

湖北省高中名校联盟 2024 届高三第一次联合测评

英 语

命题单位:武汉外校英语学科组

审题单位:圆创教育研究中心 襄阳市第五中学

本试卷共10页,67题。满分150分。考试用时120分钟。

考试时间:2023年8月17日上午8:00—10:00

★祝考试顺利★

注意事项:

1. 答卷前,考生务必将自己的姓名、准考证号填写在答题卡上。
2. 回答选择题时,选出每小题答案后,用2B铅笔把答题卡上对应题目的答案标号涂黑。如需改动,用橡皮擦干净后,再选涂其他答案标号。回答非选择题时,用签字笔或钢笔将答案写在答题卡上。写在试卷上无效。
3. 考试结束后,将本试卷和答题卡一并交回。

第一部分 听力(共两节,满分30分)

做题时,先将答案标在试卷上。录音内容结束后,你将有两分钟的时间将试卷上的答案转涂到答题卡上。

第一节(共5小题;每小题1.5分,满分7.5分)

听下面5段对话,每段对话后有一个小题,从题中所给的A、B、C三个选项中选出最佳选项。听完每段对话后,你都有10秒钟的时间来回答有关小题和阅读下一小题,每段对话仅读一遍。

1. Who is the woman looking for?
A. Jennifer Lopez. B. Emma Stone. C. Ben Affleck.
2. When did the woman have her birthday party?
A. On Saturday. B. On Friday. C. On Thursday.
3. What does the man refuse to have?
A. Milk. B. Chocolate. C. Salad.
4. What are they talking about?
A. Health. B. Weather. C. Environment.
5. Why does the woman come to the man?
A. To turn to him for help. B. To inform him of a test. C. To remind him to study.

第二节(共15小题;每小题1.5分,满分22.5分)

听下面5段对话或独白,每段对话或独白后有几个小题,从题中所给的A、B、C三个选项中选出最佳选项。听每段对话或独白前,你将有时间阅读各个小题,每小题5秒钟。听完后,各小题将给出5秒钟的作答时间。每段对话或独白读两遍。

听第6段材料,回答第6至7题。

6. Why did Lisa win an award?
A. She wrote a nice poem. B. She wrote a good article. C. She wrote beautiful music.
7. What will Justin spend his money on?
A. A new camera. B. A new computer. C. A new guitar.

英语试卷 第1页(共10页)

听第7段材料,回答第8至10题。

8. Where does the woman want to go?
A. The Globe Theater. B. The town hall. C. The garage.
9. Why will it cost the woman a lot to get to her destination?
A. It's the heavy traffic time.
B. The destination is far away.
C. She has a lot to carry.
10. What does the man remind the woman to do?
A. Shut the door.
B. Fill the car up with petrol.
C. Take her luggage when getting off.

听第8段材料,回答第11至13题。

11. Who called Susan just now?
A. The Printing company. B. Royal Company Limited. C. The Advertising agency.
12. What caused the delay in printing?
A. An urgent call. B. A tight schedule. C. A power cut.
13. What is the man expected to do right away?
A. Head to the factory. B. Make a phone call. C. Get the brochures.

听第9段材料,回答第14至17题。

14. What is the relationship between the speakers?
A. Teacher and student. B. Best friends. C. Family members.
15. Who is Michael White?
A. A member of a school club.
B. A champion cyclist in the town.
C. A friend of the woman.
16. What event will happen on Sunday?
A. A cycling race. B. An important exam. C. A meeting.
17. What are the speakers mainly discussing?
A. A new club. B. The Olympic Games. C. Homework.

听第10段材料,回答第18至20题。

18. What can we know about Alex according to the speaker?
A. He loves gardening.
B. He works with the speaker.
C. He is an Internet expert.
19. What happened to Alex and his team in the trip?
A. They discovered a new animal.
B. They planted various trees in the rainforest.
C. They had been apart for some nights.
20. What will Alex do on the show?
A. Talk about his adventures.
B. Give some tips on studying.
C. Answer some questions.

第二部分 阅读(共两节,满分50分)

第一节(共15小题;每小题2.5分,满分37.5分)

阅读下列短文,从每题所给的A、B、C、D四个选项中选出最佳选项。

A

Things to Do in Northern Ireland This Autumn

WEE BINNIAN WALKING FESTIVAL (SEPTEMBER)

The exact dates of this annual walking festival are still to be confirmed, but if it's similar to last year, it'll offer a choice of ten walks and hikes around the Mourne Mountains, ranging from easier lowland routes to tough, multi-summit challenges. Evening social events are also included.

