

LAMPIRAN

Lampiran 1. Surat Keterangan Penelitian

	<p>Team Centre of Motorcycle Research Support Jl. Ringroad Selatan, Kemasan, Singosaren, Banguntapan, Bantul, Yogyakarta. Tlp : +62 274 65 363 03</p>	<p>SPORTDYNO V3.3 DYNAMOMETER: MOTOTECH RPD ROLLER INERTIA: 1.446 Displacement Correction Correction Factor: ISO 1585 NOTE: Load Cell Included.</p>
---	---	---

SURAT KETERANGAN

Bengkel mototech sport menerangkan bahwa:

Nama	: I Wayan Yogi Arta
NIM	: 15504241006
Tempat / tgl. Lahir	: Pupuan, 23 Maret 1997
Jurusan	: Pendidikan Teknik Otomotif
Fakultas	: Teknik
Universitas	: Universitas Negeri Yogyakarta

Telah melakukan penelitian dan pengambilan data daya dan torsi motor Honda Vario 125 pada tanggal 25 Maret 2017 untuk penelitian skripsi dengan judul **"PENGARUH BERAT ROLLERS CVT TERHADAP DAYA DAN TORSI MESIN HONDA VARIO 125 PADA MOBIL GARUDA HYBRID 2017"**. Demikian surat keterangan ini dibuat untuk digunakan sebagaimana mestinya.

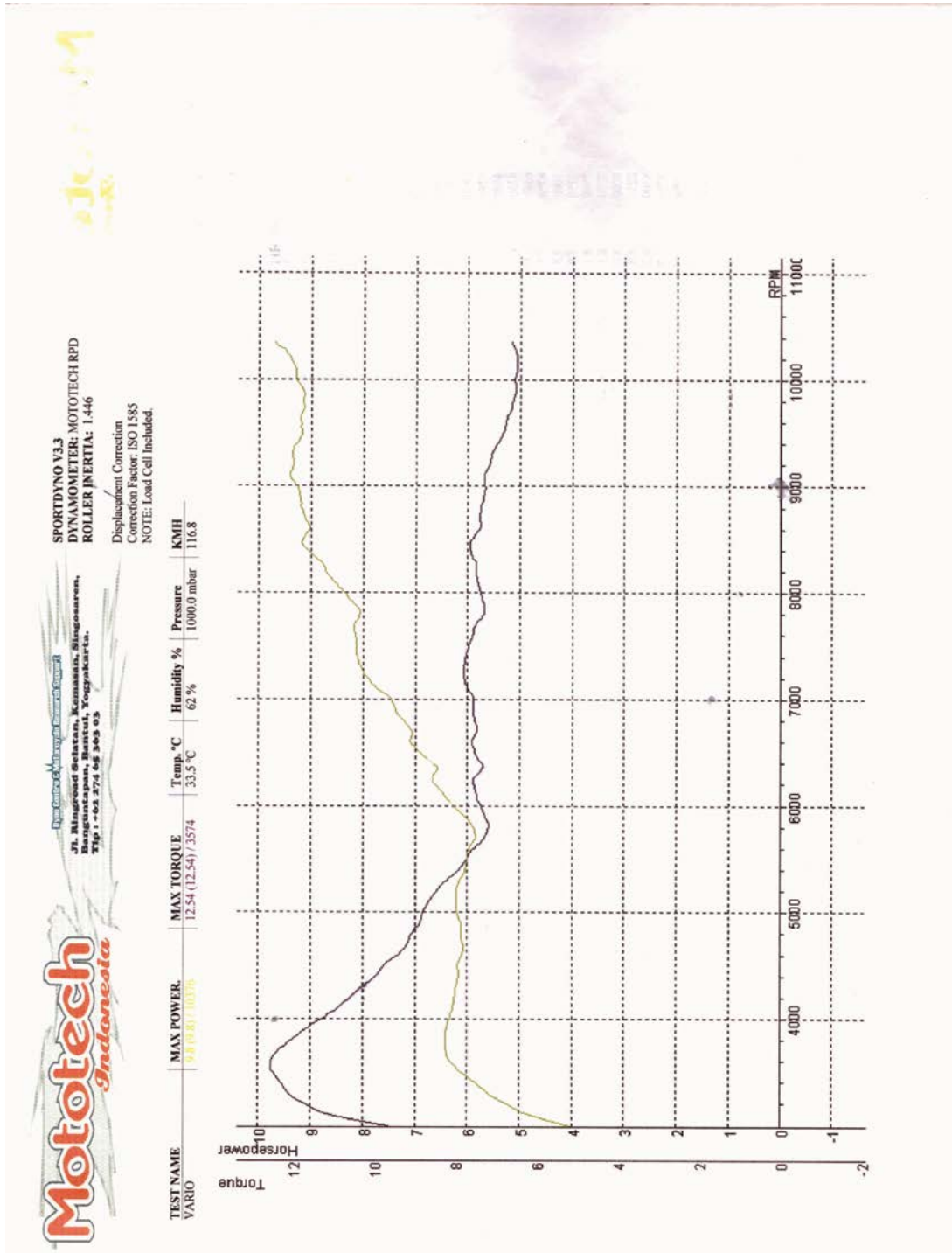
Yogyakarta, 25 Maret 2017

Kepala Bengkel,



(Alik Dwi Setiawan)

Lampiran 2. Hasil Dynotest



Gambar Hasil dynotest pengujian 1



Jl. Ringroad Selatan, Kemaman, Singaperbangsa, Mangrove, Bekasi, Yogyakarta.
 Telp : +62 274 66 3653 03

SPORTDYN V1.3
 DYNAMOMETER: MOTOTECH RPD
 ROLLER INERTIA: 1.446
 Displacement Correction
 Correction Factor: ISO 1585
 NOTE: Load Cell Included.

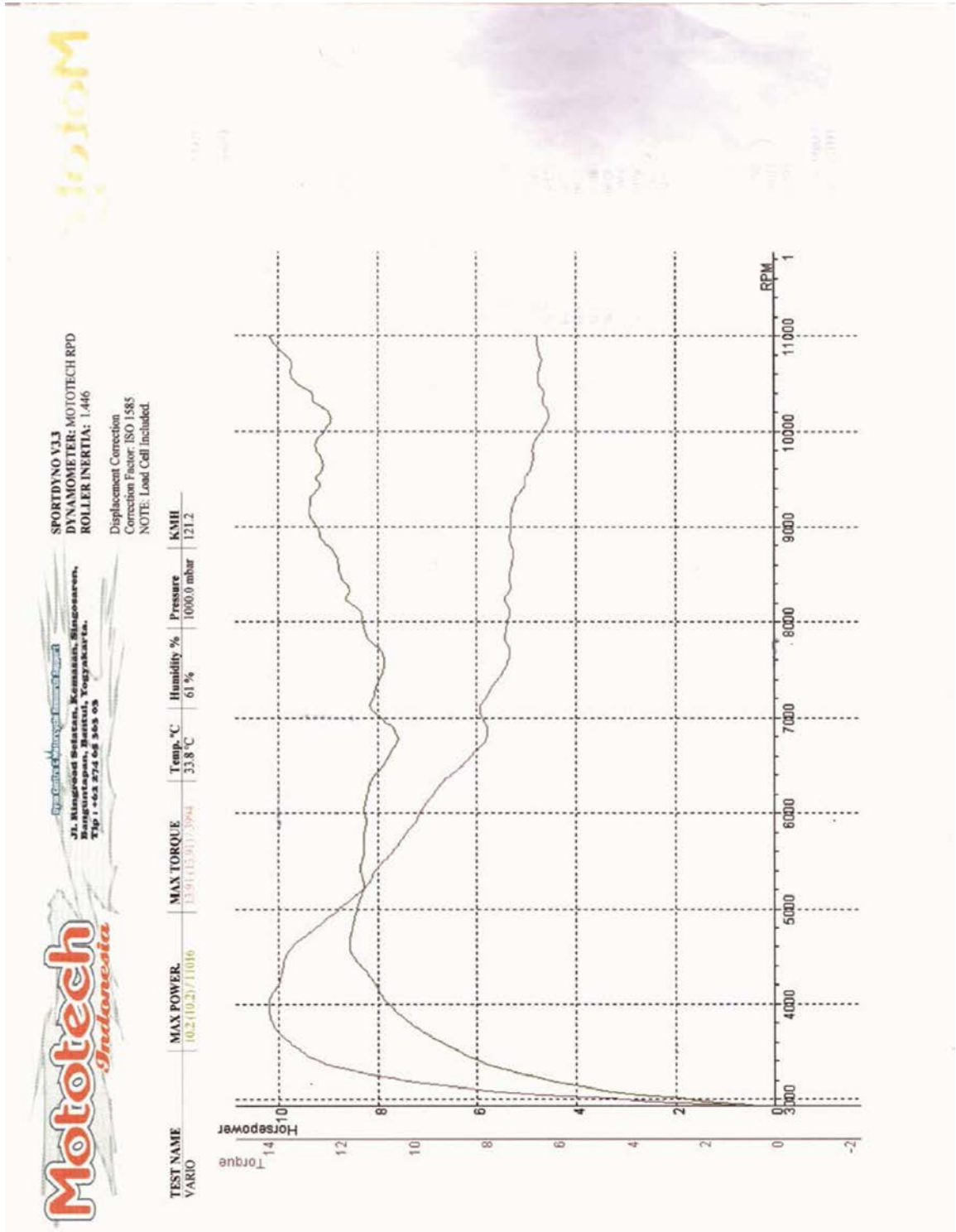
DATA FOR TEST: VARIO

Comments

RPM	HP (HP)	HP (N*M*M)	T
2750	4.2	9.98	0.52
3000	4.4	10.28	0.54
3250	5.5	11.99	0.74
3500	6.1	12.50	0.94
3574	6.3	12.54	1.00
3750	6.4	12.18	1.16
4000	6.3	11.27	1.40
4250	6.2	10.40	1.66
4500	6.2	9.72	1.94
4750	6.1	9.11	2.24
5000	6.2	8.77	2.54
5250	6.2	8.35	2.84
5500	6.0	7.72	3.18
5750	5.9	7.21	3.54
6000	6.3	7.40	3.92
6250	6.7	7.55	4.26
6500	6.9	7.53	4.62
6750	7.1	7.49	4.96
7000	7.5	7.57	5.32
7250	8.0	7.81	5.64
7500	8.1	7.66	6.00
7750	8.1	7.37	6.36
8000	8.4	7.39	6.70
8250	8.8	7.49	7.06
8500	9.2	7.61	7.40
8750	9.2	7.40	7.76
9000	9.3	7.29	8.12
9250	9.7	7.14	8.50
9500	9.2	6.83	8.88
9750	9.1	6.62	9.28
10000	9.3	6.56	9.68
10250	9.5	6.52	10.10

LOSSES: 0.0 HP 0.0 N*M*M
 TOTAL ENGINE: 9.8 HP 12.5 N*M*M

Lanjutan Gambar Hasil dynotest pengujian 1



Gamba. Hasil dynotest pengujian 2

SPORTDYNO V3J
 DYNAMOMETER: MOTOTECH RPD
 ROLLER INERTIA: 1.46
 Displacement Correction
 Correction Factor: ISO 1585
 NOTE: Load Cell Included.

