

高考语文模拟试卷(一)答案

1. C (A. chán jǐ lěi jí B. jiā sǒu zhé fěi C. gá jǔ mí quān D. bēng chēng tī lài)
2. A (B. 九州 准备就绪 C. 悬梁刺股 工于心计 D. 白内障)
3. D (A. 应为“截至” B. 应为“渡过” C. 振聋发聩:比喻用语言文字唤醒糊涂的人)
4. D (A. “既然”实用不当,可改为“即使”;应为“我国著名的车手卢宁军” B. 句式杂糅,“是受市场需求、社会导向、父母意愿、个人喜好等因素的影响造成的” C. 搭配不当,“蚁族”是“城乡接合部”显然错误)
5. D (A. “确系实情”语体色彩不协调 B. “恭候光临”用于欢迎别人 C. “本店”改为“该店”“本店”是指自己的店,转述不当)
6. A (究:彻底。)
7. A (A. 对于 B. 代词/定语后置的标志 C. 因为/用来 D. 趁着/凭借)
8. B
9. B (“揭示了制度扼杀人才这一严峻的社会问题”属无中生有。历史和时代的局限也使得作者还无法看到这一点,他将一切原因归于“小人”。)
10. (1)得到杨八的信,知道您遭遇火灾,家里没有一点积蓄了。(书、足下、余储各 1 分)
(2)这是我只顾自己而对不起公道很久了,不仅仅对不起您呀!(是、私、特各 1 分)
(3)可现在(您)被天火烧光了,所有人们的猜忌疑虑,完全变为灰尘。(为……所,涤荡,举,灰埃各 1 分)
11. (1)故人相逢在秋天的满月之夜,京城之夜已经很深了。秋风惊动枝头栖息的鸟鹊,露草里躲着唧唧鸣叫的寒虫,渲染出寂静、凄冷的氛围。
(2)这首诗描写了和同乡偶然聚会的情景,表现了乱世相逢悲喜交集的复杂心理。颔联以“还作”“翻疑”作流水对,叙江乡故人偶集,真是难得,反而怀疑是不是在做梦;尾联写欢聚对饮,长夜叙谈,并以“畏晓钟”——害怕分离时间到来作结,深刻表达出对同乡聚会的珍惜和友情的深厚。全诗心理描写真切而传神。
12. ①观流水兮潺湲。(屈原《湘夫人》)
②三顾频频天下计。(杜甫《蜀相》)
③忽魂悸以魄动。(李白《梦游天姥吟留别》)
④江娥啼竹素女愁。(李贺《李凭箜篌引》)
⑤侵晓窥檐语。(周邦彦《苏幕遮》)
⑥奈何取之尽锱铢。(杜牧《阿房宫赋》)
13. A (“没有卦象就没有画,卦象其实就是画的起源,或者说,卦象就是最早的画”文中无据,属于主观臆断。)

14. D (A. 因果倒置;B. 扩大了范围,第四段原文是“写意画家”;C. 扩大了范围,第五段原文是“凡是自大的画家”)
15. (1)(从表达层面来看)批评侧重理性与逻辑,与讲究直觉与意境的画是宿敌,同时书面语言限制了批评的表达。
(2)(从批评的方式和角度来看)批评文章很容易引起画家的抵制和质疑。
(3)(从制度和社会态度层面看)低稿酬制度下的过长的西式文本和进入批评界的一流人物太少、批评界内斗等现状也让画家看轻批评家。
16. (1)体力不支、疲惫不堪。(2)他舍不得丢下与自己相伴的动物。(3)留恋家园,对未来生活茫然。(6 分,答对 1 项 2 分)
17. (1)“木然”“不再对着我讲了”,说明老人已经陷入了绝望,不再期待眼前这位催促他赶快离开的年轻人替他分担忧虑,想以尽快中断对话的方式谢绝“我”的好意。(2)老人感觉自己身心疲惫,连话也懒得多说了。(3)“我在照看动物”一句反复出现,后一句中多了一个“只是”,意味深长,话语中交织着“怨”“冤”之情,暗含着对战争无声的控诉。(6 分,答对 1 项 2 分)
18. (1)“我”是一个线索人物,是故事的见证人;(2)我与老人的对话推动了故事情节发展;(3)由“我”叙述故事,增加了故事的真实感和亲切感;(4)通过“我”的感触表达文章的主旨;通过“我”对老人的情感态度,突出老人的形象(答对一项得 1 分,满分 4 分)
19. (1)人物对话推动故事情节发展。小说的人物几乎原地不动,人物少有动作,情节的展开主要借助人物对话。“我”与老人的问答之间,蕴涵了生动的情节。如“我”问故乡,问动物,问政治以及老人的对答。
(2)人物对话反映人物的个性心理。老人提到故乡及“看管”的动物时,让读者感受到了他对家园的留恋与热爱;不能照顾动物“只得把它们撇下了”,反映老人面对战争的无奈、苦涩和悲哀。
(3)人物对话简洁且含义丰厚。要言不烦处恰是值得玩味的,如当“我”问及政治态度时,老人答“政治跟我不相干”,而老人的苦痛恰是政治造成的;语言反复之处恰是人物表达情感,体现作者创作主旨的地方。如“那时我在照看动物”“我只是在照看动物”,这“只是”两字的强调,包含了老人多少无奈,多少冤屈,多少埋怨。
(4)人物对话的冲突富有张力。一方面,“我”的劝离与“老人”的不动构成矛盾的焦点,“我”两次劝老人离开,但老人始终没有挪动;另一方面,“我”的无能为力与“老人”的内心挣扎,构成了矛盾的两极,老人内心矛盾焦点在逃生还是拯救动物。作者借这些矛盾冲突,揭示战争给人类带来的苦难。
20. (1)人有旦夕祸福,所以我们一定要珍惜现在的每一天,让自己的生活充实、精彩,更有意义。(2)任何挫折、失败和死亡比起来都显得微不足道,要相信,只要活着就有希望。(3)生活中难免有不顺心的时候,要设法消除这些灰色情绪,对事情做最坏的打算,往最好的方面努力,我们的内心就会豁然开朗。(如答案不在上述提示之内,言之

成理也可。)

21. 新闻评论观点:

1. 见义勇为是否可以成为破格提拔干部的依据?
2. 干部的选拔应以能力考核为先。
3. 见义勇为者最需要的是精神和物质上的奖励。

22. 题意分析

这是一篇新材料作文。材料中的裁缝利用自己的智慧和技艺,使自己摆脱了失误不利的局面,变废为宝,走向成功。在理解题意的时候要抓住材料中的关键词句来准确把握立意的关键。“不小心”“废品”“为了挽回损失”等词可以帮助我们明确“金边凤尾裙”的发明并不是主观创新和时尚潮流的产物,而是一种“挽回损失”,灵活地变“废”为宝的作品。“凭借其高超的技艺”“精心”“取名为‘金边凤尾裙’”等词句告诉我们裁缝能够变废为宝的主要原因是他主观上并不放弃,甚至非常用心,加上技艺高超,创意无限。

因此,从立意上看,我们认为以下几种立意属于准确地理解材料,应判切合题意,内容项在一档打分。

①人要从不利走向有利,就要依靠自己永不放弃的精神。②人要从失误的阴影中走出来,就需要聪明过人的智慧、灵活变通的思维、高超绝妙的技艺。③成功往往有其偶然性,但更有其必然性。其中①②两点可同时采用,也可从任意一个或几个角度立意。

以下几种立意属于较准确地理解材料,应判符合题意,内容项在二档打分。

①做人不能被失误打倒。②要战胜困难才能成功。③挫折不可怕,战胜挫折才能成功。这几类立意只是抓住了材料的表面现象,而没有深入理解裁缝成功的根本原因,因此在内容只评为二类。

以下立意属于对材料的理解存在一点偏差,应判基本符合题意,内容项在三档打分。①创新塑造成功。②天生我材必有用。

其他立意则属于偏离材料,应判离题,内容项在四档打分。如“潮流往往是偶然的创作”“我们不应盲目追求潮流”等。

高考语文模拟试卷(二)答案

1. B (A. 磨洋工 C. 逮老鼠中“逮”读 dǎi 急不可耐 D. 销赃 经幢中“幢”读 chuáng)
2. D (洛阳纸贵:著作影响很大,为世所重,风行一时,广为流行。此处用于《虎妈战歌》一书恰当。A. 簿:文状、起诉书之类;对簿:受审问;公堂:旧指官吏审理案件的地方。指在法庭上受审问。易误解为“打官司”或相互对质。B. “反弹琵琶”,来自敦煌壁画中的一种舞姿造型。喻指突破常规的思维和行为;从反面看问题,与常规事物对着干。

C. “交相辉映”意思是各种光亮、彩色等相互映照。此处用错对象。)

3. C (A. 介词淹没主语,导致主语残缺 B. 主谓搭配不当。“殖民劣行”与“对正义、勇敢和善良的歌颂”搭配不当 D. 句式杂糅,“允许……”与“为……开绿灯”句式杂糅)
4. B (本段文字主要陈述“贬官文化”。①句承“贬官”,应放在开头;③句承①句中“只好与山水亲热”,说“文品”;②句说“人品”;⑤句“人品和文品双全”是对③②句的总结;④句与“地因人传”相呼应,应放在最后。)
5. D (D. 贾:价。)
6. B (B. 竟然 A. 表祈使语气,“还是”;表反问语气,“难道”。 C. 介词,“用”;连词,“因为”。 D. 结构助词,取独,不译;结构助词,“的”。)
7. D (本题考查筛选文中的信息、归纳内容要点的能力。从开头来看,求取书斋之记,是姜公本意,作者说“予意士大夫之爱公者,强为之名耳”,是作者委婉地批评姜公。)
8. B
9. (1)像盗跖一样行事,(却像)伯夷一样说话,说“我是隐者”,行吗? (“行”“语”“我隐者也”句式各 1 分)
(2)(追求)清廉与高洁,本来就是古人隐居的原因,您怀疑什么呢? (“廉与高”“固”“所以”“子何疑焉”句式各 1 分)
(3)语言,是一个人的文饰罢了,自身将要隐居了,哪里还用得着文饰呢? 这是追求显扬啊。 (“文”“显”“焉用文之”“是求显也”句式各 1 分)
10. (1)这是一首送别怀远之词。词的上片写“楚天长”与“闪孤光”已见离别之情,下片写“目送征鸿飞杳杳”“忆潇湘”更见其难舍的离别之苦。词人通过景物描写,表现与亲人依依难舍的离别之情。
(2)本句运用借景抒情(或“景中含情”“融情于景”)的方法(1 分),写帆影在斜晖下,于烟波浩渺的江流中闪烁着孤独的光芒,渐行渐远的景象。(1 分)词人有意将“楚天”之“长”,与“帆”之“孤”对比(1 分),形成空间上的强烈反差,写帆影之孤,其实是衬托出离人行旅之孤。也寄托了词人的对朋友的眷恋难舍之情和别后寂寞孤独之感。(1 分)
11. (1)举匏樽以相属 渺沧海之一粟
(2)虽取舍万殊,静躁不同
(3)响穷彭蠡之滨
12. A (过去的文化自觉是缘于救亡图存,今天的文化自觉则是着眼于全球化趋势。)
13. C (“羊羔体”“曹操墓”“学历门”只是些网络热词,限于在网上流传,不是文化自觉。)
14. (1)在深刻的文化思考中,在经济发展的背景下,发展壮大了自己的产业。
(2)在艰苦的文化实践上,追求文化创新。
(3)文化由传统向现代转型,并逐步与世界文化交融。
15. (1)比喻、夸张(2 分)。表现了环境的清冷、肃杀、恶劣、凝重等。(2 分)。
16. 寒冷,饥饿,猎杀,无容身之所。(每点 1 分)(答疲劳、疲累等不给分;答环境保护方面

的不给分;答路远等方面的内容不给分。答饥寒给 2 分。把猎杀写成猎枪、网罟等均判正确。)

17. (1)表现出空中飞行的寒鸟之多;(2)突出“人”对寒鸟飞行行为的不理解;(3)引出下文,为下文写寒鸟与人生存法则的不同埋下伏笔。(每点 2 分)(答对比、反衬并且作用分析合乎情理的给 2 分。第 3 点只答铺垫、埋下伏笔等给 1 分。)

18. (1)对在自然灾害面前坚忍意志的赞美;(所答内容与“坚忍”有关,正常判分。)
(2)对在自然灾害面前族群集体精神的赞美;(所答内容与“集体精神”有关,正常判分。)
(3)对弱小者(弱势群体)生存环境(状态)的关注(同情);(只答“同情”而未涉及对象或者只答同情寒鸟的给 1 分。)
(4)对困境中弱小者(弱势群体)生存环境改善的美好期盼(祝愿);
(5)希望人类从寒鸟的行为中汲取精神力量。(如果答对人的批判方面的内容给 1 分)
(每点 2 分,答对四点即可。)

19. (1)“经世致用”强调的是务实精神和以“实用”为宗旨的学风,要求将学习与社会实践联系起来,关心国计民生,服务社会。而孔子的“诗教”理论则强调个人修养,修成“思无邪”的思想,养成温柔敦厚的个性,把人培养成谦谦君子,从而实现修身、齐家、治国、平天下的政治理想。

(2)从实用性看,通过读诗可以提高观察能力,认识鸟兽草木的名称,进而与大自然和谐相处,还能感受到大自然的恩赐,意义非凡。

从文学性看,理解与欣赏诗歌意境,修成温柔敦厚的个性和无邪的思想,把人培养成谦谦君子,在此基础上,实现人与社会的和谐。

学以致用,在写诗中寄托感情,也能够诗歌中抒发个人的不平,达到心理的平衡。

20. (1)①双汇召开万人大会向消费者致歉;②双汇引入第三方检测机构,加强质量监督。
(2)(略)

21. 题意分析

(1)人们往往在忙碌中就会不自觉地迷失了自我以及前进的方向。命运掌握在自己手中,千万不要让盲目的忙碌改变了我们的命运。

(2)相信自己的选择,让自己始终生活在充满自信的状态,不要轻易否定自己,不要轻易怀疑自己。

(3)每个人的心中都应该有一轮太阳,那是明确的目标,是我们前进的方向。有了明确的目标,人生的航船才会找到方向,漫无目的的漂荡终归会迷路。

(4)失败和成功的最大区别就是,做同一件事情,有的人始终向着自己的目标从不怀疑的一路走了下去,而有的人,却总是会因为人生路口上的一些风景迷失了真的自己。

高考语文模拟试卷(三)答案

1. D (A.“庇”读 bì,“桷”读 tòng B.“角”读 jué C.“谄”读 chǎn)

2. D

3. A (相濡以沫:比喻在困境中的人以微薄力量相互救助。多用于夫妻之间。)

4. A 5. C 6. C 7. B

8. C (其:自己;其:其中的。为:被;为:治理。存:慰问;存:生存。阳:山之南。)

9. A (②和⑥说明他有隐居山林的志向。④说明他不与社会共处的思想。)

10. B (从文中可以看出,妻子的陪嫁东西是刘凝之分给了亲朋好友。)

11. 孟子说:“观察一个人,最好的方法莫过于观察他的眼睛。因为眼睛掩盖不了一个人内心的丑恶。心地光明正大,眼睛就会明亮;心地不光明正大,眼睛就灰暗无神。听一个人讲话的时候,注意观察他的眼神,这个人(的美与丑)怎么能够隐匿起来呢?”