GREAT NORTH LINKS CHALLENGE (18–20 OCTOBER)

Calling all golfers. You can enter this three-day event—spread along the north coast between Ballyliffin, Portrush and Portstewart, as an individual or team of four. A perfect opportunity to play three Irish Open links courses in three days.

ARMAGH FOOD AND CIDER WEEKEND (SEPTEMBER)

A four-day feast of authentic food and artisan ciders(苹果酒) in Ireland's "Orchard County". This celebration is also coupled with the traditional apple harvest. You can taste local food from the country's most inventive chefs.

OULD LAMMAS FAIR (LAST WEEK OF AUGUST)

People have been flocking to the seaside town of Ballycastle since the 17th century to celebrate this fair. Attractions include a Heavy Horse Show, horse speed events on the beach, funfair, outdoor concert and a fireworks display, as well as unique local produce and handmade arts and crafts.

21. What is the best date to arrive if you want to attend GREAT NORTH LINKS CHALLENGE?
- A. 17th October. B. 18th August.
C. 20th October. D. 1st September.
22. What can people do at the town of Ballycastle?
- A. Play golf. B. Go hiking.
C. Watch horse races. D. Taste apple ciders.
23. In which section of a website can we probably read this text?
- A. Tourism. B. Sports.
C. Education. D. Arts.

B

Alicia Quarles has her hands full these days—both of them, at all hours of the day and night. "Having a baby unexpectedly at 41 is one thing; having twins is a whole other beast," says the global entertainment editor.

Actually, until her pregnancy Quarles had been living at breakneck speed. It went so until last year. "I was exhausted," she says. "I'd been working three jobs, doing my charity and going nonstop. I was afraid my mental health was getting worse." In early August she took herself to the hospital, to see if she was OK. Doctors ran multiple tests and told her that she had had an anxiety attack, and she was 11 weeks pregnant.

"She was stressed and decompensated(代谢失调的), so everything just came to more than she could handle at the time," explains doctor Miriam Barnes, who began treating her. "Fortunately, she tried to be positive and seek help from me immediately. I told her not to have any medication at that stage and advised her to take natural therapy(疗法)."

A week later Quarles learned that she was having twins. But instead of that news adding to her anxiety, "a total peace came over me, and it felt like it all made sense," she says. Quarles, who did not take any medication, returned home to her loved ones in North Carolina, where she gave birth to Hudson and Harlow on Feb. 16. "There's nothing like family," she says. "I found out through working on myself in natural therapy that there were a lot of things I hadn't dealt with. I just kept going."

These days Quarles uses social media to document her joyful motherhood journey. Quarles has put her anxiety behind but remains in therapy and wants to encourage others who feel stressed to get help. "At first I felt guilty and embarrassed," she admits. "I don't anymore. My message is you can fall down. But you can stand up, by yourself or with the help of others. It's not a shame, and it's a blessing."

24. Which of the following best explains "breakneck" underlined in paragraph 2?

- | | |
|-----------------------------|----------------------------|
| A. Safe and slow. | B. Fast and dangerous. |
| C. Exciting and terrifying. | D. Gentle and comfortable. |

25. Why did Quarles return to North Carolina?

- A. To give birth and make some friends.
B. To have a break and treat her anxiety.
C. To take natural therapy and stay alone.
D. To look after her family and visit a doctor.

26. What does Quarles suggest people under pressure do?

- | | |
|-------------------------|--------------------------------------|
| A. Keep standing up. | B. Fall down if needed. |
| C. Face whatever comes. | D. Obtain assistance when necessary. |

27. What is a suitable title for the text?

- | | |
|---------------------------------------|---|
| A. An Anxious 41-year-old Mother | B. A Mother's Astonishing Experience |
| C. An Interesting Taste of Motherhood | D. A Mother Fighting Her Mental Breakdown |

英语试卷 第4页(共10页)

C

Desperately ill and seeking a miracle, David Bennett Sr. took the last bet on Jan. 7, when he became the first human to be successfully transplanted with the heart of a pig. “It creates the beat; it creates the pressure; it is his heart,” declared Bartley Griffith, director of the surgical team that performed the operation at the University of Maryland Medical Center.

Bennett, 57, held on through 60 tomorrows, far longer than any previous patient who'd received a heart from another species. His remarkable run offered new hope that such procedures, known as xenotransplantation (异种移植), could help relieve the shortage of replacement organs, saving thousands of lives each year.