PT. MITSUBISHI MOTORS INDONESIA
 Jl. Mampang Praya I, Kembangan, Kecamatan, Mampang Praya,
 Jakarta Selatan, Indonesia
 Telp : +62 274 98 363 03



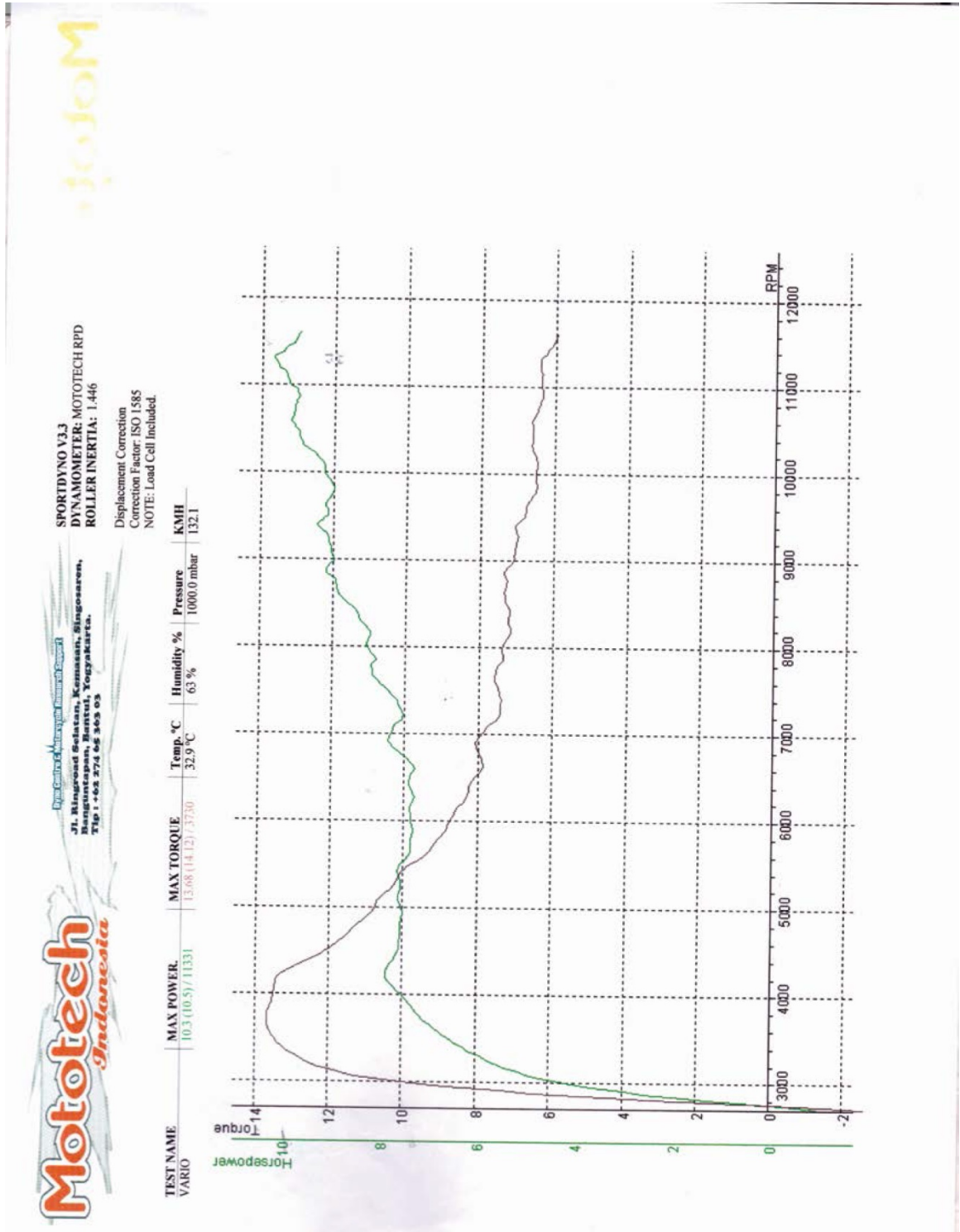
DATA FOR TEST: VARIO

Comments

RPM	HP (HP)	HP (N*M*M)	T
3000	1.9	4.50	0.56
3250	5.0	10.93	0.76
3500	6.4	13.07	0.96
3750	7.3	13.78	1.14
4000	7.8	13.91	1.30
4250	8.1	13.60	1.50
4500	8.5	13.42	1.70
4750	8.5	12.73	1.90
5000	8.4	11.97	2.10
5250	8.3	11.17	2.34
5500	8.3	10.70	2.58
5750	8.3	10.20	2.82
6000	8.3	9.76	3.08
6250	8.2	9.27	3.36
6500	7.9	8.56	3.66
6750	7.6	7.95	3.98
7000	7.9	8.03	4.28
7250	8.1	7.87	4.60
7500	7.9	7.44	4.94
7750	8.0	7.33	5.28
8000	8.3	7.34	5.64
8250	8.6	7.40	5.98
8500	8.8	7.27	6.32
8750	8.9	7.19	6.66
9000	9.2	7.25	7.02
9250	9.5	7.14	7.38
9500	9.2	6.86	7.74
9750	9.2	6.64	8.12
10000	9.1	6.38	8.54
10250	9.1	6.30	8.94
10500	9.4	6.49	9.34

LOSSES: 0.0 HP 0.0N*M*M
 TOTAL ENGINE: 10.2HP 13.91N*M*M

Lanjutan Gambar. Hasil dynotest pengujian 2



Gambar Hasil dynotest pengujian 3



Jl. Ringroad Selatan, Kemah, Singsoran,
 Banyuwangi, Banyuwangi, Yogyakarta.
 Telp : +62 274 66 363 03

SPORTDYN V33
 DYNAMOMETER: MOTOTECH RPD
 ROLLER INERTIA: 1.446
 Displacement Correction
 Correction Factor: ISO 1585
 NOTE: Load Cell Included.

DATA FOR TEST: VARIO

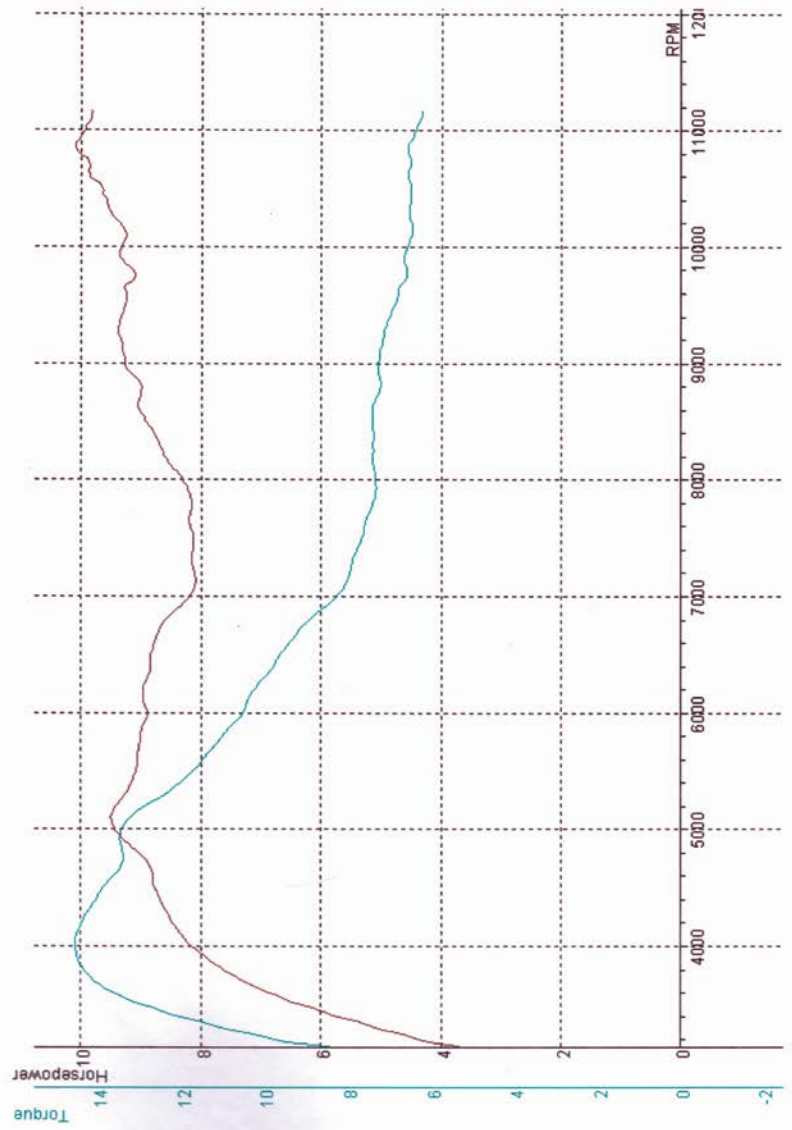
Comments

RPM	HP (HP/0(N*M*M))	T
3000	4.2	10.01
3250	5.8	12.78
3500	6.6	13.49
3750	7.1	13.68
4000	7.2	13.67
4250	7.9	13.24
4500	7.6	12.03
4750	7.6	11.34
5000	7.6	10.77
5250	7.6	10.26
5500	7.6	9.78
5750	7.4	9.12
6000	7.4	8.71
6250	7.4	8.32
6500	7.4	8.08
6750	7.6	7.95
7000	7.8	7.89
7250	7.6	7.42
7500	7.9	7.47
7750	8.3	7.52
8000	8.3	7.37
8250	8.4	7.21
8500	8.8	7.28
8750	9.0	7.27
9000	9.0	7.08
9250	9.2	6.98
9500	9.2	6.85
9750	9.1	6.57
10000	9.2	6.53
10250	9.3	6.57
10500	9.3	6.62

LOSSES: -0.2 HP
 TOTAL ENGINE: 10.5HP
 -0.4N*M*M
 14.12N*M*M

Lanjutan Gambar Hasil dynotest pengujian 3

TEST NAME	MAX POWER	MAX TORQUE	Temp. °C	Humidity %	Pressure	KMH
VARIO	10.1 (10.1) / 10881	14.56 (14.56) / 4006	33.6 °C	60 %	1000.0 mbar	121.2



Gambar Hasil dynotest pengujian 4

SPORTDYN0 V3.3
 DYNAMOMETER: MOTOTECH RPD
 ROLLER INERTIA: 1.446
 Displacement Correction
 Correction Factor: ISO 1585
 NOTE: Load Cell Included.