12. 不直接描写人物的感情,而是通过对动作的描写表达她的百无聊赖,通过对装束的描写表达她的懒散和心绪不宁,使得这首词含蓄而不直白,富有情味,令人产生无限的遐想。(大意对即可)

13. (1)固国不以山溪之险 失道者寡助

(2)今上岳阳楼 吴楚东南坼

(3)镜中衰鬓已先斑 出师一表真名世

14. 四次 悲哀;沉郁有力、坚定不移的吼叫;悲怆地轻咩;兴奋

15. 渲染环境,与斑羚的困境形成鲜明的对比,突出了斑羚求生存的追求;突出烘托了镰刀头羊挽救种群灭绝、保存种群生存后的坚定从容以及种群得以延续的希望。

16. 假如最后斑羚数是偶数,那么镰刀头羊或被渡过山涧,或成为飞渡其他羚羊而心甘情愿牺牲自身的勇者。文章的结尾却出人意料,避开人们的常规思维,斑羚数是奇数而不是偶数,使镰刀头羊既不能成为种群的生存者,又不能成为牺牲自身的勇者,而是让它坚定从容地走向死亡,体现了一种生命的悲壮美,这正是文章立意构思的巧妙之所在。

17. AD

18. ④③②⑤①

19. A C E F

A 处“甚多”可改为“甚广”

C 处“人民”可改为“人”

E 处“改善”可改为“改进”

F 处“学习”可改为“提高”

(任选三处加以修改,改正一处得 1 分,满分为 3 分。)

20. 戴着皮帽, 冒着大雪, 赶着马车, 从林间出现, 他要到哪儿去呢?

21. 略

高考理科数学模拟试卷(一)答案

一、选择题

1~8 DABDB CDA

二、填空题

9. $\{x|-3<x<2\}$. 10. 16. 11. 10. 12. ②③④. 13. $\frac{2\pi}{3}$. 14. $(-\infty, 0)$.

三、解答题

15. 解: (1) $\because f(x) = 2\sqrt{3}\cos^2 x - 2\sin x \cos x - \sqrt{3} = \sqrt{3}(\cos 2x + 1) - \sin 2x - \sqrt{3}$ 2分
 $= 2\cos(2x + \frac{\pi}{6})$ 4分

最小正周期为 π 6分

当 $2x + \frac{\pi}{6} = \pi + 2k\pi (k \in \mathbf{Z})$, 即 $x = \frac{5\pi}{12} + k\pi (k \in \mathbf{Z})$ 时函数有最小值 -2 8分

(2) $2k\pi - \pi \leq 2x + \frac{\pi}{6} \leq 2k\pi (k \in \mathbf{Z})$ 10分

$\therefore k\pi - \frac{7\pi}{12} \leq x \leq k\pi - \frac{\pi}{12} (k \in \mathbf{Z})$ 12分

函数 $f(x)$ 的单调递增区间为 $[k\pi - \frac{7\pi}{12}, k\pi - \frac{\pi}{12}] (k \in \mathbf{Z})$ 12分

16. 解: (1) 周销售量为 2 千件, 3 千件和 4 千件的频率分别为 0.2, 0.5 和 0.3. 3分

(2) ξ 的可能值为 8, 10, 12, 14, 16, 且 5分

$P(\xi=8) = 0.2^2 = 0.04, P(\xi=10) = 2 \times 0.2 \times 0.5 = 0.2,$

$P(\xi=12) = 0.5^2 + 2 \times 0.2 \times 0.3 = 0.37, P(\xi=14) = 2 \times 0.5 \times 0.3 = 0.3, P(\xi=16) =$

$0.3^2 = 0.09.$

ξ 的分布列为

ξ	8	10	12	14	16
P	0.04	0.2	0.37	0.3	0.09

..... 9分

$E\xi = 8 \times 0.04 + 10 \times 0.2 + 12 \times 0.37 + 14 \times 0.3 + 16 \times 0.09 = 12.4$ (千元) 12分

17. (1) 证明: $\because$ 在矩形 ACC_1A_1 中, $C_1E \parallel AD, C_1E = AD$,

$\therefore$ 四边形 AEC_1D 是平行四边形.

$\therefore AE \parallel DC_1$ 2分

又 $AE \not\subset$ 平面 $BC_1D, DC_1 \subset$ 平面 BC_1D ,

$\therefore AE \parallel$ 平面 BC_1D 3分

(2) 证明: $\because$ 直三棱柱 $ABC-A_1B_1C_1$ 中, $BC \perp CC_1, AC \perp BC, CC_1 \cap AC = C$,

$\therefore BC \perp$ 平面 ACC_1A_1 .

而 $C_1D \subset$ 平面 ACC_1A_1 ,

$\therefore BC \perp C_1D$ 6分

$\because$ 在矩形 ACC_1A_1 中, $DC = DC_1 = \sqrt{2}, CC_1 = 2$, 从而, 由勾股定理, 得 $C_1D \perp DC$

..... 8分

又 $DC \cap BC = C$,

$\therefore C_1D \perp$ 平面 BCD 9分

而 $C_1D \subset$ 平面 BC_1D ,

$\therefore$ 平面 $BC_1D \perp$ 平面 BCD 10分

(3) 由(2)可知平面 $BC_1D \perp$ 平面 BCD ,

$\therefore$ 斜线 CD 在平面 BC_1D 的射影在 BD 上, $\angle BDC$ 为 CD 与平面 BC_1D 所成的角.

..... 12分

又由(2)可知 $BC \perp$ 平面 $ACC_1A_1, \therefore BC \perp CD$.

$\therefore \triangle BCD$ 是直角三角形.

$\because BC = 1, CD = \sqrt{2}, \therefore \tan \angle BCD = \frac{\sqrt{2}}{2}$ 14分

18. 解: (1) 该制造商一年的利润 L (万元) 与每件玩具定价 x 的函数关系式为:

$L(x) = (x-5-m)(20-x)^2, x \in [9, 11]$ 4分 (定义域不写扣 1 分)

(2) $L'(x) = (20-x)^2 - 2(x-5-m)(20-x)$

$= (20-x)(30+2m-3x)$ 6分

令 $L'(x) = 0$ 得 $x = 10 + \frac{2}{3}m$ 或 $x = 20$ (不合题意, 舍去) 7分

$\because 1 \leq m \leq 3, \therefore \frac{32}{3} \leq 10 + \frac{2}{3}m \leq 12$.

在 $x = 10 + \frac{2}{3}m$ 两侧 $L'(x)$ 的值由正变负.

$\therefore$ ① 当 $\frac{32}{3} \leq 10 + \frac{2}{3}m \leq 11$, 即 $1 \leq m \leq \frac{3}{2}$ 时,

$L_{\max} = L(10 + \frac{2}{3}m) = (10 + \frac{2}{3}m - 5 - m)[20 - (10 + \frac{2}{3}m)]^2 = 4(5 - \frac{m}{3})^3$ 9分

② 当 $11 < 10 + \frac{2}{3}m \leq 12$, 即 $\frac{3}{2} < m \leq 3$ 时,

$L_{\max} = L(11) = (11 - 5 - m)(20 - 11)^2 = 81(6 - m)$, 11分

$\therefore R(m) = \begin{cases} 4(5 - \frac{m}{3})^3, & 1 \leq m \leq \frac{3}{2} \\ 81(6 - m), & \frac{3}{2} < m \leq 3 \end{cases}$

答: 若 $1 \leq m \leq \frac{3}{2}$, 则当每件玩具定价为 $10 + \frac{2}{3}m$ 元时, 制造商一年的利润 L 最大, 最

- 大值 $R(m) = 4\left(5 - \frac{m}{3}\right)^3$ (万元); 若 $\frac{3}{2} < m \leq 3$, 则当每件玩具定价为 11 元时, 制造商一年的利润 L 最大, 最大值 $R(m) = 81(6 - m)$ (万元). 14 分
19. 解: (1) 抛物线 $y^2 = 4x$ 的焦点为 $F(1, 0)$, 准线方程为 $x = -1$, 2 分
 $\therefore a^2 - b^2 = 1$ ① 3 分
 又椭圆截抛物线的准线 $x = -1$ 所得弦长为 $\sqrt{2}$,
 $\therefore$ 得椭圆与抛物线准线的上交点为 $\left(-1, \frac{\sqrt{2}}{2}\right)$,
 $\therefore \frac{1}{a^2} + \frac{1}{b^2} = 1$ ② 4 分
 由①代入②得 $2b^4 - b^2 - 1 = 0$, 解得 $b^2 = 1$ 或 $b^2 = -\frac{1}{2}$ (舍去),
 从而 $a^2 = b^2 + 1 = 2$ 6 分
 $\therefore$ 该椭圆的方程为 $\frac{x^2}{2} + y^2 = 1$ 7 分
 (2) $\because$ 倾斜角为 45° 的直线 l 过点 F ,
 $\therefore$ 直线 l 的方程为 $y = \tan 45^\circ(x - 1)$, 即 $y = x - 1$, 8 分
 由(1)知椭圆的另一个焦点为 $F_1(-1, 0)$, 设 $M(x_0, y_0)$ 与 F_1 关于直线 l 对称,
 9 分
 则得 $\begin{cases} \frac{y_0 - 0}{x_0 + 1} \times 1 = -1 \\ \frac{y_0 + 0}{2} = \frac{x_0 + (-1)}{2} - 1 \end{cases}$ 10 分
 解得 $\begin{cases} x_0 = 1 \\ y_0 = -2 \end{cases}$, 即 $M(1, -2)$ 11 分
 又 $M(1, -2)$ 满足 $y^2 = 4x$, 故点 M 在抛物线上, 13 分
 $\therefore$ 抛物线 $y^2 = 4x$ 上存在一点 $M(1, -2)$, 使得 M 与 F_1 关于直线 l 对称. 14 分
20. 解: (1) $\because a_{n+1} = a_n + 2a_{n-1}$, 两边加 a_n 得: $a_{n+1} + a_n = 2(a_n + a_{n-1}) (n \geq 2)$,
 $\therefore \{a_{n+1} + a_n\}$ 是以 2 为公比, $a_1 + a_2 = 4$ 为首项的等比数列.
 $\therefore a_{n+1} + a_n = 4 \cdot 2^{n-1} = 2 \cdot 2^n$ ① 2 分
 由 $a_{n+1} = a_n + 2a_{n-1}$ 两边减 $2a_n$ 得: $a_{n+1} - 2a_n = -(a_n - 2a_{n-1}) (n \geq 2)$
 $\therefore \{a_{n+1} - 2a_n\}$ 是以 -1 为公比, $a_2 - 2a_1 = -2$ 为首项的等比数列.
 $\therefore a_{n+1} - 2a_n = -2 \cdot (-1)^{n-1} = 2 \cdot (-1)^n$ ② 4 分
 ① - ② 得: $3a_n = 2[2^n - (-1)^n]$
 $\therefore$ 所求通项为 $a_n = \frac{2}{3}[2^n - (-1)^n]$ 6 分
 (2) 当 n 为偶数时, $\therefore \frac{1}{a_{n-1}} + \frac{1}{a_n} = \frac{3}{2} \left[\frac{1}{2^{n-1} + 1} + \frac{1}{2^n - 1} \right] = \frac{3}{2} \cdot \frac{2^{n-1} + 2^n}{2^{n-1} \cdot 2^n + 2^n - 2^{n-1} - 1}$

$$= \frac{3}{2} \cdot \frac{2^{n-1} + 2^n}{2^{n-1} \cdot 2^n + 2^n - 2^{n-1} - 1} < \frac{3}{2} \cdot \frac{2^{n-1} + 2^n}{2^{n-1} \cdot 2^n} = \frac{3}{2} \left(\frac{1}{2^{n-1}} + \frac{1}{2^n} \right) (n \geq 2)$$

$$\therefore \frac{1}{a_1} + \frac{1}{a_2} + \dots + \frac{1}{a_n} < \frac{3}{2} \left(1 + \frac{1}{2} + \frac{1}{2^2} + \dots + \frac{1}{2^n} \right) = \frac{3}{2} \cdot \frac{1 - \frac{1}{2^n}}{1 - \frac{1}{2}} = 3 - 3 \cdot \frac{1}{2^n} < 3 \dots\dots 8 \text{ 分}$$