The earliest attempts at xenotransplantation of organs, involving kidneys from rabbits, goats, and other animals, occurred in the early 20th century, decades before the first successful human-to-human transplants. Rejection, which occurs when the recipient's body system recognizes the donor organ as a foreign object and attacks it, followed within hours or days. Results improved after some special drugs arrived in the 1960s, but most recipients still died after a few weeks. The record for a heart xenotransplant was set in 1983, when an infant named Baby Fae survived for 20 days with an organ from a baboon (狒狒).

In recent years, however, advances in gene editing have opened a new possibility: re-edit some genes in animals to provide user-friendly spare parts. Pigs could be ideal for this purpose, because they're easy to raise and reach adult human size in months. Some biotech companies, including Revivacor, are investing heavily in the field. The donor pig was offered by Revivacor from a line of animals in which 10 genes had been re-edited to improve the heart's condition. Beyond that, the pig was raised in isolation and tested regularly for viruses that could infect humans or damage the organ itself.

This medical breakthrough provided an alternative for the 20% of patients on the heart transplant waiting list who die while waiting or become too sick to be a good candidate.

28. What does the underlined word “run” in paragraph 2 refer to?
- A. Donating his heart to a patient. B. Performing the heart operation.
C. Living for 60 days after the operation. D. Receiving a new heart from a pig.
29. Which aspect of xenotransplantation does paragraph 3 mainly focus on?
- A. Its history. B. Its procedure.
C. Its consequence. D. Its significance.
30. What makes pigs ideal for providing spare parts in xenotransplantation?
- A. Their growth rate and health condition. B. Their life pattern and resistance to viruses.
C. Their easiness of keeping and rapid growth. D. Their investment value and natural qualities.
31. Why was Bennett's operation regarded as a breakthrough?
- A. It introduced new medications to prevent organ rejection.
B. It proved the potential for using organs from various animals.
C. It guaranteed a sufficient supply of donor pigs for transplants.
D. It offered a prospect of replacement organs through gene editing.

第二节(共5小题;每小题2.5分,满分12.5分)

根据短文内容,从短文后的选项中选出能填入空白处的最佳选项。选项中有两项为多余选项。

Are your teenagers getting enough sleep? It's the key to exam success. If they sleep well, they will be more likely to perform better. Here are some practical ways you can help them.

36 Parents should avoid falling asleep on the sofa in the evenings or using tech devices when it's late. Commit to your own bedtime routine so that your teenager can be your follower.

Work out exactly how much sleep they need. Teenagers should aim for between eight and ten hours' sleep a night, according to the World Health Organisation. 37 Maybe it's eight, or maybe it's nine. But those who get less than seven hours most nights are not getting enough.

Establish a wind-down(放松) routine. Once they know how much sleep they're aiming for, help them to achieve this by negotiating a 30 to 60-minute wind-down routine before they go to bed, at the same time every night. 38

Let them have a weekend lie-in. Enable your children to get up as late as they can, sparing them the morning chores. 39 Troubling teenagers out of bed at weekends works against their sleep pattern.

40 They will reward you more.

- A. Lead by example.
- B. Let your teenagers have more sleep.
- C. Half an hour of exercise can excite their body.
- D. But the exact amount of sleep your teenager needs is unique.
- E. Getting up late occasionally will improve their work efficiency.
- F. On study-leave days an extra hour in bed will help them concentrate better.
- G. A bath will bring the body temperature down a degree which is ideal for sleep.

第三部分 语言运用(共两节,满分30分)

第一节(共15小题;每小题1分,满分15分)

阅读下面短文,从每题所给的A、B、C、D四个选项中,选出可以填入空白处的最佳选项。

The 8-year-old boy across the street stormed in and out of his own house very often. A neighbor, William Dunn, 41 what was going on in his life. So Dunn asked him.

“He told me that he didn't have a 42,” says Dunn, now 58, “and I realized there was 43 I could do for him.” That something was 44, a passion Dunn's father had shared with him.

Dunn has taken groups of kids out almost every 45 to fish. Most didn't have father figures in their lives and had never fished. “They'd been through a lot, and their lives were 46,” Dunn says. “But when they were fishing, all of that 47. Out on the boat, they'd be smiling, and even 48.”

Jayden, now 13, has become a devoted fisherman and 49 Dunn with helping him mature. “I hope he knows I mean it when I say thank you,” he says.