Jl. Mingsroad Selatan, Kecamatan, Singsaperan,
 Banguntapan, Bantul, Yogyakarta.
 Telp : +62 274 66 369 03



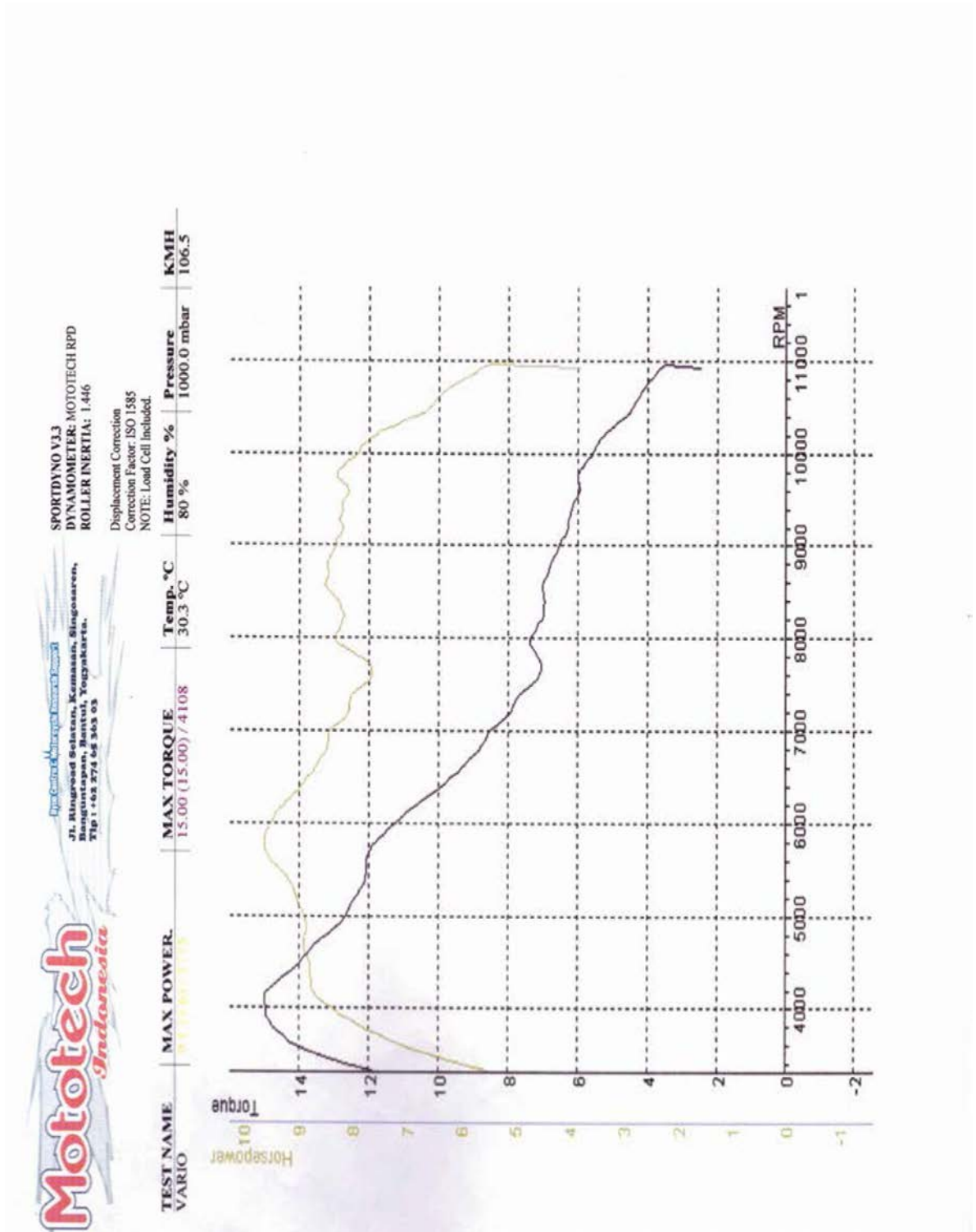
DATA FOR TEST: VARIO

Comments

RPM	HP (HPQ (N*M*M)	T
3000	4.0	8.98
3250	4.8	10.60
3500	6.5	13.13
3750	7.5	14.26
4000	8.2	14.56
4006	8.2	14.56
4250	8.5	14.30
4500	8.8	13.85
4750	9.0	13.39
5000	9.0	13.41
5250	9.1	12.62
5500	9.1	11.67
5750	9.0	11.10
6000	8.9	10.48
6250	8.9	10.10
6500	8.8	9.60
6750	8.6	9.06
7000	8.2	8.26
7250	8.1	7.93
7500	8.1	7.66
7750	8.2	7.43
8000	8.3	7.35
8250	8.6	7.40
8500	8.9	7.41
8750	9.0	7.26
9000	9.0	7.28
9250	9.1	7.16
9500	9.2	6.89
9750	9.1	6.59
10000	9.1	6.58
10250	9.0	6.52
10500	9.0	6.48

LOSSES: 0.0 HP 0.0N*M*M
 TOTAL ENGINE: 10.1HP 14.56N*M*M

Lanjutan Gambar Hasil dynotest pengujian 4



Gambar Hasil dynotest pengujian 5

SPORTDYN0 V3.3
 DYNAMOMETER: MOTOTECH RPD
 ROLLER INERTIA: 1.446
 Displacement Correction
 Correction Factor: ISO 1585
 NOTE: Load Cell Included.

Jl. Ringroad Selatan, Kerasan, Singosari,
 Mangrove, Bantul, Yogyakarta.
 Telp : +62 274 65 863 03



DATA FOR TEST: VARIO

Comments

RPM	HP (HP@)	HP@ (N*M*M)	T
3000	5.8	12.31	0.52
3250	6.0	12.66	0.54
3500	6.6	13.54	0.60
3750	7.7	14.68	0.74
4000	8.3	14.96	0.86
4108	8.6	15.00	0.92
4250	8.8	14.64	1.02
4500	8.8	13.92	1.16
4750	8.9	13.29	1.32
5000	8.9	12.64	1.48
5250	9.1	12.27	1.64
5500	9.4	12.07	1.82
5750	9.6	11.88	1.98
5755	9.6	11.88	1.98
6000	9.5	11.18	2.18
6250	9.1	10.34	2.38
6500	8.8	9.60	2.58
6750	8.5	8.92	2.82
7000	8.4	8.47	3.06
7250	8.0	7.84	3.32
7500	7.8	7.30	3.60
7750	7.8	7.08	3.88
8000	8.3	7.36	4.14
8250	8.1	6.97	4.44
8500	8.4	7.00	4.72
8750	8.4	6.82	5.02
9000	8.3	6.53	5.32
9250	8.2	6.27	5.64
9500	8.1	6.05	5.98
9750	8.3	5.99	6.32
10000	7.9	5.56	6.70
10250	7.3	5.06	7.12
10500	6.6	4.40	7.58
10750	6.1	3.98	8.08

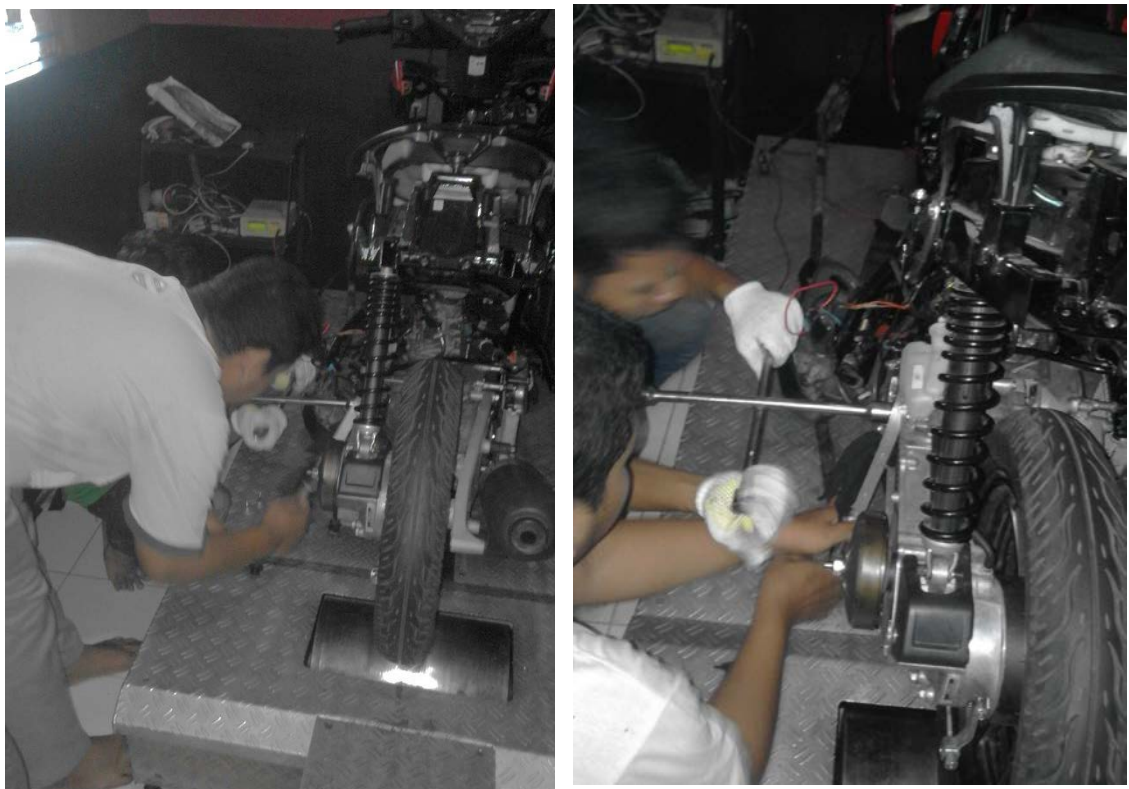
LOSSES: 0.0 HP
 TOTAL ENGINE: 9.6HP
 0.0N*M*M
 15.00N*M*M

Lanjutan Gambar Hasil dynotest pengujian 5

Lampiran 4. Dokumentasi



Gambar Menuju Tempat Dynotest



Gambar Penggantian Berat Roller Saat Dynotest



Gambar Pengambilan Data



Gambar Pengambilan Data



Gambar Diskusi Hasil Yang Didapatkan



Gambar Kompetisi International Student Car Competition

Lampiran 5. Berat Roller



Gambar Berat Roller Pengujian 1



Gambar Berat Roller Pengujian 2



Gambar Berat Roller Pengujian 3



Gambar Berat roller Pengujian 4



Gambar Berat Roller Pengujian 5

Lampiran 3. Regulasi ISCC 2017

2017 International Student Car Competition Rule

**International Student Car Competition Organizing Committee
Table of Contents**

Chapter 1. General Provisions

1.1 Outline

1.1.1 Purpose of the competition

1.1.2 Outline of the competition

1.1.3 Evaluation method

1.1.4 Contact information

1.2 Basic requirements for cars participating in the competition

1.2.1 General requirements

1.2.2 Electric cars

1.2.3 Hybrid cars

1.3 Qualifications of participants

1.3.1 Qualifications

1.3.2 Participating teams

1.3.3 Advisers

1.4 Entry

1.4.1 Schedule

1.4.2 Application and determination of participating teams

1.5 Inspection of cars and equipment

1.6 Penalties

1.6.1 Disqualification

1.6.2 Warning

1.6.3 Penalty points and point deduction

1.7 Start of the competition

1.7.1 Getting ready to start

1.7.2 Starting the competition

1.7.3 Stopping the car during the competition

1.7.4 Finish line

1.7.5 Appealing decisions

1.8 Hosts' rights and other rules

Chapter 3. Hybrid Car Regulations and Conditions

- 3.1 General conditions
- 3.2 General design requirements
- 3.3 Engines
- 3.4 Motors
- 3.5 Batteries
- 3.6 Fuel tank and fuel system
- 3.7 Characteristics of hybrid cars
- 3.8 Race car numbers
- 3.9 Fire extinguishers
- 3.10 Putting on competition logos, etc.
- 3.11 Headrests
- 3.12 Driver's protective gear
- 3.13 Brakes
- 3.14 Starters
- 3.15 Rear-view mirror
- 3.16 Exhaust system
- 3.17 Driver's visibility
- 3.18 Structure and shape of the car body
- 3.19 Bumper
- 3.20 Emergency shut down switch
- 3.21 Inspection and approval of automobiles

