QUIZ 2 SOL

1. **[2+2+3+3] Describe the Scheduling Problems and Solve**
   – Q|pj|Cmax

ANS: [2 marks] N tasks with arbirary execution time with no pre-emption, m uniform processor (or processor with different speed), objective is to minimize overall execution time.
[3 marks] Problem is NPC, if speed=1 for all the processor.
*Any solution uses **longest task to fastest processo**r will lead to good solution may not be optimal.*

   – P|pj=1| ∑wjUj

ANS: [2 Marks] N tasks with unit execution time with no pre-emption with deadline di, m identical processor , objective is to minimize weghted late job. A job is late if Ci > di, i.e. completion time of the job is higher than the deadline of the job.
[3 Marks] Solution

- *Sort the job based on deadline*
- *Take job one by one*
  - *if the ith job cannot fit to any one of the processor then find a already considered job which weight is lesser then the current one, if found replace the job with the current one.*
  - *else consider the job in considered set*

2. **[4 Marks] Explain difference between**
   – DPM and DVFS

ANS: The objective of DPM is to reduce static power consumption while DVFS is used to minimise dynamic power consumption. DPM uses different power states like sleep, shutdown, idle, deep sleep to reduce static power cosumption. DVFS uses to minimise dynamic power consumtion by setting processor (running processor) at different processor speed (Voltage-Freq Pair). DVFS work in working condition but DPM used in idle condition.

   – Turbo and Throttle

ANS: Turbo is a feature that allows *those workloads to run at higher frequencies* while staying within the thermal and electrical specifications . If required increase speed but by default it run at lower speeds.

English meaning of throttle is “a device controlling the flow of fuel or power to an engine”. Throttle means of the thermal/electrical limit exceed, we cannot increase the speed. For example at a time only 3 cores out of 8 to allow to run at 5Ghz. Another example is speed governer of the cars (if set to 80kmph, what ever the value of acceletor, speed will be limited to a maximum of 80kmph).

3. **[3 Marks] Given an application with serial fraction s=0.2, Calculate the achievable speed up of the application even if using infinite number of processors.**

ANS: with infinite processor Sp = 1/s =1/0.2=5

4. **[3 marks] How the use of try_lock() is better off as compared to the simple spin lock() method? In which scenario spin lock will not perform good?**

ANS: [1.5 marks] As try_lock() read the lock variable insteading attempting locking the lock varible. If the lock varible looks free then only it issue atomic lock. Performance of try_lock is better as compared to spin lock (ans of the next question: as it reduce extra overhead in continuius spining the lock varible in **tight loop**).

[1.5 marks]Lock variable accesses with atomic TAS or CAS very frequently in a tight loop
and it beacme the bottle neck if many (higher number of) threads accessing the same lock variable frequenctly.