3 Computer Networking (awm22)

(*a*) Using an explanation of the difference between flow-control and congestion-control, discuss the impact of a stable end-to-end latency.   [5 marks]

(*b*) Mobile end-points present a challenge for any connection-based application on an IP network. Using an example, discuss how this challenge might be resolved without a complete reworking of the end-system application.   [5 marks]

(*c*) A reverse proxy such as Varnish makes static snapshots of the content of a dynamic webpage. Outline a use-case for using such a reverse proxy, paying particular attention to a case when an otherwise useful system might need disabling.   [5 marks]

(*d*) In 2021 a large social network had to reboot all its systems after systemic failure. Discussing the extensive use of image caching, outline the challenges that face an image serving system in the social media space (that is, one that uses popularity, hashtags, and so-forth). Discuss in particular why, for weeks after the reboot, many users complained of poor performance, and of being served irrelevant or old images.

Hint: A distinguishing feature of social networks has been a heavy-tailed distribution of interest among images and users.

For your information: a large image sharing site has 500×10^6 active daily users, 500×10^6 active posts (groups of images and interactions) and 100×10^6 new images each day. Sizes varies considerably but an average image size approaches 100 Kbytes.   [5 marks]