Chapter 4. Competition Regulations and Scoring

- 4.1 Scoring for each competition category (1,000 points in total)
- 4.2 Creative automotive technical report
- 4.3 Endurance performance competition
 - 4.3.1 Description of the competition in the endurance performance category
 - 4.3.2 Evaluation points (400 points)
- 82
- 4.4 Competition in the safety performance category

4.4.1 Acceleration and braking safety

4.4.2 Gymkhana

4.5 Point deduction regulations

[Forms]

[Form 1] Sign-up sheet

[Form 2] List of competition participants

[Form 3] Guardians' consent form

[Form 4] Application for driver change

[Form 5] Application for use of replacement parts

[Form 6] Electric car technical report

[Form 7] Hybrid car technical report

[Form 8] Electric car dimensions

[Form 9] Hybrid car dimensions

[Form 10] Advisers' power of attorney

[Form 11] Application for change of representative

[Form 12] Application for change of team member

[Form 13] Application for objection

Chapter 1. General Provisions

1.1 Outline

1.1.1 Purpose of the competition

- A. To help college students better understand automobile safety and environment
- B. and promote new technology
- C. To help secure technologies for created cars through competition
- D. To increase cooperation among college students and enhance their sense of challenge

1.1.2 Outline of the competition

- A. Competition name: 2017 International Student Car Competition
- B. Date: May 19, 2017 (Friday) to May 20, 2017 (Saturday)
- C. Location: Korea Automobile Testing & Research Institute (KATRI)
- D. Hosts: Korea Transportation Safety Authority (TS) and Korea Auto-Vehicle Safety Association (KASA)
- E. Supervisor: International Student Car Competition Organizing Committee
- F. Sponsor: Ministry of Land, Infrastructure and Transport (MoLIT), car makers, part makers, etc.
- G. Categories of events
 - ① Racing
 - Endurance performance: The minimum time it takes to run a fixed distance (weight 40%)
 - Gymkhana: Running time in the slalom section for evaluating braking and steering performance (weight 30%)
 - Acceleration and braking safety: The minimum time it takes to reach 150m from the starting point and braking within 30m from the braking starting point (weight 30%)
 - ② Creative technology: Fitness for purpose, design, manufacturability, and environmental-friendliness
- H. Qualifications: Each team must be composed of full-time students enrolled in the same university or junior college.

I. Entry

- ① Entry period: January 2, 2017 (Monday) ~ February 3, 2017 (Friday)
- ② Application and contact information
 - Send applications to Korea Auto-Vehicle Safety Association, Rm. No. 916, Hyundai Dream Tower, 923-14, Mok-dong, Yangcheon-gu, Seoul
 - Contact info: ☎ 02-581-8015, Fax 02-581-8016
- ③ Application method: Internet homepage (www.kasa.kr)
- ④ Required documents
 - One application form (Use the attached form)
 - A photocopy of the ID card of the adviser and the representative of the team each and a photocopy of the bankbook for bank transfer
 - Cash aid for the participating team: To be transferred to the adviser's account
 - Prize money: To be transferred to the team representative's account
- ⑤ Entry fee: KRW200,000 per team
 - ※ Remit the entry fee to: Hana Bank, 428-910009-95204 Korea Auto-Vehicle Safety Association

J. Competition rules: The 2017 International Student Car Competition Operating Rules shall apply

K. Awards

Category		How many	Prize money	Awards	Name of award	
Electric vehicle category	Racing	Grand Prix	1	KRW5 million	Championship flag, Trophy and Certificate of award	Ministry of Land, Infrastructure and Transport Minister's Award
		Gold prize	1	KRW2 million	Trophy and Certificate of award	TS Authority President's Award
		Silver prize	2	KRW1.5 million	Trophy and Certificate of award	TS Authority President's Award
		Bronze prize	3	KRW800,000	Trophy and Certificate of award	TS Authority President's Award
		Popularity prize	5	KRW500,000	Certificate of award	TS Authority President's Award
	Creative technology	Best of Best	1	KRW1 million	Trophy and Certificate of award	KASA Chairman's Award
Hybrid car category	Racing	Best of Best	1	KRW3 million	Trophy and Certificate of award	TS Authority President's Award
		Gold prize	1	KRW2 million	Trophy and Certificate of award	TS Authority President's Award
		Silver prize	1	KRW1.5 million	Trophy and Certificate of award	TS Authority President's Award
		Bronze prize	1	KRW800,000	Trophy and Certificate of award	TS Authority President's Award
		Popularity prize	3	KRW500,000	Certificate of award	TS Authority President's Award
	Creative technology	Best of Best	1	KRW1 million	Trophy and Certificate of award	KASA Chairman's Award
Autonomous car	Racing	Gold prize	1	KRW2 million	Trophy and Certificate of award	TS Authority President's Award
		Silver prize	1	KRW1.5 million	Trophy and Certificate of award	TS Authority President's Award
		Bronze prize	1	KRW800,000	Trophy and Certificate of award	TS Authority President's Award
		Popularity prize	2	KRW500,000	Certificate of award	TS Authority President's Award
Special category	Outstanding adviser		1	KRW300,000	Certificate of award	KASA Chairman's Award
	Best teamwork		1	KRW300,000	Certificate of award	KASA Chairman's Award
	Fair play		1	KRW500,000	Certificate of award	KASA Chairman's Award

Notes) 1. No winner in the Racing category can win a prize in another category.

2. The winners of the racing category and the creative technology category (excluding the special category) are obligated: to participate in the technical seminars hosted by the Organizing Committee to for the purposes of the competition; and, to make a presentation on manufacturing technology partially on the account of the Organizing Committee.

1.1.3 Evaluation method

- A. Winners will be determined based on their total scores earned in the categories of endurance performance, Gymkhana, and acceleration performance and braking safety
- B. The scoring weights for the individual categories are 40 percent (400 points) for the endurance performance category, 30 percent (300 points) for Gymkhana and 30 percent (300 points) for acceleration performance and braking safety.

1.1.4 Contact information

- A. International Student Car Competition Organizing Committee (hereinafter referred to as the Organizing Committee)
 - 1) Korea Automobile Testing & Research Institute, Korea Transportation Safety Authority: 031-369-0213
 - Address: (zip code 07995) 200, Samjon-ro, Songsan-myeon, Hwaseong, Gyeonggi-do
 - 2) Korea Auto-Vehicle Safety Association: 02-581-8015
 - Address: Korea Auto-Vehicle Safety Association, (zip code 158-718) Rm. No. 916, Hyundai Dream Tower, 923-14, Mok-dong, Yangcheon-gu, Seoul
 - 3) Send applications to:
 - Uploading them to KASA's website: www.kasa.kr

1.2 Basic requirements for participants in the competition

1.2.1 General requirements

- A. The creative cars participating in this competition must be designed and manufactured by the members of the participating teams.
- B. Automobiles that were designed and manufactured by persons other than the members of the participating teams cannot participate in this competition.
- C. Creative cars will be evaluated on each of the prescribed racetracks in terms of their endurance performance and safety performance.

1.2.2 Electric cars

- A. Cars participating in this competition must be electric vehicles manufactured according to the competition rules for automobiles that use up to 4 batteries or automobiles as a power source. (Charging systems using wind power and solar heat - except those that involve manpower or internal combustion engines - may be used.)

1.2.3 Hybrid cars

- A. Cars participating in this competition must be able to use both gasoline engines and electric motors as power sources.
- B. Cars participating in the competition must have a system that can charge the batteries while the cars are driven.

1.3 Qualifications of participants

1.3.1 Qualifications

People who are enrolled in a college can participate in this competition as of the date when the competition begins.

1.2.1 Participating teams

- A. The people comprising the participating teams are called the members of their respective participating teams.
- B. Each participating team must be composed of persons playing the following roles:
 - 1 representative
 - 2 drivers
 - Up to 12 maintenance crew
- C. The representative will represent the team.
- D. The driver will drive the car participating in the competition. Anyone other than the driver cannot drive the car participating in the competition.
- E. The representative cannot also serve as a driver.
- F. The driver must hold a valid driver's license of class 2 or higher issued in Korea.

- G. If the driver is younger than 20 years old as of the competition day, he/she must submit the Guardians' Consent Form. [Form 3] of the Competition Rule Book can be used or it can be downloaded from the homepage. If the drivers change, the Application for Driver Change must be submitted. [Form 4] of the Competition Rule Book can be used or it can be downloaded from the homepage.
- H. Change of representative, driver or any of the team members is to be done not later than 15 days prior to the start of the competition. The form for change of driver or team member is given in [Form 11] or [Form 12] of the Operating Rules. They can also be downloaded from the website.

1.2.1 Advisers

- A. Each participating team must have at least one adviser who will give guidance to the participating team.
- B. Advisers must be full-time faculty members of the participating school.
- C. Advisers must give guidance to participating teams in regard to the design and manufacture of original cars. However, advisers cannot take a direct part in the design and manufacture of green and safe electric vehicles.
- C. Advisers must participate in the competition during the competition period.
- D. If advisers cannot participate in the competition for inevitable reasons, they may appoint persons above the position of teaching assistant in their school, and have them act on their behalf with the approval of the Organizing Committee (See [Form 10]).

1.4 Entry

1.2.1 Schedule

- A. The schedule of this competition is as follows:
 - ① Competition notice: January 2, 2017 (Monday)
 - ② Entry period: January 2, 2017 (Monday) to February 3, 2017 (Friday)
 - ③ Due date for the entry fee: February 3, 2017 (Friday)
 - ④ Technical seminar: February, 2017 (The date is to be determined)

- Purpose: To disclose expertise, such as how the winners of the previous year manufactured their cars, to teams applying for participation in the competition, hold debates, introduce new technologies related to automobiles and competition rules.
 - Location: To be announced
- ⑤ Deadline for the technical report: April 28, 2017 (Thursday)
- ⑥ Application deadline for change of representative, driver or team member: May 4, 2017 (Thursday)
- ⑦ Competition: May 19, 2017 (Friday) - May 20, 2017 (Saturday)

1.4.2 Application and determination of participating teams

A. Application

- 1) Teams hoping to participate in this competition must submit the application form and an entry fee of KRW 200,000 during the application period to the Organizing Committee. [Form 1] of the Competition Rule Book can be used or the Application Form can be downloaded from the homepage.
- 2) Application forms may be submitted in person, via e-mail, postal mail or fax. Application forms that have been postmarked during the application period and are submitted by mail will be deemed to be valid. If they are submitted by e-mail, the originals must be submitted by postal mail.

