**Answer 1:**

(a) Total track size = 20 \* (512+128) = 12800 bytes = **12.8 Kbytes**

Useful capacity of a track = 20 \* 512 = 10240 bytes = **10.24 Kbytes**

(b) Number of cylinders = number of tracks = **400**

(c) Total cylinder capacity = 15\*2\*20\*(512+128) = 384000 bytes = **384 Kbytes**

Useful cylinder capacity = 15 \* 2 \* 20 \* 512 = 307200 bytes = **307.2 Kbytes**

(d) Total capacity of a disk pack = 15 \* 2 \* 400 \* 20 \* (512+128)

= 153600000 bytes = **153.6 Mbytes**

Useful capacity of a disk pack = 15 \* 2 \* 400 \* 20 \* 512 = **122.88 Mbytes**

(e) Transfer rate tr= (total track size in bytes)/(time for one disk revolution in msec)

tr= (12800) / ( (60 \* 1000) / (2400) ) = (12800) / (25) = **512 bytes/msec**

block transfer time btt = B / tr = 512 / 512 = **1 msec**

average rotational delay rd = (time for one disk revolution in msec) / 2 = 25 / 2

= **12.5 msec**

bulk transfer rate btr= tr \* ( B/(B+G) ) = 512\*(512/640) = **409.6 bytes/msec**

(f) average time to locate and transfer a block = s+rd+btt = 30+12.5+1 = **43.5 msec**

(g) time to transfer 20 random blocks = 20 \* (s + rd + btt) = 20 \* 43.5 = **870 msec**

time to transfer 20 consecutive blocks using double buffering = s + rd + 20\*btt

= 30 + 12.5 + (20\*1) = **62.5 msec**

**12.8 Kbytes; 10.24 Kbytes; 400; 384 Kbytes; 307.2 Kbytes; 153.6 Mbytes; 122.88 Mbytes; 512 bytes/msec; 1 msec; 12.5 msec; 409.6 bytes/msec; 43.5 msec; 870 msec; 62.5 msec;**

**Answer 2:**

**T1 Examination - Question3 Solution**

1. update EMPLOYEE set salary=40000 where **ssn=123456789**;
2. alter table EMPLOYEE add **constraint fk1** foreign key (dno) references department(dnumber);
3. alter table EMPLOYEE modify lname varchar(20);
4. alter table DEPT\_LOCATIONS add primary key (Dnumber,Dlocation);
5. select \* from EMPLOYEE where sex='F’;