当 n 为奇数时, $\because a_n = \frac{2}{3}[2^n - (-1)^n] > 0, \therefore a_{n+1} > 0, \frac{1}{a_{n+1}} > 0$, 又 $n+1$ 为偶数,

$$\therefore \frac{1}{a_1} + \frac{1}{a_2} + \dots + \frac{1}{a_n} < \frac{1}{a_1} + \frac{1}{a_2} + \dots + \frac{1}{a_n} + \frac{1}{a_{n+1}} < 3 \dots\dots 10 \text{ 分}$$

(3) 证明: $\because f(n+1) - f(n) = f^2(n) \geq 0$,
 $\therefore f(n+1) \geq f(n), \therefore f(n+1) \geq f(n) \geq f(n-1) \geq \dots \geq f(1) = 2 > 0$.
 又 $\frac{1}{f(n+1)} = \frac{1}{f^2(n) + f(n)} = \frac{1}{f(n)[f(n) + 1]} = \frac{1}{f(n)} - \frac{1}{f(n) + 1}$,
 $\therefore \frac{1}{f(n) + 1} = \frac{1}{f(n)} - \frac{1}{f(n+1)}$, 12 分
 $\therefore \sum_{k=1}^n \frac{1}{f(k) + 1} = \left[\frac{1}{f(1)} - \frac{1}{f(2)} \right] + \left[\frac{1}{f(2)} - \frac{1}{f(3)} \right] + \dots + \left[\frac{1}{f(n)} - \frac{1}{f(n+1)} \right]$
 $= \frac{1}{f(1)} - \frac{1}{f(n+1)} < \frac{1}{f(1)} = \frac{1}{2}$ 14 分

高考理科数学模拟试卷(二)答案

一、选择题

1~5 DABBD 6~10 DCCDB

二、填空题

11. 2.3% 12. 5. 13. 1; $\frac{3n^2 - n}{2}$ 14. $\frac{x^2}{2} - \frac{y^2}{16} = 1$ 15. $\left[-\frac{1 + \sqrt{5}}{2}, \frac{1 + \sqrt{5}}{2} \right]$

三、问答题

16. 解: (1) 由 $m \parallel n$, 得 $b \cos C = (2a - c) \cos B$,

$\therefore b \cos C + c \cos B = 2a \cos B$ 由正弦定理, 得 $\sin B \cos C + \sin C \cos B = 2 \sin A \cos B$,

即 $\sin(B + C) = 2 \sin A \cos B, \because \sin A \neq 0, \therefore \cos B = \frac{1}{2}. \therefore B = \frac{\pi}{3}$.

(2) 由题知 $f(x) = \cos\left(\omega x - \frac{\pi}{6}\right) + \sin \omega x = \frac{\sqrt{3}}{2} \cos \omega x + \frac{3}{2} \sin \omega x = \sqrt{3} \sin\left(\omega x + \frac{\pi}{6}\right)$,

由已知得 $\frac{2\pi}{\omega} = \pi, \therefore \omega = 2, f(x) = \sqrt{3} \sin\left(2x + \frac{\pi}{6}\right)$.

当 $x \in \left[0, \frac{\pi}{2}\right]$ 时, $2x + \frac{\pi}{6} \in \left[\frac{\pi}{6}, \frac{7\pi}{6}\right], \sin\left(2x + \frac{\pi}{6}\right) \in \left[-\frac{1}{2}, 1\right]$,

所以,当 $x = \frac{\pi}{6}$ 时, $f(x)$ 的最大值为 $\sqrt{3}$; 当 $x = \frac{\pi}{2}$ 时, $f(x)$ 的最小值为 $-\frac{\sqrt{3}}{2}$.

17. 解: (1) 从 50 名教师随机选出 2 名的方法数为 $C_{50}^2 = 1\,225$,

选出 2 人使用版本相同的方法数为 $C_{20}^2 + C_{15}^2 + C_5^2 + C_{10}^2 = 350$,

故 2 人使用版本相同的概率为: $P = \frac{350}{1\,225} = \frac{2}{7}$.

(2) $\because P(\xi=0) = \frac{C_{15}^2}{C_{35}^2} = \frac{3}{17}, P(\xi=1) = \frac{C_{20}^1 C_{15}^1}{C_{35}^2} = \frac{60}{119}, P(\xi=2) = \frac{C_{20}^2}{C_{35}^2} = \frac{38}{119}$

$\therefore \xi$ 的分布列为

ξ	0	1	2
P	$\frac{3}{17}$	$\frac{60}{119}$	$\frac{38}{119}$

$\therefore E\xi = \frac{3}{17} \times 0 + \frac{60}{119} \times 1 + \frac{38}{119} \times 2 = \frac{136}{119} = \frac{8}{7}$.

18. (I) $\because AD \parallel BC, BC = \frac{1}{2}AD, Q$ 为 AD 的中点,

$\therefore$ 四边形 $BCDQ$ 为平行四边形, $\therefore CD \parallel BQ$.

$\because \angle ADC = 90^\circ, \therefore \angle AQB = 90^\circ$, 即 $QB \perp AD$.

又 $\because$ 平面 $PAD \perp$ 平面 $ABCD$, 且平面 $PAD \cap$ 平面 $ABCD = AD$,

$\therefore BQ \perp$ 平面 PAD .

$\because BQ \subset$ 平面 $PQB, \therefore$ 平面 $PQB \perp$ 平面 PAD .

(II) $\because PA = PD, Q$ 为 AD 的中点, $\therefore PQ \perp AD$.

$\because$ 平面 $PAD \perp$ 平面 $ABCD$, 且平面 $PAD \cap$ 平面 $ABCD = AD$,

$\therefore PQ \perp$ 平面 $ABCD$.

如图, 以 Q 为原点建立空间直角坐标系, 则平面 BQC 的法向量为 $n = (0, 0, 1)$;

$Q(0, 0, 0), P(0, 0, \sqrt{3}), B(0, \sqrt{3}, 0), C(-1, \sqrt{3}, 0)$.

设 $M(x, y, z)$, 则 $\overrightarrow{PM} = (x, y, z - \sqrt{3})$,

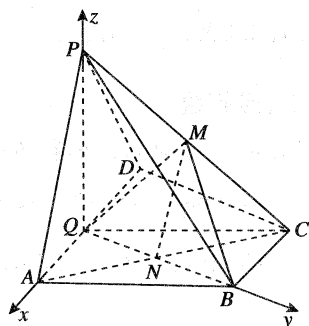
$\overrightarrow{MC} = (-1 - x, \sqrt{3} - y, -z)$,

$\because \overrightarrow{PM} = t\overrightarrow{MC}$,

$$\therefore \begin{cases} x = t(-1-x) \\ y = t(\sqrt{3}-y) \\ z - \sqrt{3} = t(-z) \end{cases} \therefore \begin{cases} x = -\frac{t}{1+t} \\ y = \frac{\sqrt{3}t}{1+t} \\ z = \frac{\sqrt{3}}{1+t} \end{cases}$$

在平面 MBQ 中, $\overrightarrow{QB} = (0, \sqrt{3}, 0), \overrightarrow{QM} = \left(-\frac{t}{1+t}, \frac{\sqrt{3}t}{1+t}, \frac{\sqrt{3}}{1+t}\right)$,

$\therefore$ 可设平面 MBQ 法向量为 $m = (\sqrt{3}, 0, t)$.



$\because$ 二面角 $M-BQ-C$ 为 $30^\circ, \cos 30^\circ = \frac{n \cdot m}{|n||m|} = \frac{t}{\sqrt{3+0+t^2}} = \frac{\sqrt{3}}{2}$,

$\therefore t = 3$ (考虑到方向性, $t = -3$ 舍去).

19. 解: (1) 由 $f(-1+x) = f(-1-x), f(1) = 3$ 得 $m = 2, n = 0$,

$\therefore f(x) = x^2 + 2x$.

设函数 $y = f(x)$ 图象上的任意一点 $Q(x_0, y_0)$ 关于原点的对称点为 $P(x, y)$, 则 $x_0 = -x$,

$y_0 = -y$,

$\because$ 点 $Q(x_0, y_0)$ 在 $y = f(x)$ 的图象上,

$\therefore -y = x^2 - 2x, \therefore y = -x^2 + 2x, \therefore g(x) = -x^2 + 2x$.

(2) $F(x) = -x^2 + 2x - \lambda(x^2 + 2x) = -(1+\lambda)x^2 + 2(1-\lambda)x$

$\because F(x)$ 在 $[-1, 1]$ 上是增函数且连续, $F'(x) = -2(1+\lambda)x + 2(1-\lambda) \geq 0$ 在 $[-1, 1]$ 上恒成立,

即 $\lambda \leq \frac{1-x}{1+x} = \frac{2}{1+x} - 1$ 在 $[-1, 1]$ 上恒成立.

由 $\frac{2}{1+x} - 1$ 在 $[-1, 1]$ 上为减函数, 当 $x = 1$ 时, 取最小值 0, 故 $\lambda \leq 0$.

20. 解: (I) $f'(x) = x + \frac{1}{x} - \frac{5}{2} = \frac{2x^2 - 5x + 2}{2x}$,

$f'(x) = 0$, 得 $x_1 = \frac{1}{2}$, 或 $x_2 = 2$, 列表:

x	$(0, \frac{1}{2})$	$\frac{1}{2}$	$(\frac{1}{2}, 2)$	2	$(2, +\infty)$
$f'(x)$	+	0	-	0	+
$f(x)$	$\nearrow$	极大	$\searrow$	极小	$\nearrow$

函数 $f(x)$ 在 $x = \frac{1}{2}$ 处取得极大值 $f(\frac{1}{2}) = \frac{7}{8} - \ln 2$,

函数 $f(x)$ 在 $x = 2$ 处取得极小值 $f(2) = \ln 2 - 1$;

(II) 方法 1: $f'(x) = x + \frac{1}{x} - (1+a), x \in (1, 3)$ 时, $x + \frac{1}{x} \in (2, \frac{10}{3})$, 5 分

(i) 当 $1+a \leq 2$, 即 $a \leq 1$ 时,

$x \in (1, 3)$ 时, $f'(x) > 0$, 函数 $f(x)$ 在 $(1, 3)$ 是增函数

$\forall x \in (1, 3), f(x) > f(1) = 0$ 恒成立; 7 分

(ii) 当 $1+a \geq \frac{10}{3}$, 即 $a \geq \frac{7}{3}$ 时,

$x \in (1, 3)$ 时, $f'(x) < 0$, 函数 $f(x)$ 在 $(1, 3)$ 是减函数 9 分

$\forall x \in (1, 3), f(x) < f(1) = 0$ 恒成立, 不合题意

(iii) 当 $2 < 1+a < \frac{10}{3}$, 即 $1 < a < \frac{7}{3}$ 时,

$x \in (1, 3)$ 时, $f'(x)$ 先取负, 再取正, 函数 $f(x)$ 在 $(1, 3)$ 先递减, 再递增,

而 $f(1)=0, \therefore \forall x \in (1,3), f(x) > f(1)=0$ 不能恒成立; 12 分
 综上, a 的取值范围是 $a \leq 1$ 13 分

方法 2: $\because x + \frac{1}{x} \geq 2\sqrt{x \cdot \frac{1}{x}} = 2, \therefore f'(x) = x + \frac{1}{x} - 1 - a \geq 1 - a$

(i) 当 $a \leq 1$ 时, $f'(x) \geq 1 - a \geq 0$, 而 $f'(x) = x + \frac{1}{x} - 1 - a$ 不恒为 0,

$\therefore$ 函数 $f(x)$ 是单调递增函数, $\forall x \in (1,3), f(x) > f(1)=0$ 恒成立;

(ii) 当 $a > 1$ 时, 令 $f'(x) = \frac{x^2 - (a+1)x + 1}{x}$,

设 $x^2 - (a+1)x + 1 = 0$ 两根是 $x_1, x_2 (x_1 < x_2)$,

$\because x_1 + x_2 = a+1 > 2, x_1 x_2 = 1, \therefore 0 < x_1 < 1 < x_2$.

当 $x \in (x_1, x_2)$ 时, $f'(x) < 0, f(x)$ 是减函数,

$\therefore f(x_1) < f(1) < f(x_2)$, 而 $f(1)=0, \therefore f(x_1) < 0 < f(x_2)$

若 $x_2 \leq 3, \because \forall x \in (1,3), f(x) > 0, \therefore f(x_2) > f(1)=0$, 不可能,

若 $x_2 > 3$, 函数 $f(x)$ 在 $(1,3)$ 是减函数, $f(3) < f(1)=0$, 也不可能,

综上, a 的取值范围是 $a \leq 1$.

