

國立成功大學
111學年度碩士班招生考試試題

編 號： 165

系 所： 能源工程國際碩士學位學程

科 目： 科技英文

日 期： 0219

節 次： 第 2 節

備 註： 不可使用計算機

※ 考生請注意：本試題不可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

Part 1 (20 points) Choose only 1 correct answer for each question. Each question is worth 2 points.

1. In a Stirling engine, it is the air in the section between the hot and cold ends that _____ the temperature gradient.
(A) provide (B) provides (C) providing (D) provided
2. Natural gas and gasoline are _____, so Taiwan's long-term energy policy relies on both of them.
(A) both fossil fuels (B) all fossil fuels (C) neither fossil fuels (D) either fossil fuels
3. Lavender _____ as feedstock for biomass.
(A) use (B) uses (C) used (D) can be used
4. Your professor thinks highly of your approach _____ this research.
(A) against (B) to (C) on (D) with
5. In Taiwan, electric cars will not _____ conventional gas cars until 2022.
(A) place (B) displace (C) undermine (D) replace
6. Not only does honey soothe a sore throat, it also _____ coughing.
(A) suppresses (B) suppress (C) does suppresses (D) do suppress
7. Paying too much for a cellphone could ruin one's financial state _____.
(A) in the short term (B) in the mean time (C) ever (D) at the same time
8. The functions of a new impedance analyzer are _____ by a one-year warranty.
(A) profited (B) benefited (C) advantaged (D) protected
9. The development of AI technology will _____ products acting like a personal assistant.
(A) evolve (B) result in (C) contribute (D) cause
10. In Taiwan, only certified engineers and technicians can _____ solar panels on one's roof.
(A) buy (B) launch (C) turn (D) install

Part 2 (20 points) Fill in each blank with 1 correct answer. Each question is worth 2 points.

SSPIDR (Space Solar Power Incremental Demonstrations and Research Project) is a 11 of flight experiments designed to 12 different critical technologies needed to build an operational solar power beaming system in space. With the end goal 13, the SSPIDR project team 14 the needs of the operational prototype and identified five critical technologies needing further development to make this system a reality. The technologies 15 the effort are Deployable Structures, Energy Generation, Thermal, Radio Frequency (RF) Beaming, and Metrology.

11. (A) collection (B) date (C) choice (D) funding
12. (A) become (B) mature (C) invent (D) phase out
13. (A) mindful (B) reminded (C) minded (D) in mind
14. (A) examined (B) endorsed (C) questioned (D) expanded
15. (A) around (B) settling (C) driving (D) connecting

The White House and at least 49 senators support a proposal to 16 an almost \$20 per-ton fee on carbon as part of President Joe Biden's climate-and-spending legislation, U.S. Senator Sheldon Whitehouse said Saturday. Under the initiative, the 17 on carbon dioxide emissions would start at less than \$20 per ton and increase 18, with revenue possibly rebated back to some consumers or dedicated to help fossil fuel workers amid the 19 clean energy, Whitehouse said on the sidelines of the COP26 20 in Scotland on Saturday.

16. (A) impose (B) suppose (C) depose (D) pose

17. (A) saving (B) finance (C) payment (D) cost

18. (A) on time (B) over time (C) in time (D) through time

19. (A) transition from (B) transition against (C) transition to (D) transient of

20. (A) climate conference (B) weather conference (C) climate congress (D) weather forecast

Part 3 (10 points) Identify and correct 5 grammatic errors in the following paragraph. Each error is worth 2 points.

Swimming pool usage must follow the guidelines announced by the Taiwan Center for Disease Control (CDC), such as carrying out the real-name registration, measuring body temperature, keeping environments well-ventilated, disinfecting regularly, and closely monitoring the amount of resident chlorine in water. In addition, masks must be worn at all times, except for swimming and showering. Instructors and student should wear masks at all times during the class. However, when engaging in exercises, if neither of them has respiratory symptoms and social distancing can be maintained from unspecified person (unspecified person refers to persons other than students or faculties from NCKU), they are allowed to do exercises without masks.

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Part 4. (30 points) Read the articles and choose 1 correct answer to each question. Each question is worth 3 points.

Article "COP26: green technologies could turn the tide," Editorial / Nature Materials 6 (2021) page 959.

As of this writing, the Climate Clock predicts that we have just under 7 years and 282 days to achieve zero greenhouse gas emissions, or face a high likelihood of irreversible climate damage. When heads of state and policymakers descend upon Glasgow this month for the 26th United Nations Climate Change Conference of the Parties (COP26), this deadline will — we hope — be on their minds.