Just as 50 as the fishing are the 51 Dunn forms with the kids. “When Jayden was going through a 52 period recently in study—I let Dunn know that his grades were suffering and he had a little talk with Jayden,” Jayden's mother says. To her delight, Jayden's grades 53 improved in the next exam.

“There is nothing like seeing a 54 light up with a smile,” Dunn says. “I feel lucky to 55 that every weekend.”

- | | | | |
|------------------|---------------|----------------|------------------|
| 41. A. revealed | B. explained | C. doubted | D. wondered |
| 42. A. mother | B. father | C. brother | D. sister |
| 43. A. something | B. nothing | C. anything | D. everything |
| 44. A. camping | B. boating | C. fishing | D. running |
| 45. A. day | B. month | C. year | D. weekend |
| 46. A. different | B. difficult | C. disciplined | D. dynamic |
| 47. A. went away | B. broke out | C. came about | D. took over |
| 48. A. studying | B. sailing | C. singing | D. speaking |
| 49. A. charges | B. entertains | C. rewards | D. credits |
| 50. A. important | B. promising | C. interesting | D. complex |
| 51. A. circles | B. habits | C. impressions | D. relationships |
| 52. A. rough | B. long | C. meaningful | D. productive |
| 53. A. hardly | B. nearly | C. genuinely | D. accidentally |
| 54. A. fisherman | B. kid | C. parent | D. neighbor |
| 55. A. dream | B. expect | C. witness | D. receive |

英语试卷 第8页(共10页)

第二节(共10题;每小题1.5分,满分15分)

阅读下面材料,在空白处填入1个适当的单词或括号内单词的正确形式。

The animated film *Chang An* has become a surprise hit, earning 56 impressive 600 million yuan at the box office of the Chinese mainland within just ten days of its release. It has appealed to audiences of all ages, who 57 (enthusiastic) recite poetry alongside the characters on screen, taking them on a fantastic journey. This film not only identifies with the Chinese people but also allows the world 58 (explore) the rich tradition of Tang poetry and the "Chinese Poetry Universe."

The story centers around the deep friendship between poet Gao Shi and the romantic poet Li Bai, offering a brief look into the glorious history of the Tang era, 59 is known for its economic prosperity and cultural advancement. The 48 Tang poems 60 (feature) in the movie present a view of the most excellent poets of that time as well as their political ambitions and ideals. These poems transport audiences 61 sandy deserts to mist-filled regions along the Yangtze River.

Chang An is undoubtedly a masterpiece that shows the unique 62 (characteristic) of Chinese culture to the world. In China, poets and their poems 63 (consider) national treasures. These poems describe not only the historical changes of a dynasty, but also 64 (people) understanding of the world. The film has raised the audiences' 65 (aware) and enhanced their love and belief in Chinese culture.

第四部分 写作(共两节;满分40分)

第一节(满分15分)

假定你是李华,你校交换生 Kevin 准备熬夜观看世界杯足球赛,你认为这样做不合适。请你给 Kevin 写一封邮件,内容包括:

1. 解释理由;
2. 提出建议。

注意:

1. 写作词数应为80个左右;
2. 请按如下格式在答题卡的相应位置作答。

参考词汇:世界杯 World Cup

Dear Kevin, I hope this e-mail finds you well. Yours sincerely, Li Hua

第二节(满分 25 分)

阅读下面材料,根据其内容和所给段落开头语续写两段,使之成为一篇完整的短文。

Sandro was born and grew up in Milan. Until he was 13 years old, he never wanted to leave his hometown. But last year, Sandro's father's investment went bad, wiping out the family and sending his parents to prison. As a teenager under 16 years old, Sandro was forced to go to Newcastle in the northeast of England to stay with his uncle Lawrence.

Sandro had a lot of difficulties in the new environment. He didn't like the food in England. Nobody could forecast the weather in Newcastle. He had to start learning the second foreign language in his new school. Pocket money was not enough as usual. Almost every subject was a challenge for him. Most importantly, he had no friends. It seemed nobody knew him and he knew nobody in the school.

On an early summer evening, when Sandro was going home alone from school as usual, a man called him from behind. Sandro turned around and saw Eddie, his PE teacher, standing in front of him.

"You know, the school will have a swimming competition next month. There will be all kinds of races. Will you participate?" Eddie asked.

Sandro took a look at Eddie with doubt and answered, "You sure? Me? No. I won't. I can swim, but I'm slower than a snail."