方法 3: $f'(x) = \frac{x^2 - (a+1)x + 1}{x}, \Delta = (a+1)^2 - 4$

(i) 当 $\Delta \leq 0$, 即 $-3 \leq a \leq 1$ 时, 函数 $y = f(x)$ 在 $(1,3)$ 上为增函数,

$\forall x \in (1,3), f(x) > f(1)=0$ 恒成立;

(ii) 当 $\Delta > 0$, 即 $a < -3$ 或 $a > 1$ 时,

① 若 $a < -3, \because x \in (1,3), \therefore f'(x) = \frac{x^2 - (a+1)x + 1}{x} > 0$

$f(x)$ 在 $(1,3)$ 增函数, $\forall x \in (1,3), f(x) > f(1)=0$ 恒成立;

② 若 $a > 1$, 由 $f'(x) = 0$, 得 $x = \frac{(a+1) \pm \sqrt{(a+1)^2 - 4}}{2} > 0$

设 $x_1 = \frac{(a+1) - \sqrt{(a+1)^2 - 4}}{2}, x_2 = \frac{(a+1) + \sqrt{(a+1)^2 - 4}}{2}$, 列表:

x	$(0, x_1)$	x_1	(x_1, x_2)	x_2	$(x_2, +\infty)$
$f'(x)$	+	0	-	0	+
$f(x)$	$\nearrow$	极大	$\searrow$	极小	$\nearrow$

$\because$ 任意的 $x \in (1,3), f(x) > 0$ 恒成立, 而 $f(1)=0$,

$\therefore \begin{cases} x_1 > 1 \\ \text{或 } x_2 < 1, \\ f(3) \geq 0 \end{cases}$

$\frac{(a+1) - \sqrt{(a+1)^2 - 4}}{2} > 1 \Rightarrow \sqrt{(a+1)^2 - 4} < a-1 \Rightarrow a < 1$, 与 $a > 1$ 矛盾,

$\frac{(a+1) + \sqrt{(a+1)^2 - 4}}{2} < 1$, 也与 $a > 1$ 矛盾,

以上两式都与 $a > 1$ 矛盾, 对任意的 $x \in (1,3), f(x) > 0$ 不能恒成立,

综上, a 的取值范围是 $a \leq 1$.

21. 解: (I) 由题意可知 $B(0, -1)$, 则 $A(0, -2)$, 故 $b=2$.

令 $y=0$ 得 $x^2 - 1 = 0$ 即 $x = \pm 1$, 则 $F_1(-1, 0), F_2(1, 0)$, 故 $c=1$.

$\therefore a^2 = b^2 + c^2 = 5$. 于是椭圆 C_1 的方程为: $\frac{x^2}{5} + \frac{y^2}{4} = 1$

..... 4 分

(II) 设 $N(t, t^2 - 1)$, 由于 $y' = 2x$ 知直线 PQ 的方程为:

$y - (t^2 - 1) = 2t(x - t)$. 即 $y = 2tx - t^2 - 1$ 6 分

代入椭圆方程整理得: $4(1 + 5t^2)x^2 - 20t(t^2 + 1)x + 5(t^2 + 1)^2 - 20 = 0$,

$\Delta = 400t^2(t^2 + 1)^2 - 80(1 + 5t^2)[(t^2 + 1)^2 - 4] = 80(-t^4 + 18t^2 + 3)$,

$x_1 + x_2 = \frac{5t(t^2 + 1)}{1 + 5t^2}, x_1 x_2 = \frac{5(t^2 + 1)^2 - 20}{4(1 + 5t^2)}$,

故 $|PQ| = \sqrt{1 + 4t^2} |x_1 - x_2| = \sqrt{1 + 4t^2} \sqrt{(x_1 + x_2)^2 - 4x_1 x_2}$
 $= \frac{\sqrt{5} \cdot \sqrt{1 + 4t^2} \cdot \sqrt{-t^4 + 18t^2 + 3}}{1 + 5t^2}$ 9 分

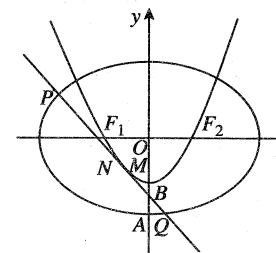
设点 M 到直线 PQ 的距离为 d , 则 $d = \frac{\left| \frac{4}{5} - t^2 - 1 \right|}{\sqrt{1 + 4t^2}} = \frac{t^2 + \frac{1}{5}}{\sqrt{1 + 4t^2}}$ 11 分

所以, $S_{\triangle MPQ} = \frac{1}{2} |PQ| \cdot d = \frac{1}{2} \cdot \frac{\sqrt{5} \cdot \sqrt{1 + 4t^2} \cdot \sqrt{-t^4 + 18t^2 + 3}}{1 + 5t^2} \cdot \frac{t^2 + \frac{1}{5}}{\sqrt{1 + 4t^2}}$

$= \frac{\sqrt{5}}{10} \sqrt{-t^4 + 18t^2 + 3} = \frac{\sqrt{5}}{10} \sqrt{-(t^2 - 9)^2 + 84} \leq \frac{\sqrt{5}}{10} \sqrt{84} = \frac{\sqrt{105}}{5}$ 13 分

当 $t = \pm 3$ 时取到等号, 经检验此时 $\Delta > 0$, 满足题意.

综上可知, $\triangle MPQ$ 面积的最大值为 $\frac{\sqrt{105}}{5}$ 14 分



高考理科数学模拟试卷(三)答案

一、选择题

1~5 ABBA 6~10 DCCDA

二、填空题

11. $a < b < c$. 12. 8π . 13. 64. 14. $-\frac{1}{2}$.

15. 当 $\alpha + \beta + \gamma = 90^\circ$ 时, $\tan \alpha \tan \beta + \tan \beta \tan \gamma + \tan \gamma \tan \alpha = 1$.

三、解答题

16. 解: (1) 由条件得 $A=2, \frac{T}{4}=3, \therefore T=\frac{2\pi}{\omega}, \therefore \omega=\frac{\pi}{6}$.

$\therefore$ 曲线段 FBC 的解析式为 $y=2\sin\left(\frac{\pi}{6}x+\frac{2\pi}{3}\right), x\in[-4,0]$.

当 $x=0$ 时, $y=OC=\sqrt{3}$. 又 $CD=\sqrt{3}, CD\parallel EF$,

$\therefore \angle DOC=\frac{\pi}{4}$ 6 分

(2) 由(1)可知 $OD=\sqrt{6}, \therefore$ 点 P 在弧 DE 上, $\therefore OP=\sqrt{6}$ 8 分

$\therefore \angle POE=\theta$, 可知 $0<\theta\leq\frac{\pi}{4}$. 矩形草坪的面积为

$$S=\sqrt{6}\sin\theta(\sqrt{6}\cos\theta-\sqrt{6}\sin\theta)=6(\sin\theta\cos\theta-\sin^2\theta)$$

$$=6\left(\frac{1}{2}\sin 2\theta+\frac{1}{2}\cos 2\theta-\frac{1}{2}\right)=3\sqrt{2}\sin\left(2\theta+\frac{\pi}{4}\right)-3$$

$\therefore 0<\theta\leq\frac{\pi}{4}$, 故当 $2\theta+\frac{\pi}{4}=\frac{\pi}{2}$ 时, 即 $\theta=\frac{\pi}{8}$ 时, S 取得最大值 $3\sqrt{2}-3$ 12 分

17. 解: (1) 设“甲至多命中 2 个球”为事件 A , “乙至少命中 2 个球”为事件 B , 由题意得,

$$P(A)=\left(\frac{1}{2}\right)^4+C_4^1\left(\frac{1}{2}\right)^1\cdot\left(\frac{1}{2}\right)^3+C_4^2\left(\frac{1}{2}\right)^2\cdot\left(\frac{1}{2}\right)^2=\frac{11}{16},$$

$$P(B)=C_4^2\left(\frac{2}{3}\right)^2\times\left(\frac{1}{3}\right)^2+C_4^3\left(\frac{2}{3}\right)^3\times\frac{1}{3}+\left(\frac{2}{3}\right)^4=\frac{8}{9},$$

$\therefore$ 甲至多命中 2 个球且乙至少命中 2 个球的概率为 $P(A)\cdot P(B)=\frac{11}{16}\times\frac{8}{9}=\frac{11}{18}$

..... 4 分

(2) $\eta=-4, 0, 4, 8, 12$, 分布列如下: 5 分

$$P(\eta=-4)=\left(\frac{1}{3}\right)^4=\frac{1}{81}, P(\eta=0)=C_4^1\left(\frac{2}{3}\right)\left(\frac{1}{3}\right)^3=\frac{8}{81},$$

$$P(\eta=4)=C_4^2\left(\frac{2}{3}\right)^2\left(\frac{1}{3}\right)^2=\frac{8}{27}, P(\eta=8)=C_4^3\left(\frac{2}{3}\right)^3\left(\frac{1}{3}\right)=\frac{32}{81},$$

$$P(\eta=12)=\left(\frac{2}{3}\right)^4=\frac{16}{81}, \dots \dots \dots 8 分$$

η	-4	0	4	8	12
P	$\frac{1}{81}$	$\frac{8}{81}$	$\frac{8}{27}$	$\frac{32}{81}$	$\frac{16}{81}$

..... 10 分

$$E\eta=-4\times\frac{1}{81}+0\times\frac{8}{81}+4\times\frac{8}{27}+8\times\frac{32}{81}+12\times\frac{16}{81}=\frac{20}{3}. \dots \dots \dots 12 分$$

18. 解: 方法 1: (1) 证明: 连接 OC , 已知 O 为 BD 中点,

$$AB=AD=\sqrt{2}, AC=BC=CD=BD=2,$$

故 $AO\perp BD, CO\perp BD$,

所以 $OA=\sqrt{AB^2-BO^2}=1, OC=\sqrt{3}$, 在 $\triangle AOC$ 中,

$OA^2+OC^2=4=AC^2$, 所以 $\angle AOC=90^\circ$, 则

$AO\perp OC$, 又 $AO\perp BD, BD\cap OC=O$, 故 $AO\perp$ 平面 BCD .

(2) 取 AC 中点 M , 连接 OM, ME, OE , 又 E 为 BC 中点, 则 $ME\parallel AB, OE\parallel DC$,

所以直线 OE 与 EM 所成的锐角就是异面直线 AB 与 CD 所成角, 在 $\triangle OME$ 中, EM

$$=\frac{1}{2}AB=\frac{\sqrt{2}}{2}, OE=\frac{1}{2}DC=1, \text{ 又 } OM \text{ 为 } Rt\triangle AOC \text{ 的斜边 } AC \text{ 上的中线, 故 } OM=1,$$

所以 $\cos\angle OEM=\frac{\sqrt{2}}{4}$, 即异面直线 AB 与 CD 所成角的余弦值为 $\frac{\sqrt{2}}{4}$.

(3) (体积法) 设点 C 到平面 AED 的距离为 h , 因为 $V_{C-AED}=V_{A-CDE}$,

即有 $\frac{1}{3}h\cdot S_{\triangle AED}=\frac{1}{3}AO\cdot S_{\triangle CED}$, 又 $CA=BC=2, AB=\sqrt{2}$ 设 $AE=x$, 则由余弦定

理有

$$\cos\angle ABC=\frac{AB^2+BC^2-AC^2}{2AB\cdot BC}=\frac{AB^2+BE^2-AE^2}{2AB\cdot BE}, \text{ 即有 } AE=\sqrt{2}, \triangle AED \text{ 为等腰三}$$

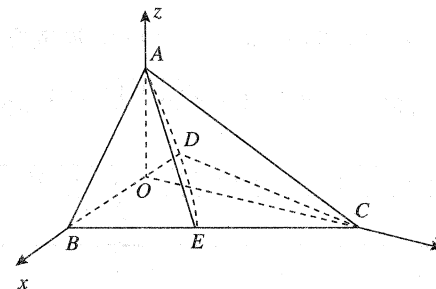
角形, 而 $DE=\sqrt{3}$, 等腰三角形 AED 底边上的高为 $\frac{\sqrt{5}}{2}$, 故 $\triangle AED$ 的面积为

$$S_{\triangle AED}=\frac{1}{2}\cdot DE\cdot\frac{\sqrt{5}}{2}=\frac{\sqrt{15}}{4}.$$

则而 $AO=1, S_{\triangle CDE}=\frac{1}{2}\times\frac{\sqrt{3}}{4}\times 2^2=\frac{\sqrt{3}}{2}$ 故 $h=\frac{2\sqrt{5}}{5}$, 点 E 到平面 ACD 的距离为 $\frac{2\sqrt{5}}{5}$.

方法 2: (1) 同方法 1.

(2) 由(1)知, 以 O 为原点, 建立如图所示的空间直角坐标系 $O-xyz$,



则 $B(1,0,0), A(0,0,1), D(-1,0,0), C(0,\sqrt{3},0)$, 则

BC 中点为 $E(\frac{1}{2}, \frac{\sqrt{3}}{2}, 0)$, 所以, $\overrightarrow{CD}=(-1, \sqrt{3}, 0), \overrightarrow{AB}=(1, 0, -1)$

$$\text{所以 } \cos\langle\overrightarrow{AB}, \overrightarrow{CD}\rangle=\frac{\overrightarrow{AB}\cdot\overrightarrow{CD}}{|\overrightarrow{AB}|\cdot|\overrightarrow{CD}|}=\frac{\sqrt{2}}{4}$$

即异面直线 AB 与 CD 所成角的余弦值为 $\frac{\sqrt{2}}{4}$.