B. Determination of participating teams

- 1) Only if participating teams have submitted the application forms and paid the entry fee will they be eligible to participate in the competition. The Organizing Committee may limit the number of participating teams according to the order that the application forms are received so that the competition can be managed smoothly.
- 2) Participating teams, whose participation has been confirmed, will attend a technical meeting where competition rules will be explained. Each participating team must have submitted by then the list of competition participants. [Form 2]

- 3) Teams participating in the technical meeting will sign, or have their seals affixed to, their application forms. Missing the meeting will result in the deprivation of the right to appeal in respect of the operation or outcome of the competition.

C. Support of participating teams

- 1) To help participating teams with the manufacture of their cars, the Organizing Committee may decide to provide each participating team with KRW 1 million in cash as a manufacturing support fund on a first-come-first-served basis within the allotted budget.
- 2) To help participating teams with the manufacture of their cars, if necessary the Organizing Committee may buy necessary parts for each team at its own expense within a specified limit.
- 3) Any team that makes an entry, but decides not to participate in the competition notify the Organizing Committee in writing of the reason for such decision and return the money it has received to the Organizing Committee.

1.3 Inspection of cars and equipment

- A. Participating teams must have their cars inspected by the time appointed.
- B. To prove that their car is a creative car before inspection, they must submit [Form 6] electric vehicle technical report or [Form 7] hybrid car technical report by a specified date (April 28).
 - ※ Technical report must be prepared using MS Word. The font must be 12-point Time New Roman, and the line spacing must be 1.6
- C. The driver and the car must be in the condition just prior to the competition when the car and equipment are inspected. At this time, the driver must present their ID, and the members of participating teams must be able to correctly answer the automobile inspector's questions about the structure of the car.

- D. If any car is found to be unsatisfactory in terms of any violations found in terms of regulations or safety, it can participate in the competition only if it passes the re-inspection after modification and supplementation.
- E. Any discrepancy in specifications between the technical report and the actual car will result in penalty.
- F. If deemed to be necessary during the competition, the car can be inspected at any time.
- E. The location and time of car inspection will be notified separately.

1.6 Penalties

1.6.1 Disqualification

- A. If anyone violates any important provision of the 2017 International Student Car Competition Rule, he/she may be disqualified, and in this case, he/she will not be allowed to take part in the competition.
- B. Disqualified persons will not receive any award of this competition.
- C. Participants will be disqualified in any of the following events:
 - 1) In the event that they violate the participant requirements under Chapter 1. or any provision under Chapter 2. Electric car regulations and conditions of the 2017 International Student Car Competition Rule;
 - 2) In the event that they violate any provision of Chapter 3. Hybrid car rules and regulations of the 2017 International Student Car Competition Rule;
 - 3) In the event that they violate those rules clearly defined as reasons for disqualification in Competition Rules and Scoring; and
 - 4) In the event that the judging committee believes that they seriously violated the competition rules or the intent of the competition.

1.6.2 Warning

- A. If any material provision of the 2017 International Student Car Competition Rule is violated, or the safe operation of the competition is disrupted, the Organizing Committee will notify it to the judging

committee and issue a warning to the applicable team according to the decision of the judging committee.

B. If a team receives a warning, it may receive penalty points according to the decision of the judging committee.

C. If any team receives a warning more than 3 times, it may be disqualified.

1.6.3 Penalty points and point deduction

A. If any material provision of the 2017 International Student Car Competition Rule is violated, penalty points will be imposed, and such points will be deducted from the score the team received in a certain category, or from its total score.

B. Points will be deducted according to the point deduction rule in Section 4.5 below.

1.7 Start of the competition

1.7.1 Getting ready to start

A. Participating teams will assemble in the waiting place 10 minutes before the start, but the start time and place will be notified separately. Inspection before start.

B. Participating teams must power on their cars and check that they work normally.

C. The Organizing Committee has the right to disqualify any team whose car is not in the same conditions as it was checked at the inspection of the car and equipment.

1.7.2 Starting the competition

A. The starting time is defined as the moment when the start flag is completely raised.

B. If cars cannot start within 10 seconds after the start is signaled, they will be allowed to restart up to two times.

C. Signals for the competition will be given by flags, and the meanings of the flags are as follows:

① Yellow flag: danger, keep eyes forward, beware of cars behind

② Red flag: stop, end signal

③ Green flag: continue

1.7.3 Stopping the car during the competition

- A. If the driver wants to stop the car due to an accident or trouble during the competition, he/she will safely stop the car according to the instructions of marshals.
- B. Marshals may have any cars which have temporarily stopped be moved out and away from the track area during the competition for the sake of safety.
- C. If a car breaks down, it can be restarted only if the driver can fix it for him/herself.
- D. If the driver cannot continue, he/she will ask the marshals for a withdrawal from the competition.

1.7.4 Finish line

The time when the front-most part of the car passes the finish line will be the time when the car arrives at the finish line.

1.7.5 Appealing decisions

- A. If an unfair decision is made against a team, the team representative (the advisor or the team leader) may appeal it in writing with the Organizing Committee within 30 minutes after the decision is made using [Form 13].
- B. If the dispute is deemed groundless by the Organizing Committee, the appealing team will have three points deducted from its score for the applicable race.
- C. Appeals will be centrally collected by the team responsible for the matter for further processing.

1.8 Hosts' rights and other rules

- A. If there are circumstances including weather conditions, the Chairman of the Organizing Committee may stop, postpone or change the competition.
- B. Participating teams may protest against the judgment of car inspectors, marshals or judges in writing only.

- C. Participants will be held solely responsible for all human and physical damage to themselves or others incurred during the competition.
- D. The 2017 International Student Car Competition Rule will go into effect at the same time as the application forms are received.
- E. Operating rules, not mentioned in the 2017 International Student Car Competition Rule, instructions to participants and drivers, or changes will be notified through site briefings. Missing of any of such briefings will result in the deprivation of the right to appeal in respect thereof.

Chapter 3. Hybrid Car Regulations and Conditions

3.1 General conditions

- A. Only those cars designed and manufactured according to the car rules described in this chapter can participate in the competition.
- B. If there are car rules that are not clearly explained in this chapter, or there are contradictory rules, participating teams must seek guidance from the Organizing Committee and follow the judgment of the Organizing Committee.
- C. Participating teams must have their cars inspected on the first day of competition at the designated location and time according to [Form 7] hybrid car technical report. All members of participating teams must be present at the inspection and must be able to answer questions from the judges or the persons to whom the judges delegated authority.
- D. Participating teams must prove that they used the parts specified by the Organizing Committee (hereinafter referred to as specified parts).
- E. Participating teams must use the specified parts provided by the Organizing Committee free of charge. If it is absolutely necessary, they may use the same type of parts as the specified parts instead after obtaining approval in advance(See [Form 6]).
- F. If in the course of a car inspection it is found that car rules have been violated or the specified parts not used, the Organizing Committee may request modification or supplementation, and if the relevant team fails to comply with the request appropriately, its cars cannot pass the inspection, and the relevant team cannot participate in the competition.
- G. Judges or the persons whom the judges delegated their authority to have the right to inspect the cars at any time during the competition, and participating teams must accede to such request. If participating teams do not receive inspection faithfully, they cannot participate in the competition.

- H. The gear ratio of the powertrain may not be changed throughout all the competition after the car passes the inspection.

3.2 General design requirements

- A. Cars participating in the competition must be designed and manufactured as 4-wheel drive cars, and have a structure that can stand on their own while stopped or running. Cars designed and manufactured as three-wheelers cannot participate in the competition.
- B. If one or more wheels are off the ground while the car is going straight, such cars will be disqualified.
- C. To maintain road grip, suspension is required. All four wheels must contact the ground when the car is stopped, moving straight and running on a curve.
- D. The size and weight of the car must be as follows:
 - ① Overall length: 2.5m or less (length)
 - ② Overall width: 1.7m or less (width)
 - ③ Wheel base: 1.0m or more (distance between the front wheel and the rear wheel)
 - ④ Tread: 0.5m or more (distance between the central points of wheels)
 - ⑤ Weight: The car must weigh no less than 150kg and no more than 250kg
without the driver.
- E. The powertrain and electrical devices must be water-proof, and if water-proofness is unsatisfactory, points may be deducted during technical evaluation.
- F. Minimum ground clearance: All participating cars must have clearance of at least 100mm when they are unladen with no driver on board and the tires are properly inflated.
- G. No tire mounted at the time of the inspection of the car may be replaced subsequently unless it has any functional problem such as puncture. If replacement is necessary for any functional problem, only a tire of the

same specifications as those of the tire mounted at the time of inspection is allowed.

- H. A cowl must be mounted on each participating car to help reduce its air resistance and improve its appearance. Any material that cannot maintain its shape on its own, such as paper or plastic film, may not be for that purpose.

3.3 Engines

- A. The power source of all cars will be a 4-stroke gasoline engine with displacement under 120cc.
- B. Alteration of the intake and exhaust system including the turbo charger is not allowed, but if required by the structure of the car, the approval of the Organizing Committee must be obtained in advance.
- C. The engines of the cars participating in the competition can be disassembled and checked for alteration.
- D. Protective plate or cover must be provided for belts, chains, sprockets and other components used for delivery of power. The plate or cover are intended to deter any unauthorized change in the gear ratio and minimize the risk of damage by any broken piece from any part moving at high speed during operation of the car.

3.4 Motors

- A. Electric motors with a total capacity of 1.0kW or more must be used.
- B. There is no limitation in quantity, manufacturer, type and weight.

3.5 Batteries

- A. The battery mounted on the car must be of 12 V 80 AH, never to exceed 48 V.
 - B. Its dimension must be 257 mm (L) x 174 mm (W) x 200 mm (H).
- 2) All participating cars must use batteries specified by the Organizing Committee: Delko DF80L or DF80R.

3.6 Fuel tank and fuel system

A. Installation of fuel tanks

- 1) Fuel tanks of the same size and shape will be supplied by the Organizing Committee. No other fuel tanks than those supplied may be used for the participating cars. Failure to comply with this provision will lead to disqualification.
- 2) The entire fuel system must be out of the reach of the driver.

B. Alteration of the fuel tank

- 1) A fuel injection system can be used instead of a carburetor.
- 2) External power like air pressure cannot be used for fuel injection.

C. Prohibitions in relation to fuel tanks

- 1) The fuel system should not be artificially heated or cooled.
- 2) The fuel tank should not be pressurized or decompressed.

3.7 Characteristics of hybrid cars

- A. Cars participating in this competition must be able to use gasoline engines and electric motors as power, and have the characteristics of a hybrid car in which these two types of power are complementary to each other.
- B. Participating cars must have a system that charges the batteries while they are running.
- C. It is recommended that participating cars should have a regenerative braking system, but it is not mandatory.