Big things happen at the summit. The Paris Agreement, the first legally binding commitment to cut greenhouse gas emissions signed by almost every country in the world, was negotiated at the 2015 COP. The treaty aims to limit global warming to a critical threshold of 1.5 °C from pre-industrial levels; a rise of even 2 °C is predicted to lead to much more severe climate impacts. If we stick to the emissions targets set in Paris, we are on track for more than 3 °C of warming by the end of the century.

Fortunately, under the Agreement, countries must update their emissions targets every 5 years to keep 1.5 °C in reach. This year's summit is the first such update. Because our best window to reach net zero will likely close this decade, COP26 takes on a special urgency: ambitious targets will need to be set in Glasgow. It will likely be too late to slash emissions in 5 years.

Materials, of course, form the backbone of many sectors that need to be decarbonized, from the front and centre (energy production) to the less obvious (construction, transportation and infrastructure). In this month's pages and in a Collection, we feature several articles that highlight the central role of materials in the shift to greener technologies.

Solar energy is now cost-competitive with coal, thanks in part to emerging photovoltaic materials for solar cells. As Annamaria Petrozza and colleagues describe, chemically versatile materials such as metal halide perovskites are rapidly beginning to outperform established semiconductors. Still, we are nowhere near realizing their full conversion efficiency or operational stability, and the pace of research will need to keep up with climate goals.

To meet the demands of energy storage in a sustainable society — including grid-scale storage systems and electric vehicles — batteries must be made more cheaply with higher energy density and stability. Ce-Wen Nan and co-workers propose that inorganic-polymer solid-state electrolytes may reduce safety hazards and manufacturing costs associated with conventional Li-ion batteries. Robert Usiskin, Joachim Maier and colleagues lay out the case for Na-based batteries to avoid the environmental and societal impacts and supply risks related to mining of Li. Fundamental research on corrosion and interfacial reactions is also needed to commercialize battery technologies, as Stefano Passerini, Arnulf Latz, Robert Kostecki and co-authors explain in their Review on rechargeable Li metal batteries.

26. In this article, "descend upon" means?
- climb down
 - leave
 - arrive at
 - None of the above
27. "The aim" in the Paris Agreement is to?
- maintain the global average temperature below 2 °C above pre-industrial levels
 - limit global warming to a critical threshold of 1.5 °C from pre-industrial levels
 - achieve a balance between greenhouse gas emissions and removals
 - None of the above
28. COP26 took place because?
- big things happen at the summit.
 - heads of state and policymakers happen to descend upon Glasgow.
 - a deadline is coming up in less than 8 years.
 - countries must update their emissions targets every 5 years since 2015.
29. COP26 takes on a special urgency because
- It will likely be too late to slash emissions in 5 years.
 - Ambitious targets will need to be set in Glasgow.
 - Because our best window to reach net zero will likely close this decade.
 - All of the above.
30. In this article, "decarbonized" means
- Remove or reduce carbon from the production process.
 - Add pressurized carbon dioxide to a drink.
 - Burn off any organic residue from an inorganic surface.
 - None of the above.
31. According to the article, solar energy is
- Cheaper than gas.
 - About the same expensive as coal.
 - More expensive than fossil fuels.
 - All of the above.
32. The pace of research for solar energy
- cannot relax but need to keep up with climate goals.
 - can relax a bit because new materials rapidly beginning to outperform established semiconductors.
 - can take a break because emerging photovoltaic materials for solar cells contribute to much lower cost of solar energy recently.
 - None of the above.

33. "metal halide perovskites"
- are close to realizing their full conversion efficiency and operational stability.
 - are chemically versatile materials.
 - already outperform established semiconductors.
 - All of the above.
34. Batteries must be made more cheaply with higher energy density and stability because of
- the demands of energy storage in a sustainable society.
 - the need of grid-scale storage systems.
 - the need of electric vehicles.
 - All of the above.
35. Compared to Li-based batteries, Na-based batteries ones
- avoid the environmental impacts.
 - avoid the societal impacts.
 - avoid supply risks.
 - All of the above.

Part 5. (20 points) Writing assignment

In 100-200 words, write an essay to recommend any renewable energy policies, technological applications, and/or future research based on the information in the Article in Part 4. A perfect score will be given if:

- There are clear topic sentences. (2 points)
- There are substantial details supporting the topic sentences. (5 points)
- The writing includes the findings in this paper appropriately. (5 points)
- The student uses correct grammar and spelling. (5 points)
- The student uses appropriate vocabulary. (3 points)