(3) 设平面 ADE 的法向量为 $\mathbf{n}=(x, y, z)$, 又 $\overrightarrow{AD}=(-1, 0, -1), \overrightarrow{AE}=(\frac{1}{2}, \frac{\sqrt{3}}{2}, -1)$

$$\text{则} \begin{cases} \mathbf{n} \cdot \overrightarrow{AD} = -x - z = 0 \\ \mathbf{n} \cdot \overrightarrow{AE} = \frac{x}{2} + \frac{\sqrt{3}y}{2} - z = 0 \end{cases} \text{所以} \begin{cases} x + z = 0 \\ x + \sqrt{3}y - 2z = 0 \end{cases}, \text{令 } y = \sqrt{3} \text{ 得} \begin{cases} x = -1 \\ y = \sqrt{3} \\ z = 1 \end{cases}, \text{即},$$

$$\mathbf{n} = (-1, \sqrt{3}, 1),$$

$$\text{又 } \overrightarrow{AC} = (0, \sqrt{3}, -1), \text{ 则点 } C \text{ 到平面 } ADE \text{ 的距离 } d = \frac{|\mathbf{n} \cdot \overrightarrow{AC}|}{|\mathbf{n}|} = \frac{2\sqrt{5}}{5}.$$

19. 解: (1) 设 $F_1(-c, 0), F_2(c, 0)$,

$\because AF_1 \perp F_1F_2$, 不妨设 $A(-c, y), (y > 0)$,

又 $\because$ 点 A 在椭圆上,

$\therefore y = \frac{b^2}{a}$, 从而得 $A(-c, \frac{b^2}{a})$, 直线 AF_2 的方程为 $y = -\frac{b^2}{2ac}(x - c)$, 整理可得

$$b^2x + 2acy - b^2c = 0.$$

由题设, 原点 O 到直线 AF_2 的距离为 $\frac{1}{3}|OF_1|$, 即 $\frac{c}{3} = \frac{b^2c}{\sqrt{b^4 + 4a^2c^2}}$.

将 $c^2 = a^2 - b^2$ 代入上式化简得 $a^2 = 2b^2$, $\therefore a^2 = 2(a^2 - c^2)$,

$$\frac{c^2}{a^2} = \frac{1}{2}, e = \frac{\sqrt{2}}{2}.$$

(2) 由题设 $\frac{1}{2} \times 2c \times \frac{b^2}{a} = \frac{\sqrt{2}}{2}$, $\therefore b = 1, c = 1, a = \sqrt{2}$, 所求椭圆 E 的方程为 $\frac{x^2}{2} + y^2 = 1$.

(3) 设 $B(x_1, y_1), C(x_2, y_2)$, 将直线 $y = x + m$ 代入 $\frac{x^2}{2} + y^2 = 1$ 并化简得

$$3x^2 + 4mx + 2m^2 - 2 = 0, \text{ 由韦达定理知: } x_1 + x_2 = -\frac{4}{3}m, x_1x_2 = \frac{2}{3}(m^2 - 1),$$

且 $\Delta = (4m)^2 - 4 \times 3 \times 2(m^2 - 1) > 0$, $\therefore |m| < \sqrt{3}$.

由题设知 $\angle BF_2C$ 是钝角, 即 $\overrightarrow{F_2B} \cdot \overrightarrow{F_2C} < 0$.

$$\therefore (x_1 - 1)(x_2 - 1) + y_1y_2 < 0, \therefore 2x_1x_2 + (m - 1)(x_1 + x_2) + m^2 + 1 < 0,$$

$$\therefore \frac{4}{3}(m^2 - 1) - \frac{4}{3}m(m - 1) + m^2 + 1 < 0, \therefore 3m^2 + 4m - 1 < 0,$$

$$\text{解得 } \frac{-2 - \sqrt{7}}{3} < m < \frac{-2 + \sqrt{7}}{3}, \text{ 上式满足 } -\sqrt{3} < m < \sqrt{3},$$

故存在 $m \in (\frac{-2 - \sqrt{7}}{3}, \frac{-2 + \sqrt{7}}{3})$ 满足条件.

20. 解: (1) $\because a_{k+1} + a_{k-1} - 2a_k = (\frac{3}{2})^{k+1} + (\frac{3}{2})^{k-1} - 2(\frac{3}{2})^k = \frac{1}{4}(\frac{3}{2})^{k-1} > 0$,

$\therefore$ 数列 $\{a_n\} (n \in \mathbf{N}^*)$ 是凸数列.

(2) (i) 由 $a_{k-1} + a_{k+1} \geq 2a_k (k = 2, 3, \dots)$ 得 $a_{k+1} - a_k \geq a_k - a_{k-1}$

$$\therefore a_m - a_n = (a_m - a_{m-1}) + (a_{m-1} - a_{m-2}) + \dots + (a_{n+1} - a_n) \geq (m - n)(a_{n+1} - a_n)$$

$$\Rightarrow \frac{a_m - a_n}{m - n} \geq a_{n+1} - a_n,$$

$$\text{又 } a_n - a_k = (a_n - a_{n-1}) + (a_{n-1} - a_{n-2}) + \dots + (a_{k+1} - a_k) \leq (n - k)(a_n - a_{n-1}) \leq (n - k)(a_{n+1} - a_n)$$

$$\Rightarrow \frac{a_n - a_k}{n - k} \leq a_{n+1} - a_n, \therefore \frac{a_m - a_n}{m - n} \geq \frac{a_n - a_k}{n - k}.$$

$$(ii) \text{ 由 } \frac{a_m - a_n}{m - n} \geq \frac{a_n - a_k}{n - k} \text{ 得 } (m - n)a_k + (n - k)a_m \geq (m - k)a_n. \text{ ①}$$

先证 $\{\frac{S_n}{n}\}$ 是凸数列.

在 $(m - n)a_k + (n - k)a_m \geq (m - k)a_n$ 中, 令 $m = n + 1$ 得

$$a_k + (n - k)a_{n+1} \geq (n + 1 - k)a_n, \text{ 令 } k = 1, 2, \dots, n - 1, (n \geq 2) \text{ 叠加得}$$

$$S_{n-1} + \frac{1}{2}n(n-1)a_{n+1} \geq \frac{1}{2}(n+2)(n-1)a_n,$$

$$\Rightarrow 2S_{n-1} + n(n-1)(S_{n+1} - S_n) \geq (n+2)(n-1)(S_n - S_{n-1})$$

$$\Rightarrow n(n+1)S_{n-1} + n(n-1)S_{n+1} \geq 2(n^2 - 1)S_n$$

$$\Rightarrow \frac{S_{n-1}}{n-1} + \frac{S_{n+1}}{n+1} \geq 2\frac{S_n}{n}.$$

故 $\{\frac{S_n}{n}\}$ 是凸数列, 由①得 $\frac{m-n}{k}S_k + \frac{n-k}{m}S_m \geq \frac{m-k}{n}S_n$.

21. 解: (1) 由题意知, $f(x)$ 的定义域为 $(-1, +\infty)$,

$$b = -12 \text{ 时, 由 } f'(x) = 2x - \frac{12}{x+1} = \frac{2x^2 + 2x - 12}{x+1} = 0, \text{ 得 } x = 2 (x = -3 \text{ 舍去}),$$

当 $x \in [1, 2)$ 时, $f'(x) < 0$, 当 $x \in (2, 3]$ 时, $f'(x) > 0$,

$\therefore$ 当 $x \in [1, 2)$ 时, $f(x)$ 单调递减; 当 $x \in (2, 3]$ 时, $f(x)$ 单调递增,

$$\therefore f(x)_{\min} = f(2) = 4 - 12\ln 3.$$

(2) 由题意 $f'(x) = 2x + \frac{b}{x+1} = \frac{2x^2 + 2x + b}{x+1} = 0$ 在 $(-1, +\infty)$ 有两个不等实根, 即

$2x^2 + 2x + b = 0$ 在 $(-1, +\infty)$ 有两个不等实根,

$$\text{设 } g(x) = 2x^2 + 2x + b, \text{ 则 } \begin{cases} \Delta = 4 - 8b > 0 \\ g(-1) > 0 \end{cases}, \text{ 解得 } 0 < b < \frac{1}{2}.$$

(3) 对于函数 $f(x) = x^2 - \ln(x+1)$, 令函数 $h(x) = x^3 - f(x) = x^3 - x^2 + \ln(x+1)$,

$$\text{则 } h'(x) = 3x^2 - 2x + \frac{1}{x+1} = \frac{3x^3 + (x-1)^2}{x+1},$$

$\therefore$ 当 $x \in [0, +\infty)$ 时, $h'(x) > 0$,

$\therefore$ 函数 $h(x)$ 在 $[0, +\infty)$ 上单调递增, 又 $h(0) = 0$,

$\therefore x \in (0, +\infty)$ 时, 恒有 $h(x) > h(0) = 0$, 即 $\ln(x+1) > x^2 - x^3$ 恒成立.

取 $x = \frac{1}{n} \in (0, +\infty)$, 则有 $\ln \frac{n+1}{n} > \frac{1}{n^2} - \frac{1}{n^3}$ 恒成立.

显然, 存在正整数 $N = 1$, 使得当 $n \geq N$ 时, 不等式 $\ln \frac{n+1}{n} > \frac{1}{n^2} - \frac{1}{n^3}$ 恒成立.

高考英语模拟试卷(一)答案

第一部分 听力(共 20 小题;每小题 1.5 分,满分 30 分)

1~5 ABCAA 6~10 BACBB 11~15 CBBAB 16~20 CCBCA

第二部分 英语知识运用(共两节,满分 45 分)

第一节 语法和词汇知识(共 15 小题;每小题 1 分,满分 15 分)

21~25 CBCAD 26~30 ABBDA 31~35 AADCD

第二节 完形填空(共 20 小题;每小题 1.5 分,满分 30 分)

36~40 CDBAA 41~45 ABCCC 46~50 BDBAC 51~55 DAADB

第三部分 阅读理解(共 20 小题;每小题 2 分,满分 40 分)

56~59 CBCA 60~63 DDCA 64~67 BDDC 68~71 CACD 72~75 ADDB

第四部分 写作(共两节,满分 35 分)

第一节 任务型读写(共 10 小题;每小题 1 分,满分 10 分)

76. Lack 77. benefits/advantages 78. strong/energetic

79. regularly/often/frequently 80. improved 81. reason

82. busy 83. far 84. tired/exhausted 85. discouraged/unconfident

第二节 书面表达(满分 25 分)

One possible version

Dear Ron,

I'm sorry to hear that you are suffering from shortsightedness, too.

To be frank, almost eight students out of ten in my class have to wear glasses in order to live a normal school life, including me myself. As far as I'm concerned, many factors contribute to this phenomenon. First, we Chinese students live under a great burden, a burden of examinations. You know, we have to fight our way in life with millions of peers. Second, most of us with shortsightedness don't have a good habit of using our eyes, either due to lack of knowledge or carelessness.

In this case, I strongly recommend that you should not use your computer for so long a time any more and that you should change your habit of reading in bed. Hopefully, your shortsightedness could be corrected by wearing proper glasses.

All in all, don't worry! It's no big deal. (149 words)

Yours sincerely,

Liu Ming

Text 1

W: Have you read the book *The Book Thief*? I was not sure about the meaning.

M: Yeah, I felt the same, and after I read it a second time, I still couldn't put all the pieces together.

Text 2

M: I hear that your parents are very rich, is it true?

W: So what? I have never depended on them.

M: But I can't understand why you work so much.

W: I am trying to make myself a future rich mother.

Text 3

W: I'd like to check in.

M: May I have your ticket? Thanks. Here are your boarding passes. Your flight will be called in 15 minutes.

Text 4

W: Look, what a beautiful watch! Is it Mary's or Sarah's?

M: Sarah's birthday gift from Carol. Didn't you know that?

W: No wonder Carol said she spent a lot of money.

Text 5

W: We've seen so much about Germany. To us the beauty of Sweden and Denmark is exciting, too. The tourist guide is a good one.

M: Have you been to any other places?

Text 6

W: What's it like working with sick people all day, Tim?

M: It's difficult because many patients need a lot of care.

W: Oh, you give them medicine and maybe change bandages?

M: Yes, and we have to write everything on charts for the doctor.

W: Anything else?

M: We help people get ready for tests. Sometimes they're pretty nervous.

W: Sounds like it's a difficult job.

M: Yes, but I really enjoy it. I feel good doing it. I love helping people, and they always thank me.

W: Well, good for you.

Text 7

W: Hello, this is Sam Baker speaking. I saw the advertisement made by your company

wanting a secretary in a newspaper. Can you give me some more details about the requirements?

M: Hello, I am glad to tell you. You need to be between 20 and 30 years old and able to work from 10:00 a. m. —5:00 p. m. Monday through Friday. You need to be comfortable working with people from various backgrounds.

W: I think I meet all the needs you explained just now. When shall have an interview in the company?

M: From next Tuesday. Please leave me your telephone number and I will inform you of the date, OK?

Text 8

W: Hi, David, are you waiting for someone?

M: Yeah, Frank will pick me up soon.

W: You will play football with him?

M: No, we'll see Bob off at the airport.

W: Bob is leaving?

M: Yeah, he has been admitted to Peking University.

W: Peking University? You mean he will go to China?

M: Right, it's his dream to study and live in China.

W: Great. Give my respects to him.

M: OK, I will. Are you going home?

W: No, Joe will pick me up for dinner tonight.

Text 9

M: What's the special character of the British people?

W: Different people have different characters. The British people have their own ways of thinking and acting. The best-known quality of the British people is their exclusiveness.

M: What does "exclusiveness" mean?

W: It means a quality of not being willing to mix with others, especially those who are considered to be inferior in social positions.

M: Why do the English people have this characteristic?

W: I think there are many reasons. Of these reasons, two are important. One is the location of Britain; the other is the distinct development of its history.

M: I know Britain is an island country which is cut off from the rest of the world.

W: That's right, and the most important reason is perhaps a matter of history. The English people are very proud of their history. It was once said that the sun never sets on British soil. That means the Empire's colonial rule reached countries all around the

world. It was the splendid history that led the Englishmen to hold such an attitude of exclusiveness.

