, $, $, %
(d) #, %, *, *

Q.84 If a four-symbol password is created that contains only the symbols #, $ and &, which of the following must be true?
(a) The password is #,$,&,$.
(b) The password contains two $.
(c) The password contains two &.
(d) The last symbol is $.

Q.85 How many different three-symbol passwords can be made using only the symbols #, $ and %?
(a) 2
(b) 3
(c) 5
(d) 6

Q.86 If a password ends with the symbol *, which of the following must be true?

(a) & appears twice in the password.
(b) $ is not the second symbol.
(c) % is not the third symbol.
(d) The password must contain at least four symbols.

Q.87 Which symbols may not be the only symbols used in a three-symbol password?

(a) #, $ and *
(b) #, $ and %
(c) # and $
(d) # and *

***Questions 88 – 90* are based on the following; choose the best answer from the answer choices given for each question.**

On each weekday evening, Monday through Friday, for one week, a financial consulting firm is offering a class on investments. A pair of exactly two instructors – one experienced and other inexperienced – will be chosen to teach each evening. The available experienced instructors are S, T, and U. The available inexperienced instructors are V, W, X, Y, and Z. Instructors will be assigned to teach classes according to the following conditions:

- **i) No instructor can be assigned to teach class on two consecutive evenings.**
- **ii) S and X, if either assigned to teach, must be assigned as a pair.**
- **iii) V must be assigned to teach Wednesday classes.**
- **iv) Y cannot be assigned to teach a class on an evening immediately preceding or following on evening when Z is assigned to teach.**

Q.88 Which of the following can be the pair of instructors assigned to teach Tuesday's class?

(a) S and Z

(b) U and X

(c) T and Y

(d) S and V

Q. 89 If T and Z are assigned to teach on Monday's Class, which of the following pairs of instructors can be assigned to teach Tuesday's class?

(a) S and X

(b) U and Y

(c) T and W

(d) S and W

Q. 90 If U is assigned to teach exactly one class, which is on Tuesday, which of the following is one of the instructors who must be assigned to teach Thursday's class?

(a) S

(b) W

(c) Y

(d) Z