Eddie smiled and then said, "Yes. Indeed. You are, in breaststroke(蛙泳), in backstroke, and in butterfly, but not in freestyle. So join the freestyle race! 200-meter freestyle is the game suitable for you."

Sandro was speechless at that moment. He had never known someone in the school was observing him and caring for him.

"I don't think I can win anything." Sandro was still a little puzzled.

"But you may get more recognition and consequently you can make some friends. That is more important than prizes." Eddie responded immediately.

Having hesitated for a while, Sandro agreed to have a try.

注意:

1. 续写词数应为 150 左右;
2. 请按如下格式在答题卡的相应位置作答。

Every afternoon for the next month, Sandro trained really hard.

Sandro dived into the pool confidently like other competitors.

湖北省高中名校联盟 2024 届高三第一次联合测评

英语试卷参考答案与评分细则

第一部分 听力(共 20 小题,每小题 1.5 分,满分 30 分)

题号	1	2	3	4	5	6	7	8	9	10
答案	C	A	B	B	A	C	B	A	A	C
题号	11	12	13	14	15	16	17	18	19	20
答案	B	C	B	A	B	C	A	A	C	C

第二部分 阅读(共两节,满分 50 分)

第一节(共 15 小题,每小题 2.5 分,满分 37.5 分)

题号	21	22	23	24	25	26	27	28	29	30
答案	A	C	A	B	B	D	D	C	A	C
题号	31	32	33	34	35					
答案	D	C	B	B	D					

第二节(共 5 小题,每小题 2.5 分,满分 12.5 分)

题号	36	37	38	39	40					
答案	A	D	G	F	B					

第三部分 语言应用(共两节,满分 30 分)

第一节 完形填空(共 15 小题,每小题 1 分,满分 15 分)

题号	41	42	43	44	45	46	47	48	49	50
答案	D	B	A	C	D	B	A	C	D	A
题号	51	52	53	54	55					
答案	D	A	C	B	C					

第二节(共 10 小题,每小题 1.5 分,满分 15 分)

56. an 57. enthusiastically 58. to explore 59. which 60. featured
61. from 62. characteristics 63. are considered 64. people's 65. awareness

第四部分 写作(共两节,满分 40 分)

第一节 (满分 15 分)

Dear Kevin,

I hope this email finds you well. I want to discuss the matter of staying up late to watch the World Cup football matches with you, as I believe it may not be the most appropriate choice. Allow me to explain my reasons and offer some suggestions.

Firstly, disrupting your regular sleep pattern can result in fatigue, thus ultimately affecting your overall well-being. Secondly, as an exchange student, it is essential to prioritize your studies. Overindulging in late-night matches can potentially distract you from your academic work.

Considering these concerns, I suggest you strike a balance between your passion for football and your need for adequate sleep. You may consider recording the matches and watching them at a more suitable time without compromising your sleep routine or academic commitments.

I sincerely hope you take these suggestions into consideration.

Yours sincerely,

Li Hua

第二节(满分 25 分)

Paragraph 1 *Every afternoon for the next month, Sandro trained really hard. Starting position, starting dive, turning, pushing off, touching the timing pad. all details, he practiced them over and over. Whenever he was exhausted, Eddie's words echoed in his mind and supplied extra energy to him. "Maybe I can't be the champion of the game, but I can be the champion for myself."* He spoke in a low mumble to himself after he finished the last training. Finally, the day of competition arrived. With the sound of the starting gun piercing through the air, the race began as expected.

Paragraph 2 *Sandro dived into the pool confidently like other competitors. He swam as freely as a fish. 150 meters covered, he was left behind by 2 competitors. In the last 50 meters, Sandro swam magnificently, with his arms pushing forward fast, his legs hitting the water hard. Finally, the championship was still out of his reach. When the result was announced that Sandro won third place, however, other players congratulated him, the audience in the stadium bursting into thunderous applause. As teacher Eddie said, he won the recognition and respect from others, with his effort.*

湖北省高中名校联盟 2024 届高三第一次联合测评 物理试卷参考答案与评分细则

评分说明：

1. 考生如按其他方法或步骤解答,正确的,同样给分;有错的,根据错误的性质,参照评分参考中相应的规定评分。
2. 计算题只有最后答案而无演算过程的,不给分;只写出一般公式但未能与试题所给的具体条件联系的,不给分。

一、选择题:本题共 10 小题,每小题 4 分,共 40 分。在每小题给出的四个选项中,第 1~7 题只有一项符合题目要求,第 8~10 题有多项符合题目要求。全部选对的得 4 分,选对但不全的得 2 分,有选错的得 0 分。

