1. A user wants to sort 5000 cards in descending order according to an alphabetic field in columns 23-45. The sorted card images are to be written with format FB(8000,80) into the sequential file QOSV which already exists and is empty. Show how to accomplish the sorting using *SCRT.

```
$RUN *SORT
SORT=CH, D, 23, 23
INPUT=*SOURCE
OUTPUT=QOSV, PB, 80, 8000
REC=5000
)
data
$ENDFILE
```

2. A FORTRAN program is to produce a CALCOMP plot of a vector of 100 points (ordered X,Y pairs). The plot is to be made with a scale factor of 25% and is to have labelled axes. List the subroutines in *PLCISYS that should be called, along with a brief description of their purpose, e.g., PLTEND - to terminate the plot.

```
PLTXMAX - optional define plot limits
PLTMAX - " " max
PLTSPACE - gives scale factor define coordinates
PENUP - to move pen without drawing to first point
PENDOWN - to move pen drawing the lines

PLTEND - end the plot
```

3. Draw a diagram depicting the basic structure of a labelled tape.
PLTSIZ - optional define scale factor
PLTMAX - optional
PLTMARKS
PScale - set up scale
PLTORS - define coordinates
PAXIS - draw axis
PLINE - draw the graph
PSYM - add char. info.
PLTEND - finish
4. A deck of 10000 cards is to be copied to a 9-track 1600 BPI tape. Assuming the inter-block gap (IBG) on a 9-track tape is 0.6 inches, calculate the number of feet of tape required

(A) assuming the tape is written with format F(80)
and (B) assuming the tape is written with format FB(8000,80).

(You may neglect the amount of tape required for labels.)

\[
\left( \frac{80}{1600} + 0.6 \right) \times 10^4 = 592.1 \\
\left( \frac{8000}{1600} + 0.6 \right) \times \left( \frac{10^4}{100} \right) = 560.1 \\
\]

5. What value is printed when the following program is run?

```
X = 1.0
CALL QQ(X,X)
WRITE(6,1000) X
1000 FORMAT(F10.5)
END
SUBROUTINE QQ(A,B)
A = 2.0
RETURN
END
```

6. Critically evaluate the following FORTRAN code sequence:

```
INTEGER ERRVEC(2) /1,215/
CALL GETIRC(IERROR,ERRVEC,8200)
DO 200 I=1,5
... READ (5,1000) X,Y,Z...
200 CONTINUE
```

Where is statement 1000?
Not to sure you can branch (200) to the end of a DO loop. You can't do it with a go to outside of the loop, but Fortran 61 may not catch the subroutine call.
The code just ignores errors. Shouldn't it print at least an error message or a count.
No END= (but perhaps IHC error #1 & EOF I'd have to look it up).
7. What kind of behavior can be expected if the statement
\[ X = Q(Y) \]
occurs in a FORTRAN program, but the variable \( Q \) has not been
dimensioned?

The function \( Q(Y) \) will be treated as a subroutine
and if not supplied or found in \( \text{LIBRARY} \) or a user \( \text{lib} \) a loader warning will
result.

8. Show the two instructions (three if you’re a purist) that
comprise the code of the \( \text{ADJAC} \) subroutine.

\[ \begin{align*}
& \text{LA 0,0(R1)} \\
& \text{SR A15,R15} \\
& \text{BR A14}
\end{align*} \]

9. What’s wrong with the following statement?

\[ \text{CALL QOSSV(10, MCHRESEPOWER)} \]

That can’t be a variable name or a constant and it’s a
literal where are the primes( ‘ ).

10. The subroutine \( \text{ISUBR} \) has been recompiled, and it’s
object code is now contained in the file \( \text{-LOAD} \). An old copy of
\( \text{ISUBR} \) is contained somewhere in the \text{sequential} file \( \text{MYPROGS} \).

(A) Show how to determine the exact location of \( \text{ISUBR} \) in
\( \text{MYPROGS} \).

\[ \text{RUN *OBJSCAN PAR = MYPROGS} \]

(B) Show how to replace the old definition, assuming it is
in lines 27-35 of \( \text{MYPROGS} \).

\[ \begin{align*}
& \text{CREATE -NEW TYPE=SEQ} \\
& \text{COPY MYPROC(*F,26,999)+LOAD+} \\
& \text{CREATE -NEW TYPE=SEQ SIZE=} \text{?} \\
& \text{RUN *LINKEDIT} \\
& \text{INCLUDE MYPROGS DELETE ISUBR} \\
& \text{EXECUTE MYPROC DELETE ISUBR} \\
& \text{RENAME MYPROC -NEW MYPROC}
\end{align*} \]
8CRE -T TYPE=SEQ
8COP MYPROBS -T (1,27) *DUMMY* (1,9) -T
8EMP MYPROBS OK
11. Where is the best place to place a REP card in an object module?

Between TGT & RLD (but always before END)

12. Describe the algorithm used by the loader to determine whether a CSI record has been erroneously truncated.

If length in record is greater than actual record length and the last char. is not a blank (X'40') than a warning is printed other wise (if last char. is a blank) the record is treated as if the missing positions were trimmed blanks.

