

## **Review of Introduction to Traffic Engineering for final exam (2020):**

交通工程导论期末考试复习提纲（2020）:

### **First part --- interpretation and explanation of common terms (30%)**

#### **第一部分-常用术语的解释和说明 (30 %)**

1. 交通工程的定义
  1. Definition of traffic engineering
2. 交通工程研究的对象
  2. Objects in traffic engineering studies
3. 交通工程的目标（目的）
  3. Goal (objective) of traffic engineering
4. 感知反应时间
  4. Perception-reaction time
5. 停车视距和视距三角形
  5. Stopping sight distance & sight triangle
6. 交通量
  6. Traffic volume
7. 年平均日交通量，年平均工作日交通量，平均日交通量，平均工作日交通量
  7. AADT, AAWT, ADT, AWT
8. 高峰小时，设计小时流量
  8. Peak hour (or rush hour) and DDHV
9. 流率及其与每小时流量的差异
  9. Rate of flow and its difference from hourly volume
10. 高峰小时系数
  10. Peak hour factor
11. 车头时距和间距
  11. Headway and spacing
12. 时间平均速度和空间平均速度
  12. Time mean speed and space mean speed
13. 百分位速度(15%, 50%, 85%)
  13. Percentile speed (15%, 50%, 85%)
14. 交通工程延误的定义
  14. Definition of delay in traffic engineering
15. 连续流和间断流
  15. uninterrupted flow and interrupted flow
16. 标准小汽车当量
  16. Passenger-Car Equivalent
17. 通行能力和服务水平的定义（高速公路基本路段，多车道高速公路，两车道高速公路，交织，合并，分叉区域）
  17. Definition of capacity and level of service (of freeway basic segment, multi-lane highway, two lane highway, weaving, merge, diverge areas)
18. 最大服务流量的定义
  18. Definition of maximum service flow rates

19. 临界间隙和随车时距
19. Critical gap and follow up time
20. 高速公路基本路段
20. Basic section of freeway
21. 流量/通行能力比率与需求/通行能力比率
21. Volume/capacity ratio versus demand/capacity ratio
22. 自由流速度的定义
22. Definition of free flow speed
23. 二路停车交叉口的通行权排名
23. Ranking of right-of-way at TWSC intersection
24. 周期长度、相位、有效绿灯时间、启动损失时间
24. Cycle length, phase, effective green time, start-up lost time
25. 领先和滞后
25. Leading and lagging
26. 法令标志, 警告标志和指路标志
26. Regulatory signs, warning signs, and guide signs

**Second part --- elaboration of concept or principle (30%)**

**第二部分-概念或原则的阐述 (30%)**

1. 机动性与访问性
1. Mobility versus access
2. 静视力和动视力
2. Static visual acuity and dynamic visual acuity
3. 流量、密度和速度之间的关系
3. Relationship between volume, density and speed
4. 点速度研究及"速度差幅度"在点速与平均速度频率曲线中的含意
4. Spot speed studies and implication of "pace" in the frequency curve of spot speed & mean speed
5. 行程速度和运行速度
5. Travel speed & running speed
6. 临界速度
6. critical speed
7. 进行假设检验的目的
7. Objective of conducting hypothesis testing
8. 饱和车头时距和饱和流率的关系
8. relationship of saturation headway and saturation flow rate
9. 行程时间等时线
9. Meaning of travel time contour line
10. 影响高速公路和多车道高速公路自由流速度的因素
10. Factors affecting free-flow speed of freeways and multilane highways
11. 稳定排队状态
11. Stable status of queuing
12. 跟车时间百分比和平均行程速度
12. percent time-spent-following & Average Travel Speed