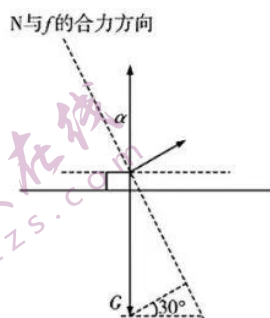
题号	1	2	3	4	5	6	7	8	9	10
答案	D	C	B	B	D	A	D	BD	AD	ACD

1. D 【解析】半衰期是统计规律,对大量原子核有意义,故选项 A 错误;核反应方程如选项 D 所述,不是裂变反应,故选项 B 错误,选项 D 正确;Li 的质子数是 3,中子数是 $5-3=2$,故选项 C 错误。
2. C 【解析】物体做曲线运动的条件是:物体所受合力的方向与它的速度方向不在同一直线上。若仅改变一个力的大小或方向,或者仅撤去其中一个力,合力方向与速度方向可能共线,不一定做曲线运动。故选项 A、B、D 错误,选项 C 正确。
3. B 【解析】匀减速至零的直线运动可以逆向视为初速度为零的匀加速直线运动。最后 2s 内,由 $x = \frac{1}{2}at^2$,解得 $a=1\text{m/s}^2$ 。最初 2s 内,由 $x_1=v_0t_1 - \frac{1}{2}at_1^2$,解得 $v_0=5\text{m/s}$ 。由 $v_0=at$,解得 $t=5\text{s}$,故选项 B 正确。
4. B 【解析】小球从抛出到第一次落在斜面上时,有 $x=v_0t$, $y=\frac{1}{2}gt^2$,又 $\tan 30^\circ = \frac{y}{x}$,解得 $t=0.4\text{s}$,故选项 B 正确。小球竖直分速度 $v_y=gt=4\text{m/s}$,故选项 A 错误。小球水平位移 $x=v_0t$,所以,小球从抛出到落在斜面上的位移 $s = \frac{x}{\cos 30^\circ} = 1.6\text{m}$,故选项 C 错误。由平抛运动的推论可知,小球落到斜面上时,速度与水平方向夹角不变,故选项 D 错误。
5. D 【解析】以小球 C 为研究对象,根据牛顿第二定律,有 $F \sin \theta = ma$, $F \cos \theta = mg$,代入数据,解得 $a=7.5\text{m/s}^2$,轻绳对小球的拉力大小为 $F=5\text{N}$,故选项 A、B 错误。以物块 AB 整体为研究对象,底板对物块 A 的摩擦力大小为 $F_f=2Ma=150\text{N}$,故选项 C 错误。以物块 B 为研究对象,物块 A 对物块 B 的摩擦力大小为 $F_f'=Ma=75\text{N}$,故选项 D 正确。

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6. A 【解析】设水位差为 Δh , 已知 $H=50\text{ cm}$, $h=30\text{ cm}$, 由 $p_0 HS=(p_0+P_{\text{水}}) \cdot (H-h+\Delta h) S$ 得 $\Delta h=28.6\text{ cm}$ 故选项 A 正确。

7. D 【解析】如图所示, 分析书籍受力, 设 N 与 f 合力的方向与竖直方向成 α 角, 由题意 $\tan\alpha=\mu=0.5$, 显然 $\alpha<30^\circ$ 。当 θ 从 30° 逐渐增大到 60° 过程中, 拉力 F 一直增大。此过程中 N 与 f 的合力一直减小, f 一直减小, N 一直减小, $F\cos\theta$ 一直减小, 故 $P=Fv\cos\theta$ 一直减小。选项 D 正确。



8. BD 【解析】打开振荡器开关后, D 点开始振动需经历的时间为 $t=\frac{BD}{v}=1.5\text{ s}$, 故选项 A 错误。由 $\lambda=vT$, 解得 $\lambda=0.4\text{ m}$, 故选项 B 正确。C 距 A、B 两波源的波程差 $\Delta x=0.8\text{ m}=2\lambda$, 所以 C 点是振动加强点, 故选项 C 错误。CD 线段上共有 $\Delta x=-2\lambda, -\lambda, 0, \lambda, 2\lambda$, 5 个振动加强点, 故选项 D 正确。

