Database System Final Exam ~~2026~~ 2022/06/15

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1. (A) True
   (B) False
   (C) ~~False~~ True
   (D) True
   (E) True
   (F) False
   (G) False
   (H) False
   (I) True
   (J) False
   (K) False
   (L) False

2. (A)
```
SELECT Dname, COUNT(*)
FROM DEPARTMENT, EMPLOYEE
WHERE Dnumber = Dno
GROUP BY Dname
HAVING AVG(Salary) > 30000;
```

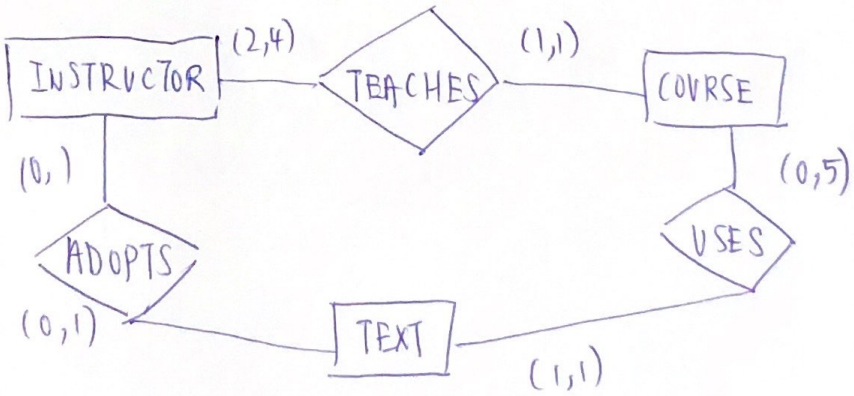
(B)
```
SELECT COUNT(*)
FROM EMPLOYEE AS E
WHERE EXISTS
    (SELECT *
     FROM EMPLOYEE AS S
     WHERE E.Super_Ssn = S.Ssn
       AND
       E.Sex = S.Sex);
```

(C)
```
CREATE VIEW VIEW1 AS
SELECT Dname, Fname, Lname, Salary
FROM DEPARTMENT D, EMPLOYEE E
WHERE D.Mgrssn = E.Ssn;
```

3. (A)

```
SELECT  COUNT (*)
FROM  STUDENT AS S , COURSE AS C
GROUPBY  C. Dept
HAVING  &
```

4.



5. relation $R = \{A, B, C, D, E, F, G, H, I, J\}$

$\{\{A, B\} \rightarrow \{C\}, \{B, D\} \rightarrow \{E, F\}, \{A, D\} \rightarrow \{G, H\}, \{A\} \rightarrow \{I\}, \{H\} \rightarrow \{J\}\}$

we known $AD \rightarrow GH$, so $ABD \rightarrow ABDGH$

∵ we known $A \rightarrow I$, ∴ $ABD \rightarrow ABDI$

we also known $AB \rightarrow C$ so, $ABD \rightarrow ABCD$

$BD \rightarrow EF$ so, $ABD \rightarrow ABDEF$

$AD \rightarrow GH$ So, $AD \rightarrow H$ ∵ $H \rightarrow J$, ∴ $AD \rightarrow J$ ∴ $ABD \rightarrow ABDJ$

∴ $ABD \rightarrow ABCDEFGHIJ$

∴ ABD is key

Decompose R into 2NF : R1 (A, B, C)
R2 (B, D, E, F)
R3 (A, D, G, H, J)
R4 (A, I)

Decompose R into 3NF : R1 (A, B, C)
R2 (B, D, E, F)
R3.1 (A, D, G, H)
R4 (A, I)
R3.2 (H, J)

6. (A) $r1(X)$; $r3(X)$; $w1(X)$; $r2(X)$; $w3(X)$

(B) $r1(X)$; $r3(X)$; $w3(X)$; $w1(X)$; $r2(X)$

(C) $r3(Y)$; $r3(Z)$; $r1(X)$; $w1(X)$; $w3(Y)$; $w3(Z)$; $r2(Z)$; $r1(Y)$; $w1(Y)$; $r2(Y)$; $w2(Y)$; $r2(X)$; $w2(X)$;

Let have 3 transactions T1, T2, T3.

Consider they are execute concurrently & produce a Schedule S.

(A) this seem to be not serializable, ∵ T1 reads $X(r1(X))$ before T3 but the T3 reads $X(r3(X))$ before T1 writes $X(w1(X))$.

(B) this is not serializable, ∵ T1 reads $x(r1(X))$ before T3 but the T3 writes $X(w3(X))$ before the T1 got writes $x(w1(X))$.
I think the operation $r2(X)$ of T2 will not affect the schedule.