3.8 Race car numbers

- A. Participating cars must have three 20cm x 20cm race car numbers (they can be painted) on the front, left and right sides.
- B. The Organizing Committee does not provide teams with a race car number; thus, participating teams must make and put on their own race car numbers.
- C. Race car numbers must be rigid enough that they are not deformed while the car is running lest the car number should be unidentifiable.

- D. The car numbers will be determined by the Organizing Committee and duly notified.

3.9 Fire extinguishers

- A. Fire extinguishers must be installed where the drivers and marshals can easily find them.
- B. Fire extinguishers must be easily separable from cars for use, but installed securely enough not to fall off cars due to impact during the drive.

3.10 Putting on competition logos, etc.

- A. Flagpoles must be installed on the bodies of the cars participating in the competition as shown in [Figure 1], and the competition flag provided by the Organizing Committee must be installed.

3.11 Headrests

- A. To prevent the driver's head from moving backward in the case of an accident, a headrest must be installed in the car.
- B. The area of the headrest must be greater than 232.0cm², and it must be made from shock-absorbing material. The shock absorber must be thicker than 3.8cm, and placed within 2.5cm from the driver's helmet in an uncompressed state.

3.12 Driver's protective gear

- A. Drivers must put on a 5 or more point safety belt that can securely restrain the two shoulders and the waist. The width of the belt's strap must be at least 45mm. The waist strap, the shoulder strap and the crotch strap must be fixed to the structure of the car. The connection between the safety belt and the car body must be made via brackets. The bracket must be welded to the body. Installation using any holes drilled through the body will not be acceptable. It must be possible to easily put on and release the safety

belt with simple operations. The waist belt and the shoulder belt share the same release mechanism, which must be a quick-release-type latch with a metal-to-metal connection. The joints of the safety belt must be sewn by the sewing machine.

- B. Drivers must wear a helmet certified with KS, KC, SNELL, DOT or other equivalent quality standard acceptable to the Organizing Committee to protect the head from impact. The chin strap must be fastened when the helmet is worn.
- C. Drivers must wear goggles or a helmet with goggles to secure a clear view while driving.
- D. Drivers must wear a long-sleeved jacket, long pants, gloves and shoes. If possible, they are recommended to wear nonflammable clothes for the sake of safety.
 - 1) It is recommended to wear clothes made of fire-resistant materials, but it is not mandatory. However, it is mandatory for drivers to wear a long-sleeved wrist-length jacket and ankle-length cotton pants.
 - 2) Drivers must wear fire-resistant (excluding leather) gloves. Gloves with holes are prohibited.
 - 3) Drivers are recommended to wear shoes made of fire-resistant materials, but it is not mandatory. However, sandals and shoes with holes are prohibited. There should not be any danger of causing safety accidents as the shoe laces are exposed outside.
- E. Drivers who fail to comply with the protective gear rules cannot participate in the competition.

3.13 Brakes

- A. Drivers must be able to operate the brake pedal with their foot.
- B. When drivers step on the brake pedal, 3 or more brake actuators must work surely and safely.

- C. The brake must be an independent hydraulic unit with two systems so that if either system is out of order, the other system can put the car to a stop. (The simplest method is to use a tandem master cylinder.)
- D. Safety must be sufficiently ensured by installing a mechanism for preventing the brake pad from sticking out.
- E. Two brake lights must be installed on the left and right side of the car each. The brake lights must be 15w or brighter, and if LED is used, it must be bright enough to be visible in broad daylight. Before starting the driving test, the two brake lights must be working normally. The brake lights must be operational when the power is switched off.

3.14 Starters

- A. Cars must have a device the driver can use to turn on and off the power in the normal driving position.
- B. Cars cannot be started by an external force, such as through manpower.

3.15 Rear-view mirrors

- A. Rear-view mirrors must be installed on the left and right side of the cars to secure a clear rear view for the sake of safety.
- B. Rear-view mirrors must be rigid and strong enough to function normally while the car is running.

3.16 Exhaust system

- A. Mufflers must be installed to prevent noise.
- B. Mufflers must work normally.
- C. Exhaust pipes must be located in the back of the car, and the exhaust gas should not be emitted in the direction of the driver.

3.17 Driver's visibility

All cars must allow drivers to secure a clear view so that they can see everything in front, and 90° left and right with their own eyes in the normal driving position without relying on reflectors or other ancillary equipment.

3.18 Structure and shape of the car body

- A. Cars must be designed in such a way that drivers can escape on their own or easily escape with outside help in case of an emergency, such as in an accident. For this purpose, cars with a top are allowed to cover part or all of the top with a detachable cover, but the switchgear must be easily visible inside and outside the car, and it must be easily operable without requiring any special tool.
- B. There must be no sharp edge in and outside of the car that may threaten the safety of the driver, the drivers of other cars, staff or spectators. Any edge must be finished unsharp. All front parts of the car that may come in contact with humans - exterior, frame, other components, etc - must be rounded so that they have a radius of at least 38mm.
- C. Any part of the primary structure or reinforcements on or around the driver's seat that may come in contact with the driver's helmet must be covered with elastic materials at least 12cm thick, such as polystyrene and sponge.
- D. The car body must be rigid enough to secure maneuverability.
- E. A flagpole with an ox ball for the competition flag must be installed on the car body as illustrated in [Figure 1] so that the height from the ground to the tip of the ox ball exceeds 1,800mm.
- F. Shielding of the wall and floor of the driver's compartment
 - 1) To protect the driver from any foreign object, shielding from the ground must be provided for the driver's compartment by installing a plate of no less than 1 mm thick over the compartment's wall and floor. The plate must extend from where the driver's buttocks would be positioned all the way to where his/her foot would be positioned.
 - 2) For the purpose of these rules, the wall refers to the space between the bottom left or right frame and the side frame.

G. Roll hoops

- 1) Roll hoops protect the driver's head and hands from contact with the ground in the event of rollover of the car.
- 2) When the driver sits on the driver's seat and fastens the seat belt, the distance between a virtual straight line extending from the uppermost point of the main roll hoop to that of the front roll hoop and the uppermost point of the tallest driver's helmet must be no less than 50 mm.
- 3) Main roll hoop
 - The main roll hoop must consist of a single piece of round pipe and extend from one (left) floor frame over the driver to the other (right) floor frame.
 - The distance between the point where the main roll hoop meets the main frame structure on the left and its counterpart on the right must be at least 380 mm (when measured from the pipe to the inside of the pipe).
 - When viewed from the side, the gradient of the main roll hoop relative to a vertical line on the front and the rear must be within 10 degrees.
- 4) Main roll hoop supports
 - At least two round pipes must support the main roll hoop, with one(s) on the left and the other(s) on the right.
 - If the main roll hoop leans backwards, it must have a support at the rear.
 - Likewise, if it leans forward, it must have a support in the front.
 - In principle, the support for the main roll hoop must be connected to the uppermost point of the hoop. If this cannot be followed, the alternative connection between the support and the hoop must be located within 160 mm from the uppermost point of the hoop, with the angle between the connection and the hoop being no less than 30 degrees.

- The main roll hoop support must consist of a fully straight pipe with no curved section along it.

5) Front roll hoop

- The main roll hoop must consist of a single piece of round pipe and extend from one (left) floor frame over the steering shaft to the other (right) floor frame.
- No part of the front roll hoop must be lower than the steering wheel no matter which angle it is in.

6) Front roll hoop support

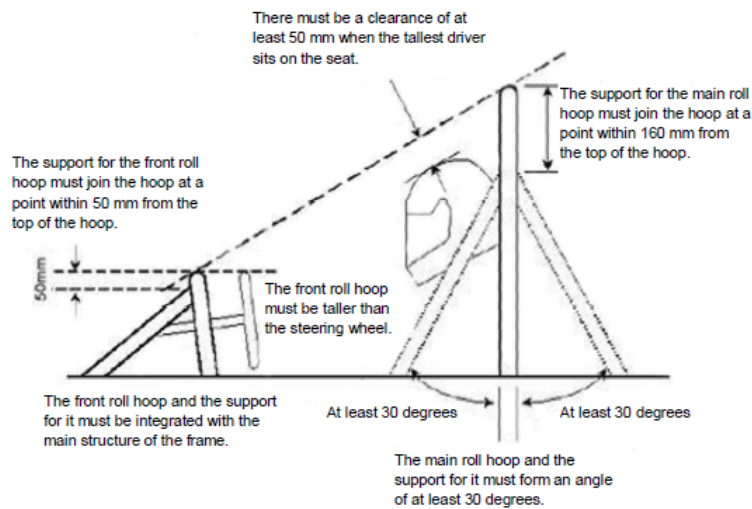
- The front roll hoop support must extend towards the front of the roll hoop to be able to protect the driver's legs.
- The support for the front roll hoop must be connected to the uppermost point of the hoop. If this cannot be followed, the alternative connection between the support and the hoop must be located within 150 mm from the uppermost point of the hoop.

7) Requirements for the roll hoop pipe

- The roll hoop pipe must be made of regular steel or carbon steel containing at least 0.1 percent of carbon, with its outer diameter being at least 25 mm and its thickness being at least 1.8 mm.
- The physical properties of any steel material used must have values greater than those presented in the table below.

No.	Physical property	Value	Unit
1	Modulus of elasticity	200	GPa
2	Yield strength	300	MPa
3	Tensile strength	365	MPa

- No composite material may be used for the main roll hoop or the front roll hoop.



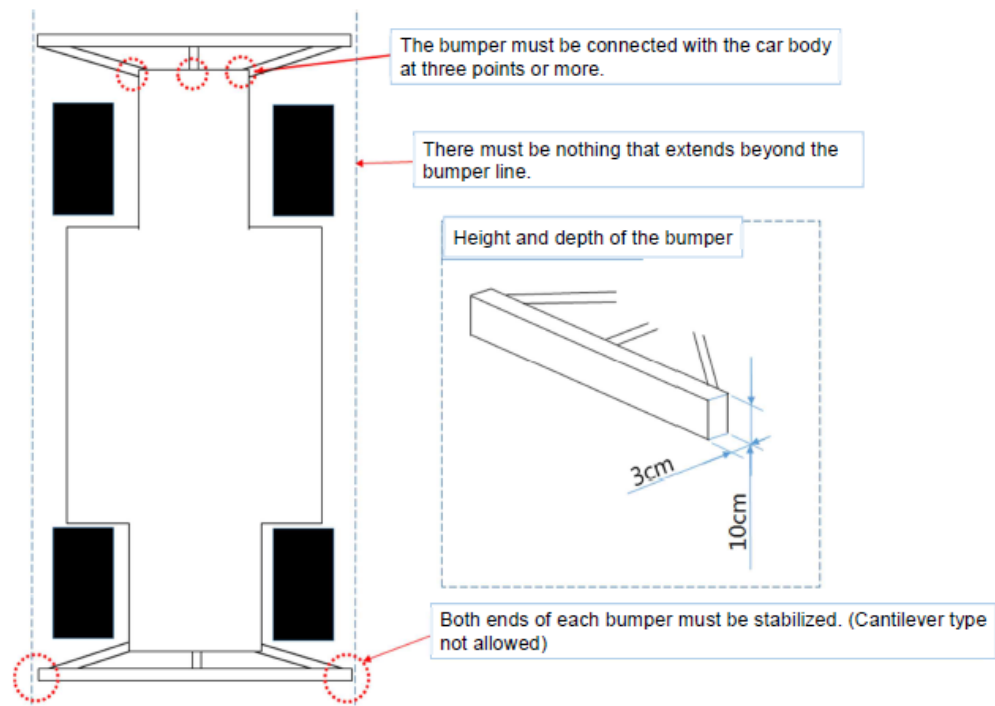
[Figure 2] Roll hoops

H. Limit angle of turnover

The car must not roll over when it tilts unladen up to 35 degrees to either side.