Text 10

I am a university teacher in Zhejiang University. I have lived in Hangzhou for 4 years. I am from Sydney. I'm teaching spoken English here. I can learn lots of Chinese from my students. My Chinese is good, too. During my spare time, I often do shopping myself. There are so many places to go and there are so many beautiful goods waiting for me.

With time going by, I have learned how to bargain like a native. When I find a thing I like, I will take my time. In this way I can find any problem with it, for example, the color and quality. I don't look eager to buy it. The shopkeeper will try to show me the good points, of course. I shake my head and give him a lower price. He may not agree. Then I pretend to leave. The shopkeeper will call me back. In this way, I bought lots of beautiful and cheap things. The most important thing is that I can speak Chinese fluently. They think I am familiar with all things in China. So they won't ask me the highest price. Recently I bought a vase for my mother. She thought it was at least \$1000. But in fact it only cost me \$200.

高考英语模拟试卷(二)答案

第一部分 听力(共20小题;每小题1.5分,满分30分)

1~5 CABBC 6~10 BCABB 11~15 ACBCB 16~20 ACBBA

第二部分 英语知识运用(共两节,满分35分)

第一节 语法和词汇知识(共15小题;每小题1分,满分15分)

21~25 BACAB 26~30 CBCAD 31~35 ACDCD

第二节 完形填空(共20小题;每小题1分,满分20分)

36~55 BADDA BBCCD CCBA A DDABC

第三部分 阅读理解(共20小题;每小题2分,满分40分)

56~60 CCDBA 61~65 ABDBC 66~70 CADCB 71~75 DACAC

第四部分 写作(共两节,满分45分)

第一节 阅读表达(共5小题;每小题3分,满分15分)

76. Rules of Internet Communication

77. Because we should treat others in the same way you would want to be treated.

78. to ask others personal questions

79. I think the basic rule is the best. In real life, we usually want others to be good to us, but we seldom consider our own behavior.

80. 但是,就像面对面交流一样,网上交流也应当遵循一些行为规则。

第二节 书面表达(满分 30 分)

One possible student version

Recently we have carried out a detailed survey of whether people should keep pets in cities, which shows we students hold entirely different ideas.

Some students think it's a good idea to keep pets because unaccompanied old people who live alone at home can get some comfort from pets. Besides, getting along well with animals will make our life interesting. On the contrary, the other students are against the idea to raise pets in cities. In their opinion, raising pets costs a large amount of money and, if too many people keep pets in cities, it is bad for the environment. What is worse, pets may make too much noise disturbing the neighbors and even attack people sometimes.

I like animals and I find it amazing to bond with such pets as dogs. I don't think it is bad to keep pets at home even if we are in cities, but we must take some measures to prevent them from polluting our environment or causing other troubles.

听力录音原文

Text 1

M: I thought you only liked collecting stamps.

W: I also like collecting coins. But collecting train tickets is my favorite activity.

Text 2

W: Songs that make our hearts happy can make them stronger, too?

M: Sure. It's a new find by American researchers and reported in Russia on Tuesday.

Text 3

W: Do you have any change? I'm dying for candy and this machine won't give change.

M: Look. This one gives change. I think I'll get something to eat, too.

Text 4

M: My son will take his entrance examination next year. But he only dreams of being admitted to Peking University.

W: Then he must make more effort than other classmates.

Text 5

M: Why didn't you call me yesterday? I was waiting by the phone all day.

W: I'm sorry, I couldn't call. I couldn't find a phone.

M: What do you mean you couldn't call? You have a cellphone, don't you?

W: I used to have a cellphone. The teacher took it away because I tried to call you from class.

Text 6

M: How are you, Mrs Brandon?

W: Pretty good. How are you doing.

M: Not so good. I just lost my job today.

W: I'm sorry to hear that.

M: How are your students doing?

W: They are very nervous about their final test.

M: I remember you gave our class a hard final test in my first year of college. Many of us failed. But I really learned a lot from you. You see, I can speak very good English.

W: Thank you for saying so.

Text 7

M: Mark was born in the year of the Sheep.

W: Mark's a Sheep? In which year was he born?

M: Yeah. He was born in 1979. That's why he's so creative.

W: Dale was born in 1980.

M: Then Dale's a Monkey.

W: Well, he's funny, so that's perfect for him.

M: Haha, you're right.

Text 8

M: Hello. This is Mike. Who is it, please?

W: Oh, Mike. This is Amy. My goodness! I've got hold of you at last.

M: Nice to hear from you again after all these years. What have you been doing?

W: Well, I've tried many things since school. I'm now working for a food processing company in charge of sales. So I travel a lot.

M: Oh, that's great. You must really enjoy it.

W: Oh, I do. Yeah, it's interesting, but it's quite tiring. But, hmm, what about you, Mike?

M: I work in a law firm, practicing in business law.

W: Oh, that's challenging.

M: Yeah, but I like my job.

Text 9

W: You're going to your job interview dressed like that?

M: You have a problem with my clothes?

W: The jacket and pants are fine. Gray is a good color. But the tie is terrible.

M: You don't like orange ties?

W: It's too bright. You shouldn't wear orange. Don't you have a red or blue tie?
M: OK, I'll put on a red tie. Anything else?
W: No, you look great. Oh, the shoes. Take off those white shoes.
M: All right. I'll put on my black shoes. All right?
W: Perfect. Oh, and take a briefcase. It'll make you look smart—I mean smarter.

Text 10

Hello, everyone. I'd like to tell you something about the student clubs in our school. Let's begin with our reading club. It was first started in 1968, and has 90 members now. Every Thursday afternoon, they gather together to exchange their ideas on books. And you may join them to share your views. If you are a music lover, come to our music club. This club has a total of 85 members who usually meet on Saturday. Sometimes they go to the concerts together and sometimes they give performance themselves. For those who enjoy outdoor sports, bicycle club can be a good choice. Trips are usually organized on Wednesday and last at least two hours. Together with our 50 cyclists, you can not only see the beautiful nature, but also make yourself stronger. Of course, there are also many other clubs in our school. For more information, please go to the school website.

高考英语模拟试卷(三)答案

第一部分 听力(共 20 小题;每小题 1.5 分,满分 30 分)

1~5 ABBAC 6~10 CBACC 11~15 ACAAB 16~20 CBCBA

第二部分 英语知识运用(共两节,满分 35 分)

第一节 语法和词汇知识(共 15 小题;每小题 1 分,满分 15 分)

21~25 DCBBD 26~30 CCDBD 31~35 CAACB

第二节 完形填空(共 20 小题;每小题 1 分,满分 20 分)

36~40 AADCB 41~45 BABDD 46~50 CCABB 51~55 DACBD

第三部分 阅读理解(共 20 小题;每小题 2 分,满分 40 分)

56~60 ADDAC 61~65 ACBDA 66~70 AABBA 71~75 BDCAB

第四部分 书面表达(共两节,满分 45 分)

第一节 阅读表达(共 5 题,每小题 3 分,满分 15 分)

76. How to Deal with Culture Shock / Dealing with Culture Shock Overseas / The Way to Overcome Culture Shock
77. Firsthand experience is extremely valuable and having someone you can trust to talk

- about their experience in a certain country is very important.
78. Talk with people who have visited the country.
79. It is most important to be polite and reasonable to local people and show respect for their culture.
80. 在旅行中灵活是很重要的,而且它确实能帮助人们克服可能会经历到的文化冲击。

第二节 写作(满分 30 分)

One possible version

Nowadays, with the growing popularity of computers, teachers, students and their parents are paying less and less attention to handwriting.

According to a recent survey, about 85.8 percent of middle school students think that their handwriting is poor. Yet for various reasons, many students don't want to improve their handwriting. 51.5 percent of the students think that they can just use a computer, so there is no need to waste time improving their handwriting, and 32.3 percent believe that they are so busy with the study that they do not have time to practice. 10.9 percent think that practicing handwriting is useless.

As the saying goes, writing style shows the man. Beautiful and neat handwriting is beneficial, especially for middle school students. Therefore, in my opinion, more emphasis should be placed on this aspect in future.

听力录音原文

Text 1

M: I'm sorry I can't go with you to the cinema. I have to go to class because I have a test.

W: That's too bad. I wish that you could come along.

Text 2

M: Sheila doesn't look like an Asian person, but she speaks Japanese and Chinese so well. Where does she come from?

W: She's an American, but she's lived in the Far East for most of her life. She speaks Japanese and Chinese as well as she speaks English.

Text 3

W: Here you are. Half a dozen tins of beef. Is there anything else you'd like to buy on the shelves?

M: Yeah. Have you bought any of the tinned butter that was advertised on TV?

W: Oh, not yet. Where is it?

Text 4

W: I'd like to exchange this dress, please.

M: What's wrong? Is it the wrong size?

W: No, the size is OK, but there's a little hole in the back—right here.

M: Oh, really? Well, no problem. Let me exchange it for you.

Text 5

M: Hi, Rose. How are you?

W: Not bad. And you?

M: OK. Listen, are you interested in going to an art exhibition on Saturday? A friend of mine is having an exhibition of her paintings. It's the opening night—free drinks and food.

W: Well, actually, I don't have anything planned. It sounds kind of fun. Why not?

Text 6

W: I'm tired of sitting on packing cases, Joe. Don't you think we should buy at least two chairs?

M: Do you know how much new chairs cost? One cheap comfortable armchair costs eight pounds.

W: Yes, I know. It's terrible. But I have an idea. Why don't we look for chairs at a street market? I've always wanted to see one.

M: All right. Which one shall we go to?

W: Portobello Road, I think. There are a lot of second hand things there. But we'll have to go tomorrow. It's only open on Saturdays.

M: What time do you want to go? Not too early, I hope.

W: The guidebook says the market is open from nine to six. It is a very popular market so we'd better be there when it opens.

M: Right. Then I'll set the alarm.

Text 7

W: Excuse me!

M: Yes, Ma'am? What can I do for you?

W: I have a problem with this coffee maker, and I want my money back.

M: Well, what seems to be the problem?

W: The problem is that it doesn't work! I've only used it three times.

M: I'd be happy to exchange it for you.

W: Thank you, but I don't want it any more. I invited six people to my place for dinner last night. After dinner, I used the coffee maker, I put in the coffee and water, I turned it on, and nothing happened!

M: I'm really very sorry about this. Here's the money.

Text 8

W: Good evening, sir. I'm Assistant Manager. I'm afraid we've had a complaint about the

noise from your neighbor who's trying to get some sleep.

M: Oh, I see.

W: Could you please ask your friends to be a little quieter so that our guests can get a good night's sleep?

M: Oh, I'm so sorry. I suppose we were talking rather loudly. We won an important prize. We were having a bit of a celebration.

W: I'm pleased to hear it. Shall I have some coffee brought to you?

M: No, that won't be necessary. We were just about to pack up anyway.

Text 9

W: Have you ever been to Japan? I'm going there this fall.

M: Yeah, I was there last summer.

W: Really? Tell me about it. What was it like?

M: Oh, it was terrific.

W: Where did you go?

M: Tokyo and Kyoto. I only had a week and a half.

W: What did you think of Tokyo?

M: Exciting, but not very attractive. All the buildings are gray and ugly. And it's very crowded, of course.

W: And how about Kyoto?

M: That is a fascinating place. I like Kyoto a lot better. It's smaller than Tokyo. It's not as crowded. And it's just generally more interesting.

W: Why? What's there to see?

M: Well, there are lots of beautiful temples and some really lovely gardens, and it's also got an old palace.

W: Sounds great. I also want to buy a camera. Which city do you think is better for shopping?

M: Tokyo, I guess. It's got more shops and a bigger selection. But it's also more expensive. In fact, it's probably the most expensive city in the world.

Text 10

Few people would even think of beginning a new job at the age of 76, but one of America's most famous artists did just that. Anna Mary Robertson, better known as "Grandma Moses" turned to painting because she was too old to work on her farm.

Grandma Moses painted carefully and her works were nice. She first painted only to please herself, and then began to sell her works for a little money. In 1939, a collector, Louis Caldor happened to see several of Grandma Moses' works hanging in a shop. He liked them, bought them at once, and set out to look for more. Caldor held a show to in-

roduce the works of Grandma Moses to other artists. Grandma Moses died on December 13, 1961, at the age of 101. She was world famous.