13. 下游设施合流区域
13. For merge areas the downstream facility flow
14. 可能的交叉口交通冲突类型
14. possible traffic conflict types of intersection
15. 基于 MUTCD 的交通信号安装保证
15. Warrants of traffic signal installation based on MUTCD
16. 左转弯许可和保护型相位的区别
16. Difference between permissive and protective phase for left turn movement
17. 二路停车和全路停车的区别
17. Difference between two way stop and full way stop
18. STOP 标志和 YIELD 标志的区别
18. Difference between STOP and YIELD sign
19. 在交通标志中, 实线与虚线的区别
19. Difference between solid lines and broken lines in traffic markings
20. 交通信号控制中半感应式控制和全感应式控制的区别
20. Difference between semi-actuated and full-actuated control in traffic signal timing plan
21. 交通信号控制的优点和缺点
21. Merit and demerit of traffic signal control
22. 在交叉口提供多面信号的原因
22. The reason of providing multiple-face signals at intersections

### **Third part --- calculations (30%)**

#### **第三部分---计算 (30%)**

1. 停车视距公式:  $d = 0.278S_i t + \frac{S_i^2 - S_f^2}{254(F \pm G)}$

1. SSD equation:  $d = 0.278S_i t + \frac{S_i^2 - S_f^2}{254(F \pm G)}$

2.5 分钟高峰小时系数, 10 分钟高峰小时系数, 15 分钟高峰小时系数

2. PHF<sub>5</sub>, PHF<sub>10</sub>, PHF<sub>15</sub>

3. 时间平均速度和空间平均速度公式:  $TMS = \frac{1}{n} \sum V_i$        $SMS = \frac{1}{\frac{1}{n} \sum \frac{1}{V_i}}$

3. TMS and SMS equations:  $TMS = \frac{1}{n} \sum V_i$        $SMS = \frac{1}{\frac{1}{n} \sum \frac{1}{V_i}}$

4.  $v = S \times D$

5. 频率曲线和累积频率分布曲线

5. Frequency and cumulative frequency distribution curves

6. 车头时距数量      资料由公众号【工大喵】收集整理并免费分享

6. The number of the headways

7. 真正平均地点车速的范围

7. Range of true mean of spot speed:  $\mu = \bar{X} \pm 1.96E$

8. Greenshields 线性模型

8. The Greenshields linear model

9. 三个参数之间的图形关系(速度-密度, 流量-速度, 流量-密度曲线并指出拥挤区和非拥挤区)

9. Graphical Relationship Among Three Parameters (速度-密度, 流量-速度, 流量-密度曲线并指出拥挤区和非拥挤区)

10. 泊松分布, 二项分布, 负指数分布和相应的计算

10. Poisson, Binomial, Exponential distributions and corresponding calculations

11. 卡方分布( $\chi^2$ )拟合优度检验

11. Chi-square ( $\chi^2$ ) goodness-of-fit test

12. 重型车系数:  $f_{HV} = \frac{1}{1 + P_T \times (E_T - 1) + P_R \times (E_R - 1)}$

12. Heavy vehicle factor:  $f_{HV} = \frac{1}{1 + P_T \times (E_T - 1) + P_R \times (E_R - 1)}$

13.  $FFS = BFFS - f_{LW} - f_{LC} - f_N - f_{ID}$  ;  $FFS = BFFS - f_{LW} - f_{LC} - f_M - f_A$

14. 两种类型的分析-  $v_p = \frac{V}{PHF \times N \times f_{HV} \times f_p}$  ;  $N = \frac{DDHV}{PHF \times MSF_i \times f_{HV} \times f_p}$

14. Two types of analysis ---  $v_p = \frac{V}{PHF \times N \times f_{HV} \times f_p}$  ;  $N = \frac{DDHV}{PHF \times MSF_i \times f_{HV} \times f_p}$

15.  $c_{px} = v_{cx} \left[ \frac{e^{-(v_{cx} \times t_{cx} / 3600)}}{1 - e^{-(v_{cx} \times t_{fx} / 3600)}} \right]$  (关键是定义冲突流)

15.  $c_{px} = v_{cx} \left[ \frac{e^{-(v_{cx} \times t_{cx} / 3600)}}{1 - e^{-(v_{cx} \times t_{fx} / 3600)}} \right]$  (the key point is to define conflicting flow)

16.  $g_i = g_{TOT} \times \left( \frac{V_{ci}}{V_c} \right)$