9. AD 【解析】根据几何关系可知, 入射点、磁场圆的圆心 O_1 、出射点 O 与轨迹圆的圆心四点的连线构成菱形, 所以粒子的轨迹半径 $R=\frac{mv}{qB}=l$, 速度大小 $v=\frac{qBR}{m}=kBl$, 故选项 A 正确, 选项 B 错误。根据几何关系可知, 从粒子源上端射出的粒子轨迹对应的圆心角等于 120° , 所以粒子在磁场中的运动时间 $t=\frac{\theta}{2\pi}T=\frac{2\pi}{3kB}$, 故选项 C, 选项 D 正确。

10. ACD 【解析】将 L_1, L_2 看成一个整体, L_3, L_4 看成一个整体, 设整体的额定电压和电流为 U, I 。当 S_1 闭合, S_2 断开时, 有 $U_{\text{串}}=U, U_{\text{原}}=\frac{n_1}{n_2}U_{\text{串}}=5U$, 又 $I_{\text{串}}=I, I_{\text{原}}=\frac{I}{5}$ 。 R_1 上, 有 $I_{R_1}=I-I_{\text{原}}=\frac{4}{5}I$, $R_1=\frac{5U}{\frac{4}{5}I}=\frac{25U}{4I}$ 。输入电压 $U_1=U+5U=6U$, 输入功率 $P_1=U_1I=6UI$, R_1 上的功率 $P_{R_1}=5U \times \frac{4}{5}I=4UI$ 。当 S_2 闭合, S_1 断开时, 同理可得: $U_2=6U, P_2=6UI, P_{R_2}=4UI, R_2=\frac{U}{4I}$ 。可知选项 A、C、D 正确。

二、非选择题:本题共 5 小题,共 60 分。

11. (1) 匀速直线(2分,填“匀速”也给 2分) (2) 0.025(3分) (3) 2(2分)

【解析】(1) $h-t$ 图象为一条直线,所以小球做匀速直线运动。

(2) 小球做匀速直线运动,合外力为零。由图象得 $v_{球} = 5\text{m/s}$,而 $f = k(v_{球} + v_1)^2 = mg$,解得 $k = 0.025\text{kg/m}$ 。

(3) 若只增加小球密度,小球质量增加,小球仍做匀速直线运动,由 $f = k(v_{球} + v_1)^2 = mg$ 可知,小球速度增大,即 $h-t$ 图象的斜率增大。所以图象可能为 2。

12. (2) B(2分) (3) 不需要(2分) (4) 4.00(2分)

(5) $2gL = \left(\frac{d}{t_p}\right)^2 + \left(\frac{d}{t_q}\right)^2$ (2分。 $2gL = \frac{5d^2}{4t_p^2}$ 或 $2gL = \frac{5d^2}{t_q^2}$ 给 1分) (6) C(2分)

【解析】(2) $v_p : v_q = \frac{d}{t_p} : \frac{d}{t_q}$,由圆周运动规律 $v_p : v_q = 2 : 1$,解得 $t_p : t_q = 1 : 2$ 。

(3) 本实验验证机械能守恒定律时,不需要测量钢球的质量。

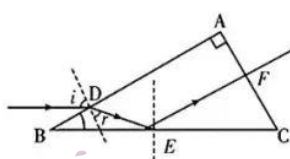
(4) 由游标卡尺的读数原理,挡光片的宽度 $d = 4.00\text{mm}$ 。

(5) 当系统转动过程中满足机械能守恒定律,有 $2m\kappa L - m\kappa L = \frac{1}{2}m\left(\frac{d}{t_p}\right)^2 + \frac{1}{2}m\left(\frac{d}{t_q}\right)^2$,

即 $2gL = \left(\frac{d}{t_p}\right)^2 + \left(\frac{d}{t_q}\right)^2$

(6) 钢球半径对线速度计算的影响。

13. 画出光路如图所示。



光在 AB 面上发生折射,由几何关系,入射角

$i = 60^\circ$ (1分)

根据折射定律

$n = \frac{\sin i}{\sin r}$ (2分)

解得

$r = 30^\circ$ (1分)

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由临界角公式

$$\sin C = \frac{1}{n} = \frac{\sqrt{3}}{3}$$

显然, 光在 BC 面上的入射角 $\alpha = 60^\circ > C$, 故光在 BC 面上发生全发射。

(1分)

由几何关系可知, 光在玻璃中传播的路程

$$x = DE + EF = \frac{9\sqrt{3}}{2} \text{ cm}$$

(1分)

光在玻璃中的速度

$$v = \frac{c}{n}$$

(1分)

而

$$t = \frac{x}{v}$$

(1分)

