

FORMULA
STUDENT **EAST**

ANSWER KEY OF
QUIZ
2020 FS EAST
FOR DRIVERLESS
VEHICLE TEAMS



#FSEASTAUG4<>9

RELEASE

VERSION 1.1

RELEASE DATE: 31ST OF JANUARY 2020

FURTHER DETAILS AT [FSEAST.EU](https://fseast.eu)

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Which of the following events did NOT happen on this day (Jan 31st)?

- ☐ Launch of the Apollo 14 Mission
- ☐ The Soviet Union launches the unmanned Luna 9 spacecraft
- ☒ Launch of the Vostok 6 (first spaceflight for a woman)
- ☐ Launch of the first successful American satellite (Explorer 1)

Concerning a given vector field v , which statement is correct?

- ☒ $\text{div}(\text{rot}(V))=0$
- ☐ $\text{rot}(\text{grad}(V))=0$
- ☐ $\text{div}(\text{grad}(V))=0$
- ☐ $\text{rot}(\text{rot}(V))=0$

$\nabla \cdot \nabla \times v = 0$	<i>true</i>
$\nabla \times \nabla v = 0$	<i>false</i>
$\nabla \cdot \nabla v = 0$	<i>false</i>
$\nabla \times \nabla \times v = 0$	<i>false</i>

Which of the following dimensionless quantities is independent of the flow parameters and depend only on the fluid and the fluid state?

- ☐ Re number
- ☒ Pr number
- ☐ Nu number
- ☐ Gr number

Which statement is true for the Cost and Manufacturing Event?

- ☐ Vehicles must be presented for cost and manufacturing judging in finished condition, fully assembled, complete, ready-to-race condition, with its dry or wet tires mounted
- ☐ Covers and/or parts must be removed before the judging to facilitate access and presentation of components or concepts.
- ☐ The teams may present their vehicle at the designated time to the judges.
Teams that miss their time slot can present their vehicle at the end of the day to the judges.
- ☒ Teams are allowed to bring laptops and tablets beside the handwritten, or printed handouts to the event.

Which of the following expressions is part of the 5S methodology?

- ☒ seiketsu
- ☐ sayori
- ☐ shikishima
- ☐ shinchaku

What is not the main objectives of the TPS?

- ☐ Design out overburden
- ☐ Inconsistency
- ☐ Eliminate waste
- ☒ Transportation cost cut

The length of the acceleration track is 75 metres. Hypothetically the acceleration of the cars is constant, and linear, without slip. The vehicle starts from the starting line of the Acceleration track and then covers 75 metres. At the finish line, the speed of the racecar is 108 km/h. How much time it is needed for the car complete the Acceleration Event and what was the acceleration of the car?

- ☒ Time = 5 sec Acceleration = 6 m / sec ²
- ☐ Time = 4 sec Acceleration = 7 m / sec ²
- ☐ Time = 5 min Acceleration = 6 km / h ²
- ☐ Time = 5,65 sec Acceleration = 5,84 m / sec ²

Which type of emergency stop button is allowed to be used in the cockpit?

- A,  B,  C, 
- ☐ A
 - ☒ B
 - ☐ C
 - ☐ D: It is not allowed to use an emergency stop button in the cockpit.

In which unit can you express the signal strength of a wireless network?

- ☐ V
- ☐ Pa
- ☐ Ohm
- ☐ Ah
- ☐ A
- ☒ dBm
- ☐ J

How would you declare an array of 5 function pointers, that take no input parameter and return an uint8_t type variable in C programming language?

- ☐ void (*functions[5])(uint8_t value);
- ☒ uint8_t (*functions[5])(void);
- ☐ uint8_t (*functions)[5](void);
- ☐ void (functions[5])(uint8_t value);
- ☐ uint8_t (functions[5])(void);
- ☐ uint8_t* (functions[5])(void);

Where do you need to mount the LVMS?

- ☐ In the middle of a completely red circular area of ≥ 45 mm diameter.
- ☒ In the middle of a completely red circular area of ≥ 50 mm diameter.
- ☐ In the middle of a completely orange circular area of ≥ 45 mm diameter.
- ☐ In the middle of a completely orange circular area of ≥ 50 mm diameter.

Which brake light cannot be used, assuming that the whole area is illuminated with even luminous intensity?

- ☐ A 6 cm wide and 3 cm high rectangle.
- ☐ A near round shape with the diameter of 5 cm.
- ☒ A triangle with 6 cm base and 4.5 cm height.
- ☐ A 20 cm long LED strip.

One of the following statements is false. Which one?

- ☐ GLONASS is the Russian global navigation satellite system. The system control centre is in Krasnoznamensk.
- ☐ Galileo is the global navigation satellite system of the EU. Its satellites are in the Medium Earth Orbit (MEO) at the altitude of 23222 km.
- ☒ QZSS is the Japanese global navigation satellite system. The first satellite was launched in September 2010.
- ☒ GPS is the global navigation satellite system of the USA. The satellites are in a Semi-Synchronous Orbit and their period is 11h 16min.
- ☐ BeiDou is the Chinese navigation satellite system. It is named after the Big Dipper asterism. The first and second phases were local systems, while BeiDou-3 will provide global services.

Imagine a DV session: DV Trackdrive. The marshalls order you and your teammates to move into the security zone. The session starts on the marshalls mark, the car goes well, but on the other side of the track, the car slows down, kills its engine, and the green light turns on. The investigation report says that your car went out of the range of your remote control. What comes next?

- It will be a DNF because of the stopped car before the finish.
- The marshalls send the car back to scruteneering and order you to gain the range of the remote control.
- You can repeat the trackdrive session from the beginning, staying in a different, but closer safety zone with the remote control.
- The covered distance of the car until the stop is measured. It is rated to the needed total distance of the trackdrive session and the team gets points. Points are equal to the ratio of the covered distance and the needed total trackdrive session.

How is KNN different from k-means clustering?

- In KNN once all the data points are being grouped into their clusters, each cluster will re-select the most suitable data points among its members to be its new cluster centers. Then, the whole process of re-clustering begins.
- K-means needs labeled points.
- KNN needs labeled point, while k-means doesn't.
- K-means is supervised because you are trying to classify a point based on the known classification of other points.

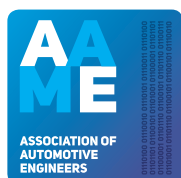
**AUG
4<>9
2020**

**SEE YOU AT FS
EAST 2020,
WE WILL BE
THERE!**

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CHANGELOG

Version	Date	Modification	Page
1.0.0	31st of January 2020	Initial release	-
1.1	31st of January 2020	Multiple answers are acceptable	3



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