3.19 Bumpers

- A. To protect the car body in a collision, a one-piece structure fitted to the body at three or more points must be installed in the front and the rear. The front and rear bumpers must not be detachable and must have their both ends fixed. Their ends must not be sharp. At this time the minimum width of the bumper must be at least 10cm, and the bumper must look thicker than 3cm.
- B. Since the primary role of the bumper is to protect the driver, the front and the rear bumpers of the car must be designed to fully perform their intended role. No part of them may protrude beyond their surfaces. Failure to comply with this provision will lead to disqualification.



[Figure 3] Specifications of the bumper

3.20 Emergency shutdown switch

- A. There must be at least two emergency shutdown switches. Each switch must be able to cut off electricity supply to all electrical devices like the batteries, generator, lights, fuel pump, spark plugs and ECU, and stop the engine.
- B. The switch must be a mechanical switch, and it is recommended to put on a sticker for recognition, and the location of the shut down switch must be clearly marked.
- C. Even if the switch is activated, the brake light must keep working.

3.21 Inspection and approval of automobiles

- A. Participating teams must have their cars inspected at designated times during the competition according to their “creative hybrid car technical reports.”

- B. The inspection will take place right after each team makes registration. An inspection may be added immediately prior to or after each category of race.
- C. Members of participating teams must faithfully answer questions about car rules that are asked by judges or persons to whom the judges have delegated authority.
- D. Only those cars which passed the inspection can participate in the competition.
- E. The inspection of the car checks that the electric vehicle technical report is in consistent with the initial inspection. If they are different from each other, such teams will receive penalty points or shall be disqualified.

Chapter 4. Competition Regulations and Scoring

4.1 Scoring for each competition category (1,000 points in total)

- A. Each competition category is scored as follows:
 - ① Endurance performance category: 400 points
 - ② Gymkhana category: 300 points
 - ③ Acceleration performance and braking safety: 300 points
- B. The scores of the overall category will be the sum of the scores of individual categories (point deductions reflected). If there are ties, teams with a higher score in the endurance performance category, Gymkhana, and acceleration and braking safety will take precedence in that order.

4.2 Creative car technical report

- A. Submission of the report

The technical report may be submitted in person, via postal mail, fax or e-mail. Reports having a postmark of any date during the application period will be considered valid.
- B. Point deduction regulation

Technical reports submitted after the deadline will have 5 points deducted for each day of delay. Three points will be deducted from the total endurance performance score, 1 point from Gymkhana score, and 1 point from the acceleration and braking safety score. For example, if the design report whose due date is May 14 is submitted on May 17, 15 points will be deducted from the design report score. If the technical report is not submitted at all, the applicable car will be given no opportunity for inspection and, accordingly, will be automatically excluded from the competition.

4.3 Endurance performance competition

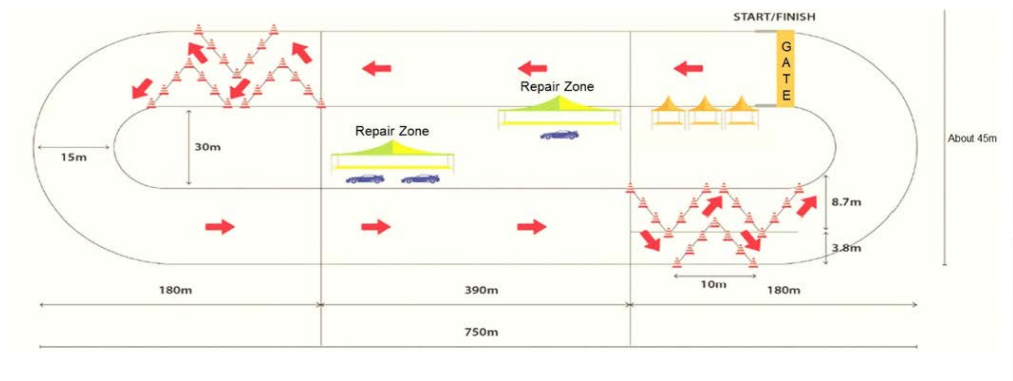
4.3.1 Description of the competition in the endurance performance category

- A. Advance preparation

Cars must be waiting at the designated place by the designated time for inspection. Any late showup for the stipulated place will result in penalty in accordance with the rules depending on the Organizing Committee.

B. Driving course

- Paved track
- Driving course: Length 1.5 km, lane width and turning radius 10m
- Driving direction: counter-clockwise
- Deceleration areas will be installed before the turns to prevent cars from speeding



C. Competition method

- 1) Teams may be divided into group A and group B, and they will be ranked according to the time taken for them to cover the specified distance. However, teams that have failed to cover the whole course within the given time will be ranked according to the distance they have covered.
- 2) The cars will start sequentially according to their scores from the acceleration category.
- 3) Electric vehicles will circle the 1.5 km/cycle driving course 30 times for a total of 45km.
- 4) Hybrid car will circle the 1.5 km/cycle driving course in the multi-purpose track 15 times for a total of 22.5km. Fuel capacity must not be greater than 300 Mℓ.

- 5) After scores are calculated, points will be deducted for each obstacle knocked down. (1 point for each obstacle knocked down).
- 6) If there is a tie (in terms of total scores after accounting for any points deduction), the team with fewer obstacles knocked down will be ranked higher.

D. Time measurement

- ① Each car participating in the competition will be timed by the Organizing Committee using a transponder or other similar means.
- ② The transponder will be provided by the Organizing Committee in the field.

E. Start

- 1) Cars will start one team after another at regular intervals according to their scores in the acceleration category. If there are ties in acceleration performance scores, the driving time will be the criterion.
- 2) Each participating team will start at the moment the start flag is raised.
- 3) Cars must be started with their own power. In other words, cars cannot be started with the push of people. It is not allowed in any competition category, and if it is caught, it may result in disqualification.
- 4) If a car cannot start immediately due a problem of the car when the start flag is raised, the next car will start. Cars that failed to start right away are allowed to start when they are ready to start.

F. Breakdown of the car while running

- 1) Repairing the car in the lane is strictly prohibited, and if it is caught, it may result in disqualification.
- 2) If drivers are forced to leave the car due to the car breaking down, they must move the car quickly to the repair zone.
- 3) Marshals must provide help so that any car that has broken down can be moved quickly to the repair zone.

- 4) Broken-down cars must be repaired in the designated repair zone at the yellow flag signal of the marshal. In this case, the instructions of the marshals must be strictly complied with.
- 5) If cars restart after finishing repairs in the designated repair zone, they must enter the track through a separate gate. If there is no separate gate, they must enter the track where they entered the repair zone. When the cars enter the track, they must follow the instructions of marshals so that they do not interfere with the car participating in the competition.
- 6) If a car has a serious trouble and cannot run, the team must quickly apply for withdrawal in order not to interfere with the competition.
- 7) Maintenance personnel of the same team may be assigned to the repair zone. At this time, as far as the equipment for maintenance and repairs is concerned, their own tools placed in the repair zone immediately before the driving competition may be used for the repairs to the extent that they are not using any power line. At this time, however, the tools of other teams may not be borrowed, and no additional tools other than prepared in advance may be supplied.
- 8) Entry into the lane during the competition is strictly restricted, and no entry is allowed without the permission of the marshals.

G. Driving rules

- 1) All participating teams must comply with the safe driving duties.
- 2) No passing or intentional interruption of passing likely to threaten safety is allowed.
- 3) If this rule is violated, penalties may be imposed according to the decision of the judging committee.
- 4) No battery replacement will be allowed during the race.

H. Arrival at the finish line

- 1) The time when the front-most part of the car passes the finish line will be the time when the car arrives at the finish line.

- 2) Cars that arrive at the finish line must wait in the designated place for inspection.

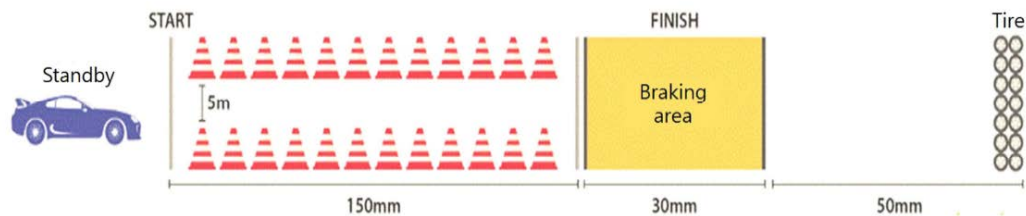
4.3.2 Evaluation points (400 points)

- A. Excluding disqualified cars or cars with 0 points in the endurance performance category, points will be deducted at a certain ratio according to ranks.
- B. The score to be given to the electric vehicle team that cleared 45 km (or 22.5 km for hybrid cars) in the shortest time will be 400 points, and a score lower by points will be given to each team down the ranking.
- C. In the following events, the following penalties will be imposed:
 - ① Driving using power not in compliance with the regulation: disqualification
 - ② Repairing cars outside the designated area: disqualification
 - ③ Deliberate change of the weight of the car: disqualification
 - ④ Intentional obstruction of the path of other cars: disqualification or warning
 - ⑤ Other serious violation of driving rules: disqualification
 - ⑥ Failure to cover the minimum driving distance (less than 10 km): endurance performance 0 points
 - ⑦ Inappropriate driver change: endurance performance 0 points
 - ⑧ Lack of a transponder on the car: endurance performance 0 points

4.4 Competition in the safety performance category

4.4.1 Acceleration and braking safety

A. Track



B. Competition method

- 1) Two teams will start at the same time in the track at the start signal, and accelerate. The time taken for them to cover a 150m range will be measured. They must stop within 30m afterwards. The braking distance so measured must not be longer than the limit (30m range) otherwise participation in the next round will not be allowed. The measurement will be made from the body of each car.
- 2) Zero points will be given if the car turns by 90 degrees or more during braking.
- 3) The above will be repeated twice for each participating team. If the time cannot be measured as the team failed to start, it will get 0 points.
- 4) Hybrid cars must run the first race in the all electric mode (use of internal combustion engines is prohibited), and the second race in the overall mode (internal combustion engines and electric motors are used).

