## (b).

### (i) 1NF

As given, each Attribute id, name, age, classid, gender, manager and salary are Atomic.

**Therefore, Employee is in 1NF**

### (ii) 2NF

Requirement:

* Employee is 1 NF
* Every Non-Prime attribute in Employee is fully dependent on every candidate key in Employee

Candidate Keys: Manager, (classid, id, gender)

Nonprime attributes: Name, Age, Salary

Violation: id 🡪Name (i.e. classid, id, age 🡪 Name)

Name is not dependent on either candidate keys Manager or (classid, id, age).

**Employee is not 2NF**

### (iii) 3NF

Requirement:

* Employee is in 1NF and
* For each X->A in F+ where X is a set of attributes in Employee and id is a single attribute in Employee then
  + Either X->id is trivial FD or
  + X is a Super key of Employee or
  + A is a prime attribute of Employee.

Employee is in 1NF.

**id** 🡪 Name (**Name** 🡪 (**id, Age**), therefore, **Name** 🡪**id** and **Name** 🡪 **Age**) does not meet second condition

Because:

1. **Name** 🡪 **Age** is not trivial FD
2. **Name** is not a Super key
3. **Name** is not a prime attribute (i.e. subset of **Manager** or (**classid, id, Gender)**)

**Employee is not in 3NF**

### (iv) BCNF

Requirement:

* Employee is in 1NF and
* For each X->A in (Manager)+ where X is a subset of attributes in Employee and id is a single attribute in Employee then
  + Either X-> A is trivial FD or
  + A is a Super Key of Employee.

Employee is in 1NF.

**Name** 🡪 **Age** (**Name** 🡪 (**id**, **Age**), therefore, **Name** 🡪**id** and **Name** 🡪 **Age**) does not meet second condition

Because:

1. **Name** 🡪 **Age** is not trivial FD
2. **Name** is not a Super key.

**Employee is not in BCNF**