車載通訊技術 期中考 （106/04）

Ans:

1, 4, 3, 4, 2
4, 1, 1, 4, 2,
2,

1. 下列哪一項不是 IEEE802.11p 的特性?
   (1) 時間性
   (2) 高速移動性
   (3) 互通性
   (4) 以上皆非
   答案：1。
2. 何謂 On-Board Unit(OBU)
   (1) 面板單元
   (2) 路側設施
   (3) 通訊控制單元
   (4) 可移動的 WAVE 通訊單元
   答案：4。
3. 請問在 DSRC(Dedicated Short Range Communications)的架構中所規範的 channel，Control channel 與 Service channel 個數分別為何?
   (1) 2 個 Control channel,5 個 Service channel
   (2) 3 個 Control channel,4 個 Service channel
   (3) 1 個 Control channel,6 個 Service channel
   (4) 6 個 Control channel,1 個 Service channel
   答案：3。
4. DSRC/802.11p 和 802.11a 的參數比較，下列何者不是：
   (1) DSRC/802.11p 把信號的頻寬從 20MHz 降低成 10MHz
   (2) DSRC/802.11p 資料的傳輸率範圍為 6Mbps 到 27Mbps
   (3) DSRC/802.11p 傳輸的能源 level 也被修正成能夠在室外通訊，通訊範圍也增加到 1000 公尺
   (4) DSRC/802.11p 資料的傳輸率範圍為 10Mbps 到 100Mbps
   答案：4。
5. 在 DSRC 的實體層協定(802.11p)則採用以什麼為基礎所修改而成的調變協定，所以能夠適用於資料多路傳輸？
   (1) IEEE (2) OFDM (3) FFT (4) DCF。
   答案：2
6. IEEE 802.11 DCF 仍然存在許多問題，以下何者不是？
   (1) 使得暴露終端的問題更加嚴重
   (2) 讓競爭期間競爭通道使用權的節點便多
   (3) 分散協調機制下 Backoff 時間長短的問題
   (4) 模擬架構以及真實測試平台的設計。
   答案：4
7. 何謂 Road-Side Unit(RSU)
   (1) 路側設施，為 WAVE 中不會移動的通訊單元
   (2) WAVE 的通訊控制主機
   (3) WAVE 的訊息發佈單元
   (4) WAVE 的通訊管理單元
   答案：1。

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8. 媒體存取控制層的設計上，DSRC/802.11p 和其他 IEEE 802.11 的標準類似，都是採用下列何種的運作方式：
   (1) CSMA/CA
   (2) CSMA/CD
   (3) TDMA
   (4) CDMA
   答案：1。
9. 在 Vehicular Communication 中，車輛可以透過何種方式連上網路，下列何者不是：
   (1) 3G 網路
   (2) WLAN
   (3) 車輛跟車輛之間的車間通訊
   (4) 藍芽
   答案：4。
10. DSRC 的通訊服務使用了多少的頻帶以便讓一些公用的安全和隱私相關應用？
   (1) 3.850~3.925GHz
   (2) 5.850~5.925GHz
   (3) 6.850~6.925GHz
   (4) 5.650~5.725GHz
   答案：2。
11. DSRC/802.11p 資料的傳輸率範圍為多少至多少？
   (1) 3Mbps~24Mbps
   (2) 6Mbps~27Mbps
   (3) 8Mbps~27Mbps
   (4) 10Mbps~24Mbps
   答案：2。

問答題，56%

1. (a) What are V-V and V-I communications? (英文全名) (4%) (16% total)
   (b) What is the VANET? (英文全名與說明) (4%)
   (c) List two major VANET applications. (4%)
   (d) What frequency band and communication standard are used for VANET? (4%)

Ans:

(a) Vehicle to vehicle communication (2%)
Vehicle to infrastructure communication (2%)

(b) Vehicular Ad Hoc Network (2%)
The mobile nodes (vehicles) can communicate each other without central access points. (2%)

(c) VANET safety applications (2%)
Non-safety applications (2%)

(d) 5.9 GHz band; (2%)
DSRC (IEEE 802.11p) (2%)

2. Explain five kinds of position-based VANET routing protocols. (name: 2%, operation: 2%, 20% total)

Ans:

- Greedy routing algorithm is a memoryless algorithm. A node selects the node that is closest to the destination (including itself) as the next node in the route.

- The compass routing algorithm, forwards packets to the neighbor N that forms the smallest angle $\angle$ NSD with the destination, where S is the forwarding node, N is a potential next hop and D is the destination.

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- Randomized Compass routing
  1) the neighbor with smallest angle above that line and the neighbor with smallest angle below that line
  2) one of those neighbors is randomly chosen to be the next hop

- In the MFR, node S forwards the packet to node A that is the node that minimizes the dot product and $\overrightarrow{DS} \cdot \overrightarrow{DA}$

- In GEDIR, packets are sent to neighbor A that is closest to destination D, although the distance of the current node, S, to the destination is less than the distance from node A to node D

3. (a) What is Geocasting？(2%) (b) List two categories of Geocast protocols. (6%) Explain how they work. (4%) (c) Explain Location-Based Multicast (LBM) and list two types of forwarding zone (8%) (20% total)

Ans:

(a) Geocasting distinguishes itself by specifying hosts as group members (1%) within a specified geographical region, i.e., the Geocast region (1%)

(b) Data-Transmission Oriented protocols: (3%)
use flooding or a variant of flooding to forward Geocast packets from the source to the Geocast region. (2%)
Routing Creation Oriented protocols: (3%)
create routes from the source to the Geocast region via control packets. (2%)

(c) LBM is practically identical with flooding data packets, with the modification that a node determines whether to forward a Geocast packet further via one of two schemes (4%)
- A BOX Forwarding Zone (2%)
- A CONE Forwarding Zone (2%)