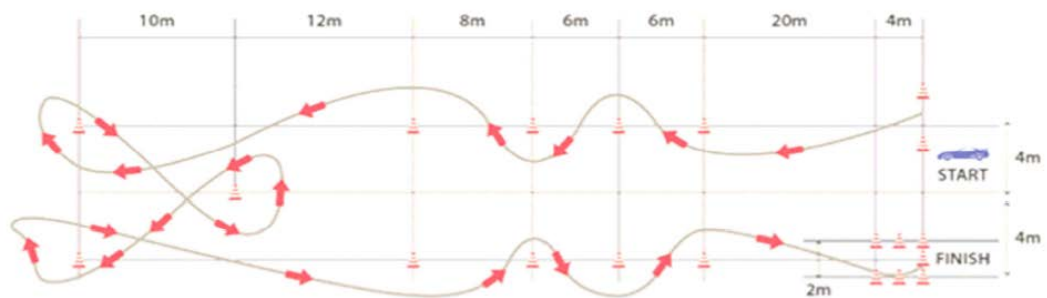
C. Evaluation score (300 points)

- 1) The acceleration performance score of a team whose result of the 2 races was race disallowed will be 0 points.
- 2) The score of each acceleration race will be 150 points for the team with the shortest driving time, and 1.5 points will be deducted each time from each lower-ranked team.

- 3) The scores of the two acceleration races will be totaled, and the rank in the acceleration category will be determined. If there is a tie, ranks will be determined according to the sum of the driving times.

4.4.2 Gymkhana

A. Race track



B. Competition method

- 1) In the race track illustrated above, cars will start at the start signal, running along the designated courses while avoiding obstacles, and the time until arrival will be measured.
- 2) The above will be repeated twice for each participating team. If the time cannot be measured as the team failed to start, it will get 0 points.
- 3) Hybrid cars must run the first race in the all electric mode (use of internal combustion engines is prohibited), and the second race in the overall mode (internal combustion engines and electric motors are used).
- 4) In the following events, the following penalties will be imposed:
 - a. Knocking down obstacles (4 or less): 1.5 point will be deducted from the Gymkhana category score for each obstacle knocked down.
 - b. Knocking down obstacles (5 or more): One race will be disallowed..

C. Evaluation points (300 points)

- 1) The Gymkhana score of a team whose result of the 2 races was race disallowed will be 0 points.

- 2) The score of each Gymkhana race will be 150 points for the team with the shortest driving time regardless of the number of obstacles knocked down, points will be deducted at a time from the score of each lower ranked team.
- 3) The scores of the two Gymkhana races will be totaled, and the rank in the Gymkhana category will be determined. If there is a tie, ranks will be determined according to the sum of the driving times.
- 4) After scores are calculated, points will be deducted for each obstacle knocked down. The number of obstacles knocked down during the race is based on the number of tennis balls on the rubber cones falling to the race. (1.5 point for each obstacle knocked down)
- 5) If there are ties (scores after point deduction), the teams will be ranked according to the number of obstacles knocked down.

4.5 Point deduction regulations

Unless teams violating rules are to be disqualified, the following point deduction rule will be applied to impose penalties:

A. Electric vehicle (hybrid car) technical report

- ① Technical reports submitted after the deadline will have 5 points deducted for each day of delay. 3 points will be deducted from the endurance performance score, 1 point from the Gymkhana score, and 1 point from the acceleration performance and braking safety score.

B. Inspection of cars

- ① Three points for each kg below the minimum weight or above the maximum weight will be deducted from the total score.
- ② If cars fail to assemble at the designated time for the second inspection, 5 points will be deducted for 5 minutes of delay. At this time, 3 points will be deducted from the endurance performance score, 1 point from the Gymkhana score, and 1 point from the acceleration performance and braking safety score.

- ③ Point deduction according to the disqualification due to structural change or the decision of the judging committee

C. Endurance performance category

- ① If cars fail to start within 10 seconds after the start signal, 5 points will be deducted from the endurance performance score. 3 points will be deducted from the endurance performance score for each safe driving violation warning.
- ② If objections are raised due to accidents during the competition, 3 points will be deducted from the endurance performance score of both parties for each warning regarding unsafe driving.
- ③ If cars enter the track arbitrarily, not according to the instruction of the marshal, after repairs are completed in the repair zone, 3 points will be deducted from the endurance performance score for each warning regarding unsafe driving.
- ④ If cars enter the lane without the permission of marshals during the competition, 5 points will be deducted from the endurance performance score for each warning.

D. General

- ① If teams interfere with the competition or race intentionally, or raise objections in ways not specified in the rules, 10 points will be deducted from the total score.
- ② If an appeal raised in writing is deemed groundless by the Organizing Committee, 3 points will be deducted from the appealing team's score for the specific race.
- ③ 3 points will be deducted from the total scores of the teams with no adviser or appointed person above the position of teaching assistant.
- ④ Late showup at the stipulated place for the race will result in a reduction in the score or disqualification for the applicable race, depending on the decision by the Organizing Committee.
- ⑤ Failure to wear driver's protective gear including a helmet or seat belt during a race will result in disqualification for the race.

- ⑥ Movement of a participating car outside the track must be made without power and manually by the team members, always with the driver onboard. Failure to do so will result in deduction of 5 points from the team's score.
- ⑦ Violation of the rules by a team may be reported by anyone. False reporting, if confirmed, will result in deduction of 3 points from the score of the reporter's team.
- ⑧ Drivers may be subject to test for driving drunk. Any driver found drunk during drive shall be disqualified.
- ⑨ Any discrepancy between the specifications contained in the technical report and the actual specifications will result in deduction of 10 points from the total score.

[Penalty schedule]

◦ Reasons for disqualifications

Category	Description	Pursuant to:
Member or car	Violation of requirements or rules	1.6.1
Competition rules or intention	Material non-compliance	1.6.1
Repeated warnings	3 or more warnings	1.6.2
Technical report	Failure to submit	4.2.1.B (No participating)
Driving performance	Use of non-compliant power	4.3.1
Driving performance	Repairing outside designated area	4.3.1
Driving performance	Unauthorized changing of the car's weight	4.3.1
Driving performance	Intentional obstruction of another car's path	4.3.1
General	Failure to wear driver's protective gear	4.5
	Driving drunk	4.5

◦ Penalties

Category	Description	Penalty	
Technical report	Late submission	- 5 points/day • 3 for drive, 1 for acceleration and braking, 1 for gymkhana	4.5.A
Car inspection	Underweight or overweight	- 3 points from the total per kilogram	4.5.B
Car inspection	Late showup for gatherings	- 5 points/5 minutes • 3 for drive, 1 for acceleration and braking, 1 for gymkhana	4.5.B
Driving performance	Travel distance shorter than required (10 km)	0 point for driving performance	4.3.1.H
	Unauthorized driver change	0 point for driving performance	4.3.1.H
	Late start (within 10 seconds after signal)	5 points for driving	4.5.C
	Warned for violation of safety rules	3 points for driving/count	4.5.C
	Warned for groundless appeal	3 points for bi-directional driving/count	4.5.C
	Unauthorized entry into the track after repair	3 points for driving/count	4.5.C
	Unauthorized access to the track	5 points for driving/count	4.5.C
	Lack of a transponder	0 point for driving performance	4.3.1.H
Gymkhana	Failure to start	0 point for gymkhana	4.4.2.B
	Tipping over obstacles	1.5 point/obstacle * One round null if five or more are hit	4.4.2.B

General	Appeal for decisions	3 points off the total (if rejected)	4.5.D
	Intentional interruption of the event or a race	10 points off the total	4.5.D
	Non-participation by the adviser (or his designee)	3 points off the total	4.5.D
	Late showup at the track	Penalty or disqualification (depending on the Organizing Committee's decision)	4.5.D
	Violation of non-powered movement	5 points off the total	4.5.D
	False reporting of rule violation	3 points off the total	4.5.D
	Discrepancy in specifications between the technical report and the actual car	10 points off the total	4.5.D



UNIVERSITAS NEGERI YOGYAKARTA
FAKULTAS TEKNIK

KARTU BIMBINGAN PROYEK AKHIR /TUGAS AKHIR SKRIPSI

FRM/OTO/04-00

27 Maret 2008

Nama Mahasiswa : I Wayan Yogi Arta
No. Mahasiswa : 15504241006
Judul TA : PENGARUH BERAT ROLLERS CVT TERHADAP DAYA DAN TORSI MESIN HONDA VARIO 125 PADA MOBIL GARUDA HYBRID 2017
Dosen Pembimbing : Dr.Zainal Arifin,.M.T.

Bimb. Ke	Hari/Tanggal Bimbingan	Materi Bimbingan	Catatan Dosen Pembimbing	Tanda tangan Dosen Pemb.
1	Jumat, 30 November 2018	BAB I	Perbaiki Judul dan Latar belakang	
2	Kamis, 06 Desember 2018	BAB I	Revisi Latar Belakang dan Rumusan Masalah	
3	Rabu, 19 Desember 2018	BAB II	Cantumkan sumber pada setiap kutipan, gambar dan tabel.	
4	Jumat, 28 Desember 2018	BAB II	Ganti gambar yang tidak jelas, sesuaikan keterangan dari gambar	
5	Kamis, 10 Januari 2019	BAB II dan BAB III	Revisi kerangka berpikir dan metode penelitian	
6	Jumat, 18 Januari 2019	BAB III	Revisi skema penelitian dan jumlah sampel	
7	Rabu, 23 Januari 2019	BAB III dan BAB IV	Revisi Grafik pengujian dan penulisan format data.	
8	Selasa, 12 Februari 2019	BAB IV dan BAB V	Revisi Pembahasan dan format chart serta simpulan.	
9	Kamis, 25 April 2019	BAB V	Implikasi dan keterbatasan	
10	Kamis, 02 Mei 2019	BAB V	Simpulan Ujias	

Keterangan :

1. Mahasiswa wajib bimbingan minimal 6 kali
Bila lebih dari 6 kali. Kartu ini boleh dicopy.
2. Kartu ini wajib dilampirkan pada laporan PAVTAS



UNIVERSITAS NEGERI YOGYAKARTA
FAKULTAS TEKNIK

BUKTI SELESAI REVISI TUGAS AKHIR SKRIPSI S1

FRM/OTO/11-00

27 Maret 2008

Nama : I Wayan Yogi Arta
NIM : 15504241006
Program Studi : Pendidikan Teknik Otomotif
Judul TAS : Pengaruh Berat Roller CVT Terhadap Daya dan Torsi
Mesin Honda Vario 125 pada Mobil Garuda Hybrid 2017

Dosen Pembimbing : Dr. Zainal Arifin, M.T.,

Dengan ini Saya menyatakan Mahasiswa tersebut telah selesai revisi.

No	Nama	Jabatan	Paraf	Tanggal
1	Dr. Zainal Arifin, M.T.	Ketua Penguji		02.07.2013
2	Muhkamad Wakid, S.Pd. M.Eng.	Sekretaris Penguji		02.07.2013
3	Drs. Kir Haryana, M.Pd.	Penguji Utama		02.07.2013

Keterangan:

1. Arsip Jurusan
2. Kartu ini wajib dilampirkan dalam laporan Tugas Akhir Skripsi.