解得

$$t = 4.5 \times 10^{-11} \text{ s}$$

(2分)

14. (1) 小球下摆至最低点, 满足机械能守恒定律

$$m_0 g l (1 - \cos 37^\circ) = \frac{1}{2} m_0 v_0^2$$

(2分)

小球在最低点, 由牛顿第二定律

$$T - m_0 g = \frac{m_0 v_0^2}{l}$$

(2分)

解得

$$T = 0.07 \text{ N}$$

(1分)

由牛顿第三定律, 球对轻绳的拉力大小为 0.07 N 。

(1分)

(2) 小球与物块碰撞, 满足动量守恒定律, 机械能守恒定律

$$m_0 v_0 = m_0 v_{01} + m_1 v_1$$

(2分)

$$\frac{1}{2} m_0 v_0^2 = \frac{1}{2} m_0 v_{01}^2 + \frac{1}{2} m_1 v_1^2$$

(2分)

解得

$$v_1 = \frac{4}{3} \text{ m/s}$$

(1分)

(3) 物块滑到圆弧轨道最高点的过程中, 满足动量守恒定律、机械能守恒定律

$$m_1 v_1 = (m_1 + m_2) v_2 \quad (1 \text{ 分})$$

$$\frac{1}{2} m_1 v_1^2 = \frac{1}{2} (m_1 + m_2) v_2^2 + m_1 g R \quad (2 \text{ 分})$$

解得

$$R = \frac{1}{15} m \quad (1 \text{ 分})$$

15. (1) 棒运动至 AB 端, 由平抛规律

$$v_y = v_0 \tan \theta \quad (1 \text{ 分})$$

$$y = \frac{v_y^2}{2g} \quad (1 \text{ 分})$$

由几何关系

$$h = y + l \sin \theta \quad (1 \text{ 分})$$

联立, 解得

$$h = \frac{v_0^2 \tan^2 \theta}{2g} + l \sin \theta \quad (1 \text{ 分})$$

(2) 棒运动至 AB 端的速度

$$v_1 = \frac{v_0}{\cos \theta} \quad (1 \text{ 分})$$

棒在 AC、BD 导轨上运动, 设 t 时刻流过棒的电流为 i , 由牛顿第二定律

$$mg \sin \theta - \mu mg \cos \theta - Bid = ma \quad (1 \text{ 分})$$

在 $t \sim t + \Delta t (\Delta t \rightarrow 0)$ 时间内, 根据加速度的定义

$$a = \frac{\Delta v}{\Delta t} \quad (1 \text{ 分})$$

根据电流的定义

$$i = \frac{\Delta Q}{\Delta t} \quad (1 \text{ 分})$$

由法拉第电磁感应定律, 电容器上的电压变化

$$\Delta U = Bd \Delta v \quad (1 \text{ 分})$$

电容器上的电量变化

$$\Delta Q = C \Delta U \quad (1 \text{ 分})$$

联立,可得

$$a = \frac{mg \sin \theta - \mu mg \cos \theta}{m + B^2 d^2 C} \quad (1 \text{分})$$

故棒做匀加速直线运动,由运动学公式

$$v_2^2 - v_1^2 = 2al \quad (1 \text{分})$$

解得

$$v_2 = \sqrt{\frac{2mgl(\sin \theta - \mu \cos \theta)}{m + B^2 d^2 C} + \frac{v_0^2}{\cos^2 \theta}} \quad (1 \text{分})$$

(3)棒刚滑到 CD 时,电容器两端的电压

$$U_{c_1} = Bdv_2$$

电容器上的电量

$$Q_{c_1} = CU_{c_1}$$

棒刚滑上 EG、FH 时,棒两端的电压

$$E_{\text{棒}} = B \frac{d}{3} v_3 < U$$

所以,电容器放电,棒做加速运动。终态时,有

$$U_C = B \frac{d}{3} v_3 \quad (1 \text{分})$$

由动量定理

$$BI \frac{d}{3} \cdot t = mv_3 - mv_2 \quad (1 \text{分})$$

$$\text{又 } Q_{c_2} = CU_{c_2}$$

而

$$\bar{I}t = Q_{c_1} - Q_{c_2} \quad (1 \text{分})$$

联立,解得

$$v_3 = \frac{3B^2 d^2 C + 9m}{B^2 d^2 C + 9m} v_2$$

即

$$\frac{v_2}{v_3} = \frac{B^2 d^2 C + 9m}{3B^2 d^2 C + 9m} \quad (1 \text{分})$$

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