高考物理模拟试卷(一)答案

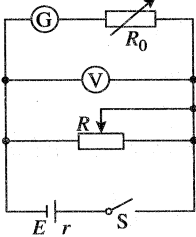
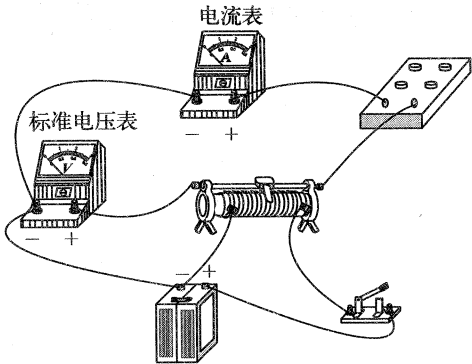
一、选择题

1. D 2. D 3. D 4. A 5. A 6. A 7. BD 8. BD 9. C 10. A 11. ACD 12. A

二、实验题

13. (1)1.50 (2)1.60(1.60、1.61 均正确) (3)2.40(2.40~2.42)

14. (1)100 (2)串联 9900 (3)如图



三、计算题

15. (1)(2) 设飞行时间为 t , 则

$$\text{水平方向位移: } l_{AB} \cos 30^\circ = v_0 t$$

$$\text{竖直方向位移: } l_{AB} \sin 30^\circ = \frac{1}{2} g t^2$$

$$\text{解得: } t = \frac{2\sqrt{3}}{3g} v_0, l_{AB} = \frac{4v_0^2}{3g}$$

(3) 设小球抛出 t' 时间与斜面间距离最大。此时小球的速度 v' 与斜面平行。

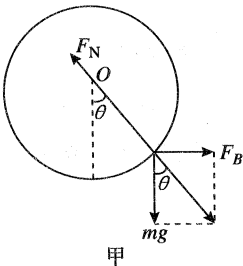
$$\text{则 } \frac{g t'}{v_0} = \frac{\sqrt{3}}{3}, t' = \frac{\sqrt{3} v_0}{3g}$$

$$16. A: F_T = \frac{\mu G_1}{\cos \theta + \mu \sin \theta}$$

$$B: F = \mu(G_1 + G_2) - \mu F_T \sin \theta + \mu G_1 - \mu F_T \sin \theta = 414 \text{ N}$$

17. 在图甲中, 从左向右看, 棒 PQ 的受力如图所示, 棒所受的重力和安培力 F_B 的合力与环对棒的弹力 F_N 是一对平衡力, 且 $F_B = mg \tan \theta = \sqrt{3} mg$

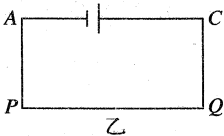
$$\text{而 } F_B = IBL, \text{ 所以 } I = \frac{\sqrt{3} mg}{BL}$$



$$= \frac{\sqrt{3} \times 10 \times 10^{-3} \times 10}{0.87 \times 0.2} \text{ A} = 1 \text{ A}$$

在右图所示的电路中两个圆环分别连入电路中的电阻为 R , 则

$$R = \frac{\frac{9}{3} \times \left(9 - \frac{9}{3}\right)}{9} \Omega = 2 \Omega$$



$$\begin{aligned} \text{由闭合电路欧姆定律得 } E &= I(r + 2R + R_{\text{棒}}) \\ &= 1 \times (0.5 + 2 \times 2 + 1.5) \text{ V} = 6 \text{ V} \end{aligned}$$

高考物理模拟试卷(二)答案

一、选择题

1. D 2. B 3. C 4. C 5. D 6. D 7. C 8. D 9. ACD 10. B 11. CD 12. D

二、实验题

$$13. (1) \textcircled{1} \frac{\sqrt{s^2 - (h_1 - h_2)^2}}{s}$$

$$\textcircled{2} \frac{d}{t}$$

$$\textcircled{3} \frac{d^2}{2st^2}$$

$$\textcircled{4} \frac{mg(h_1 - h_2)}{s} - \frac{md^2}{2st^2}$$

(2) 3.62

14. (1) 丙、乙、甲

(2) 挡光片(或遮光片、遮光板) 光电门传感器(或光电门、光电传感器)

(3) 在误差允许的范围内, 在只有重力做功的情况下, 小球的机械能守恒

三、计算题

15. (1) 1.2s (2) 8.4m

$$16. (1) m_1 g \sin 53^\circ = m_2 g \sin 37^\circ \quad m_2 = 4 \text{ kg}$$

$$(2) P \rightarrow D, mgh = \frac{1}{2} m v_D^2$$

$$h = L_1 \sin 53^\circ + R(1 - \cos 53^\circ)$$

$$F_D - mg = m \frac{v_D^2}{R} \text{ 得: } F_D = 78 \text{ N}$$

由牛顿第三定律得, 物块 P 对轨道的压力大小为 $F_D' = 78 \text{ N}$

(3) PM 段: $v_M = 2 \text{ m/s}$

沿 MN 向上运动: $a_1 = g \sin 53^\circ + \mu g \cos 53^\circ = 10 \text{ m/s}^2 \quad v_M = a_1 t_1 \quad t_1 = 0.2 \text{ s}$

所以 $t_1=0.2\text{s}$ 时, P 物到达斜面 MN 上最高点, 故返回 $x=\frac{1}{2}a_2t_2^2$

沿 MN 向下运动: $a_2=g\sin 53^\circ-\mu g\cos 53^\circ=6\text{m/s}^2$

$$MK=\frac{v_M}{2}t_1-\frac{1}{2}a_2t_2^2=0.17\text{m}$$

(4)末状态为 $v_C'=v_M'=0$ $\mu mg\cos 53^\circ L_{\text{总}}=mgL_1\sin 53^\circ$

得 $L_{\text{总}}=1.0\text{m}$

17. (1)设第 n 滴液滴在 A, B 板间做匀速直线运动, 此时, 板上电荷量为 $Q=(n-1)q$, 板

$$\text{上电压 } U=\frac{Q}{C}=\frac{(n-1)q}{C}.$$

$$\text{板间电场强度 } E=\frac{U}{d}=\frac{(n-1)q}{Cd} \quad ①$$

由平衡条件得 $qE=mg$ ②

$$\text{由①②得 } n=\frac{mgCd}{q^2}+1$$

(2)设能够到达 B 板的液滴不会超过 x 滴, 且第 $(x+1)$ 滴到 B 板的速度恰为 0, 然后返回极板上, 最大电荷量 $Q'=xq$ ③

$$\text{极板间最大电压 } U'=\frac{Q'}{C}=\frac{xq}{C} \quad ④$$

对第 $(x+1)$ 滴, 由动能定理得 $mg(h+d)-qU'=0$ ⑤

$$\text{由④⑤解得 } x=\frac{mgC(h+d)}{q^2}$$

高考物理模拟试卷(三)答案

一、选择题

1. A 2. A 3. D 4. ABD 5. D 6. ABD 7. BC 8. D 9. BC 10. B 11. C 12. BC

二、实验题

13. (1)BD (2)②④⑦ (3)0.337 0.393

14. (1)平均落点 (2) α, β, L, H

$$(3)m_A \cdot \sqrt{2gL(1-\cos\alpha)} \quad m_A \cdot \sqrt{2gL(1-\cos\beta)} \quad 0 \quad m_{Bx} \cdot \sqrt{\frac{g}{2H}}$$

三、计算题

15. $L=15\text{m}, v_2=8\text{m/s}$

16. 炸药爆炸, 滑块 A 与 B 分别获得向左和向右的速度, 由动量守恒可知, A 的速度较大 (A 的质量小), A, B 均做匀速运动, A 先与挡板相碰合成一体 (满足动量守恒) 一起向左匀速运动, 最终 B 也与挡板相碰合成一体 (满足动量守恒), 整个过程满足动量守恒。

(1)整个过程 A, B, C 系统动量守恒, 有:

$$0=(m_A+m_B+m_C)v, \text{ 所以 } v=0$$

(2)炸药爆炸, A, B 获得的速度大小分别为 v_A, v_B . 以向左为正方向, 有:

$$m_A v_A - m_B v_B = 0, \text{ 解得: } v_B = 1.5\text{m/s}, \text{ 方向向右}$$

$$\text{此过程持续的时间为: } t_1 = \frac{\frac{L}{2}}{v_A} = \frac{1}{6}\text{s}$$

A 向左运动, 与挡板相撞并合成一体, 共同速度大小为 v_{AC} , 由动量守恒, 有:

$$m_A v_A = (m_A + m_C) v_{AC}, \text{ 解得: } v_{AC} = 1\text{m/s}$$

此后, 设经过 t_2 时间 B 与挡板相撞并合成一体, 则有:

$$\frac{L}{2} = v_{AC} t_2 + v_B (t_1 + t_2), \text{ 解得: } t_2 = 0.3\text{s}$$

所以, 板 C 的总位移为: $x_C = v_{AC} t_2 = 0.3\text{m}$, 方向向左

17. (1)电流稳定后, 导体棒做匀速运动

$$\text{有 } BIL = mg$$

$$\text{解得: } B = \frac{mg}{IL}$$

(2)感应电动势 $E = BLv$

$$\text{感应电流 } I = \frac{E}{R+r}$$

$$\text{解得: } v = \frac{I^2(R+r)}{mg}$$

(3)由题意得导体棒刚进入磁场时的速度最大, 设为 v_m

$$\text{机械能守恒 } \frac{1}{2}mv_m^2 = mgh$$

$$\text{感应电动势最大值 } E_m = BLv_m$$

$$\text{感应电流最大值 } I_m = \frac{E_m}{R+r}$$

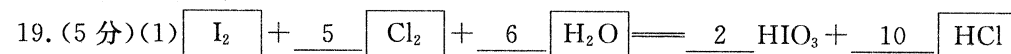
$$\text{解得 } I_m = \frac{mg\sqrt{2gh}}{I(R+r)}$$

高考化学模拟试卷(一)答案

一、选择题

1~5 BDDAA 6~10 DCCBC 11~15 CBDDB 16~18 ABD

二、完成下列各题



(2) I_2

- (3)橙红 $\text{HBrO}_3 > \text{Cl}_2 > \text{HIO}_3$
(4)10.58
20. (7分)(1)否
(2)是 气体通过浓硫酸减少 4.48L
(3) $\text{Al}(\text{OH})_3 + 3\text{H}^+ \rightleftharpoons \text{Al}^{3+} + 3\text{H}_2\text{O}$
(4) $\text{Al}, (\text{NH}_4)_2\text{SO}_4, \text{MgCl}_2$

21. (8分)(1)BD
(2) NO_3^- 、 Al^{3+} 、 SO_4^{2-}
(3) Fe^{3+} 、 HCO_3^- 、 Ba^{2+}
(4) $3\text{Cu} + 8\text{H}^+ + 2\text{NO}_3^- \rightleftharpoons 3\text{Cu}^{2+} + 2\text{NO} \uparrow + 4\text{H}_2\text{O}$
22. (7分)(1) CO_2
(2) $\text{CO}_3^{2-} + \text{H}_2\text{O} \rightleftharpoons \text{HCO}_3^- + \text{OH}^-$
(3) $2\text{Na} + \text{O}_2 \xrightarrow{\text{点燃}} \text{Na}_2\text{O}_2$
(4) $\text{Al}^{3+} + 3\text{HCO}_3^- \rightleftharpoons \text{Al}(\text{OH})_3 \downarrow + 3\text{CO}_2 \uparrow$

23. (8分)(1)e f d c
(2)无水 CuSO_4
(3)吸收 Cl_2
(4)①③ 湿润的 KI 淀粉试纸(或湿润的有色布条)
(5)紫色石蕊试液 溶液变红且不褪色

24. (6分)(1)0.023 (2)9.8 (3)40%

25. (5分)解:(1) $n(\text{NaOH}) = 0.1\text{L} \times 4.00\text{mol/L} = 0.4\text{mol}$
 $w(\text{NaOH}) = 0.4\text{mol} \times 40\text{g/mol} \div (100\text{mL} \times 1.20\text{g/mL}) \times 100\% \approx 13.3\%$

- (2)由钠守恒可知,溶液中
 $n(\text{NaOH}) = n(\text{NaCl}) + n(\text{NaClO})$
 $n(\text{Cl}^-) = 0.4\text{mol} - 0.0800\text{mol} = 0.32\text{mol}$

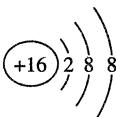
- (3) $\text{Cl}_2 + \text{H}_2 \rightleftharpoons 2\text{HCl}$ $\text{Cl}_2 + 2\text{NaOH} \rightleftharpoons \text{NaCl} + \text{NaClO} + \text{H}_2\text{O}$
由反应方程式可知:与 NaOH 反应的氯气为 0.08mol,该反应生成的 NaCl 为 0.08mol,因此氢气燃烧产生氯化氢为 0.24mol,则氢气为 0.12mol,总的氯气为 0.20mol。所用氯气和参加反应的氢气的物质的量之比 $n(\text{Cl}_2) : n(\text{H}_2) = 5 : 3$ 。

高考化学模拟试卷(二)答案

一、选择题

1. D 2. C 3. D 4. D 5. D 6. B 7. D 8. B 9. B 10. B
11. B 12. A 13. C 14. A 15. D 16. B 17. C 18. C

二、完成下列各题

19. (12分)(1)第三周期ⅦA族 
(2)氮气分子中氮氮键为氮氮三键,键长短,键能大,难断裂 X(或 Cl)
(3) $\text{NH}_4^+ + \text{H}_2\text{O} \rightleftharpoons \text{NH}_3 \cdot \text{H}_2\text{O} + \text{H}^+$
(4)22.4
(5)-292.2

20. (12分)(1)Fe Fe_3O_4 $\text{Fe}(\text{OH})_3$
(2) $3\text{Fe} + 4\text{H}_2\text{O}(\text{g}) \xrightarrow{\Delta} \text{Fe}_3\text{O}_4 + 4\text{H}_2 \uparrow$
 $\text{Fe}_3\text{O}_4 + 8\text{H}^+ \rightleftharpoons \text{Fe}^{2+} + 2\text{Fe}^{3+} + 4\text{H}_2\text{O}$
(3)0.05mol/(L·min) 0.44L²/mol² 60%

21. (12分)(1)防止溶液倒吸(或安全瓶) 防止 SO_3 液化或凝固
(2)