13. Why will the following sequence of PL/I statements not produce the intended behavior when the program is run?

PUT FILE(SERCOM) LIST('ENTER A NEW VALUE');
GET FILE(GUSER) SKIP EDIT(STRINGVAR) (A(30));

Depends on what the intended behavior is.
14. Why is X'81' a good choice for a core constant on the 360?

You can see it when you are looking over a dump. It causes addressing errors if used as an address.

Causes very rapid error conditions when used in FORTRAN program (not initialized user) or at least the values printed are suspect.

In general cause the programmer to wake up and wonder why things are going on in a strange manner.

15. Show the internal representation (in hex) of the following constants:

- E'17'
- E'-1.5'
- C'ABCD'
- PI2'6'
- H'-3'

16. Give the values of X, A, B, & C after the following SNOBOL4 statements are executed:

X = 'ABCDEFGH'

X = 'ABC' $ A ARE $ B 'G' . C 'J' =

A = 'ABC'

B = 'DEF'

C = '6'

The statement fails.
17. What is the difference between the STOP and MTS commands in command language subsystems?

STOP terminates a run, releases devices & storage & returns to MTS command mode.

MTS return to MTS command mode without releasing storage or devices in a way allowing a restart.

18. Why must a user type "GO" to initiate a terminal session when using the Memorex terminal controller (763-0300)?

Used to establish parity & baud rates on the Memorex with autospeed.

(perhaps just baud rate)

2741 type?

19. Discuss the responsibilities of calling and called programs and register usage conventions in an OS/I calling sequence.

RO called program can return value here

RI caller places pointer to a pointer list here

R2-R12 no special use

R13 caller places pointer to save area here

R14 caller places return address here

R15 caller places entry point address of called here

called must save & restore register he (she?) plans to use
20. The maximum size of a line file is always the smallest of four criteria. What are the criteria?

\[
\begin{align*}
\text{line max size} & : 255 P \\
\text{seq max size} & : 32767 P \\
\text{space on volume} & \\
\text{the maxsize parameter set when file was created} & \\
\text{size of volume} & \\
\text{USER ID ALLOC}
\end{align*}
\]

21. Describe the functions of HASP in 50 words or less. (Answers of more than 50 words will be marked as incorrect.)

Spoools card images and print lines from slow devices to faster devices. Allows overlap between execution & I/O, does external scheduling based on time estimates & actual # of pages to print. Punching done on a FIFO scheme. Provides *PRINT*, *PUNCH*, & *BATCH* services. Communicates with remote stations.

22. Explain precisely what happens when the following run is submitted:

\[
\begin{align*}
\$\text{SIG ccid} & \text{ needed here (assumed)BAD ASSUMPTION} \\
\$\text{RUN*WATFIV} & \\
\$\text{COMPILE} & \\
\ldots & \\
\text{FORTRAN source deck} & \ldots \\
\$\text{DATA} & 1.0 2.0 3.0 \\
\$\text{SENDFILE} & \\
\$\text{STOP} & \\
\$\text{SIGNOFF} & \\
\end{align*}
\]

Nothing but error messages because & RUN* will not be a valid mtr command. Otherwise WATFIV would compile the program (if there were no serious errors) & execute it, perhaps reading the data & even the EOF thus printing a warning a quitting. "$\text{STOP}$ isn't at XITS connected but who cares? and we are done.
23. When are two dollar signs ($$')s) needed to get one dollar sign into a file?

When using the active file features of the command system in either number mode of when entering line numbers by hand.

TO GET $$ IN COL 1

24. Give a sequence of SDS commands that will cause the values of I, X(I), & Y(I) to be printed out every time the following program passes through statement 100.

```
DO 100 I=1,5
  X(I) = Z(C, W, E)
  Y(I) = X(I) + Z(I)
100 CONTINUE
```

Test option?

```
AT $100
D I, X(I), Y(I)
END
RUN or continue
```

25. (T-F-D) $CONTINUE WITH *DUMMY* is equivalent to $ENDFILE.

T when you are reading the file and IC is allowed (@IC and SET IC=ON).

```
ENDFILE=?
```

26. (T-F-D) If a user wants to cancel job 123456,

```
$CANCEL 123456
```

Perhaps. IF it is issued before the job starts, $ under the nine card.
27. (T-F-D) Assuming 5=SOURCE*, a program containing the following code may exhibit different behavior depending on the number of records read from *SOURCE*.

CALL READ(INBUF,INL,0,0,5)

28. (T-F-D) After a program interrupt has occurred, the PSW points to the instruction following the instruction which caused the interrupt.

Usually but not always

MIS trap had happened?

Under what circumstances?

29. (T-F-D) The following code sequence properly tests whether NUMB is a power of 2:

L GRA,NUMB
LCR GRB,GRA
NR GRB,GRA
CR GRB,GRA
BE POWEROF2

Discussion, Examples?
30. (T-F-D) In certain cases the subroutine QOSV does not reference all of its arguments. If such is the case, the following example will work properly:

CALL QOSV(X,Y)

...  

SUBROUTINE QOSV(A,B,C,D)

Yes as long as

C & D are not used.

*WATFIV would not be happy.*