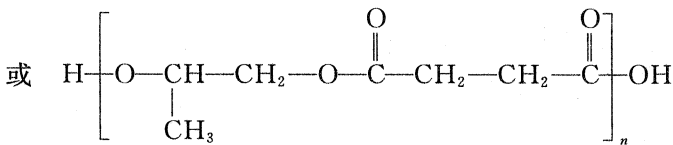
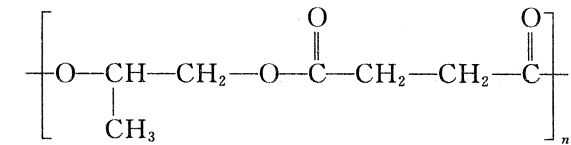
检验试剂	预期现象与结论
0.5mol·L ⁻¹ BaCl ₂ 溶液	产生大量白色沉淀,证明气体产物中含有 SO ₃
0.01mol·L ⁻¹ 酸性 KMnO ₄ 溶液(或 0.01mol·L ⁻¹ 溴水)	若溶液的紫色(或橙色)褪去,证明气体产物中含有 SO ₂ ;若溶液中紫色(或橙色)无明显变化,证明气体产物中不含 SO ₂

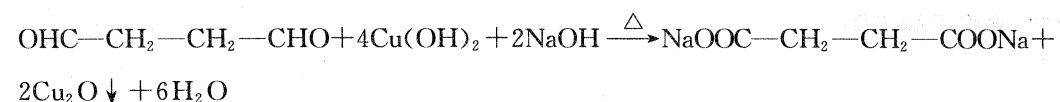
- (3)NaOH 溶液
22. (10分)(1)碳碳双键、羧基

- (2)C
(3)
$$\text{CH}_2=\overset{\text{CH}_3}{\text{C}}-\text{COOH} + \text{HO}-\text{CH}_2-\overset{\text{CH}_3}{\text{CH}}-\text{OH} + \text{HO}-\overset{\text{O}}{\underset{\text{OH}}{\text{P}}}-\text{OH} \xrightarrow{\text{一定条件}}$$

$$\text{CH}_2=\overset{\text{CH}_3}{\text{C}}-\overset{\text{O}}{\underset{\text{O}}{\text{C}}}-\text{OCH}_2-\overset{\text{CH}_3}{\text{CH}}-\overset{\text{O}}{\underset{\text{OH}}{\text{P}}}-\text{OH} + 2\text{H}_2\text{O} \quad \text{酯化反应(或取代反应)}$$

(4) $\text{OHC}-\text{CH}_2-\text{CH}_2-\text{CHO}$





高考化学模拟试卷(三)答案

一、选择题

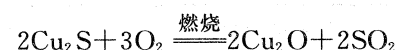
1. C 2. D 3. D 4. B 5. C 6. B 7. C 8. B 9. D
10. C 11. C 12. B 13. C 14. B 15. D 16. C

二、完成下列各题

17. (12分)(1) $S > Cl > C$ 或 $r(S) > r(Cl) > r(C)$ HClO_4 HCl

(2) $\text{S}::\text{C}::\text{S}$ 2

(3) 四 IB $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^1$ 或 $[\text{Ar}]3d^{10} 4s^1$



(4) $2\text{CO}(\text{g})+\text{SO}_2(\text{g}) \rightleftharpoons 2\text{CO}_2(\text{g})+\text{S}(\text{g})$ $\Delta H = -270\text{kJ/mol}$

18. (16分)(1) $\text{Cu}+2\text{H}_2\text{SO}_4(\text{浓}) \xrightarrow{\Delta} \text{CuSO}_4+\text{SO}_2\uparrow+2\text{H}_2\text{O}$

② $\text{Na}_2\text{S}_2\text{O}_3$ 在酸性溶液中不能稳定存在

打开 K_2 , 关闭 K_1

③ 漏斗、玻璃棒、烧杯

④ NaOH

在 C 中的反应停止后, 吸收 A 中产生的多余 SO_2 , 防止空气污染

(2) ① 加入最后一滴 I_2 标准溶液后, 溶液变蓝, 且半分钟内颜色不改变

② 90.2%

19. (9分)(1) 0.20/ t_1

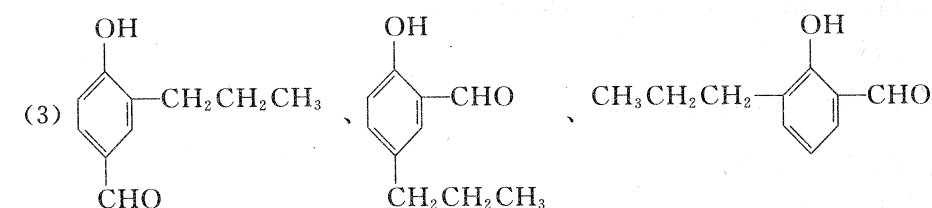
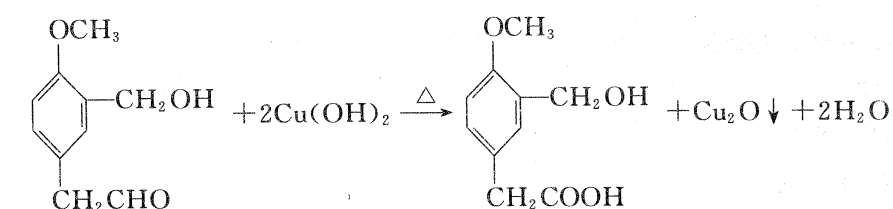
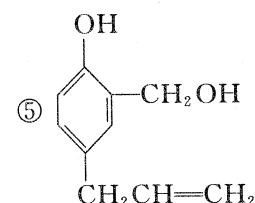
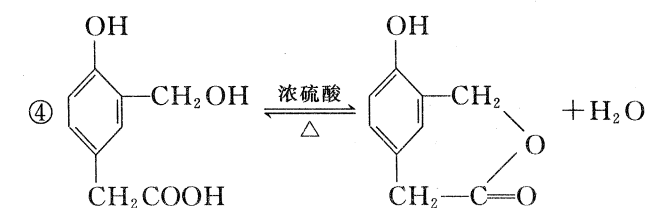
(2) 0.40

(3) 增大 增大

(4) 放热

20. (15分)(1) $\text{C}_{10}\text{H}_{12}\text{O}_2$

(2) ① 保护酚羟基 ② HCOOH 2 ③ 缩聚反应



高考生物模拟试卷(一)答案

一、单项选择题(本题包括 20 小题, 每小题 2 分, 共 40 分。每小题只有一个选项最符合题意。)

1~5 BBDAD 6~10 ABBDD 11~15 DDDCC 16~20 BACCB

二、非选择题(本题包括 6 小题, 共 60 分。)

21. (7分)(1) N 和 P N

(2) 碱基 a(或脱氧核苷酸)的数目及排列顺序

(3) 种类、数目、排列顺序

(4) 肝糖原 脂肪

22. (6分)(1) 0.8

(2) 偏低 植物同时进行呼吸作用, 消耗了部分氧气

(3) 暗

(4) 在上述条件下, 光照不是限制光合作用速率的主要因素, 而温度才是限制光合作用速率的主要因素

(5) 把 B 组植物换成死亡的, 其他相同处理

23. (8分)(1) 信息(或“传递信息的”)

受体(或“特异性受体”“受体蛋白”“糖蛋白”)

(2) 实验目的: 心得安和肾上腺素对小鼠耗氧量(或呼吸速率、呼吸作用、心脏活动、心率)的影响

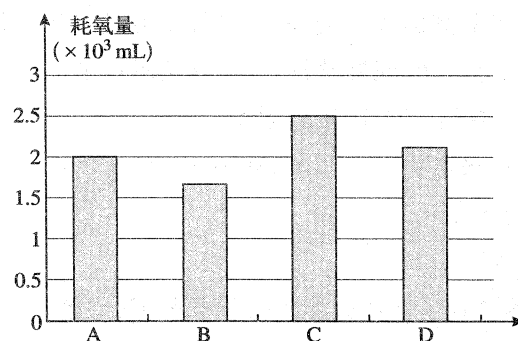
方法步骤:

①生理盐水(或“一定量或等量生理盐水”)

②大烧杯内液面上升高度(或“大烧杯液面高度变化”“大烧杯液面高度”“液面的刻度读数”)

结果分析:

①如图。选择合适的图表类型和正确绘图各1分。

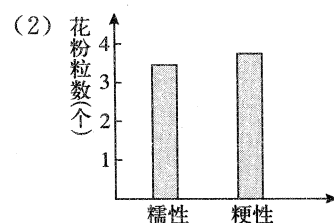


②抑制(或拮抗)

③校正(或消除)因非生物因素(或物理因素)引起的气体体积变化(或“消除非生物因素或物理因素对实验结果的影响”)

24. (9分)(1)红墨水(或染料) 细胞失水太多、太快而死亡 (2)细胞分裂间期所用时间比分裂期长 (3)①胰蛋白酶的化学本质是蛋白质 ②多肽也能使双缩脲试剂显紫色 (4)光圈和反光镜;或换用平面镜;或使用小光圈使视野变暗(答对一点得分) (5)没有(将加入二苯胺后的DNA混合物)放在沸水浴中 (6)②画色素滤液细线次数太少(只画一次滤液细线)或者滤液细线触及层析液 (7)海藻酸钠的浓度偏低,固定的酵母细胞数目较少

25. (6分)(1)甲,3、3 乙,5、3 丙,4、4 丁,3、4 平均数,3.8、3.5



(3)杂合体

(4)植物的生殖细胞具有全能性

(5) $1 - (1/2)^n$

26. (9分)(1)蛋白质工程 基因工程

(2)基因表达载体 启动子

(3) Ca^{2+}

(4)固定化酶 ①提高了酶的利用率 ②降低了生产成本,提高了产物的产量和质量

(5)替换

27. (7分)(1)都有细胞壁、细胞膜、核糖体

(2)在C试管中加入2 mL酒精做对照;在3支试管中分别滴加0.5 mL重铬酸钾的浓硫酸溶液并轻轻震荡,观察溶液是否变灰绿

(3)避免了前一次吸取酵母菌培养液对以后测定酵母菌数量的影响

(4)分解者

(5)缺乏相应分解酶系(或缺乏纤维素酶和半纤维素酶) 在酵母菌中转入分解酶系相关基因;利用酶或微生物分解秸秆;利用物理和化学方法分解秸秆;将酵母菌与其他能分解秸秆的微生物混合发酵(答对任意一项得1分)

(6)海藻酸钠溶液的配制

28. (8分)

(1)AAbb、aaBB

(2)酶的合成来控制代谢过程

(3)紫色:蓝色:白色=3:3:2

(4)遗传图解如下(亲本和子代各1分,共2分)

亲本: $\text{X}^{\text{d}}\text{X}^{\text{d}} \times \text{X}^{\text{D}}\text{Y}^{\text{d}}$

(雌、窄叶) ↓ (雄、宽叶)

F_1 : $\text{X}^{\text{D}}\text{X}^{\text{d}} : \text{X}^{\text{d}}\text{Y}^{\text{d}}$

(雌、宽叶) (雄、窄叶)

1 : 1

高考生物模拟试卷(二)答案

一、单项选择题(本题包括20小题,每小题2分,共40分。每小题只有一个选项最符合题意。)

1~5 BCCDC 6~10 DDBCB 11~15 CDACA 16~20 BDDAA

二、非选择题(本题包括6小题,共60分。)

21. (1)核移植技术、动物细胞培养、胚胎移植

(2)目的基因 显微注射法

(3)胰蛋白酶 卵细胞大易操作、分化程度低,体细胞的细胞核在卵细胞质中才能表现出全能性

(4)B 桑椹胚或囊胚

(5)荷斯坦奶牛 因为个体⑦的核遗传物质来自荷斯坦奶牛,⑥只是为胚胎发育提供营养和场所,⑦并没有获得⑥的遗传信息 XX

(6)节约资源,降低成本等 乳腺(房)生物反应器

22. (1)生态系统的组成成分、食物链和食物网 物质循环、能量流动和信息传递 生产

- 者 分解者
(2)阳光
(3)鸣蝉的长吟、油蛉的低唱、蟋蟀弹琴等(答出一个即可)
(4)否 细菌等分解者具有分解枯枝落叶或动物尸体的作用
(5)被云雀捕食的一个种群

23. I. 光合 左移 澄清石灰水变浑浊 呼吸作用产生了 CO_2

II. 有机物(淀粉) 酒精 淀粉 没有对照组

24. (1)D

(2)①C 质壁分离 原生质层 选择透过性

②蔗糖溶液 $<$

③蔗糖不能透过膜,而尿素能透过膜,所以在尿素溶液中,细胞质壁分离后会自动复原

25. (1)生殖隔离 (2)基因突变

(3)雄性 二 显微镜观察

(4)①Aabb ②X (5)显微注射 受精卵

26. (1)电能 活跃的(ATP 和 NADPH 中)化学能

(2)内膜向内腔折叠形成嵴

(3)胰高血糖素、肾上腺素

(4)⑦ 乳酸 酒精

(5)丙氨酸

(2)神经和激素 冷觉感受器→传入神经→下丘脑体温调节中枢→传出神经→骨骼肌

(3)增加 甲状腺激素

(4)大脑皮层

23. (1)光合 H_2O (2)组 2 和组 6 (3)葡萄糖 ATP 有氧呼吸

4 组无氧气,不能进行有氧呼吸,淀粉合成缺少 ATP (4)无

24. (1)反转录法 (2)目的基因或标记基因 (3)幼龄或胚胎 分裂能力强、分化程度低

(4)10 (5)无菌、无毒 (6)胚胎移植 (7)转基因技术

25. (1)AABB 和 aabb 基因的自由组合定律

三角形果实:卵圆形果实=3:1 AAbb 和 aaBB

(2)不定向性 定向改变

(3)7/15 AaBb、aaBb、Aabb

(4)①分别将三包荠菜种子和卵圆形果实种子种下,待植株成熟后分别将待测种子发育成的植株和卵圆形果实种子发育成的植株进行杂交,得到 F_1 种子;

②将得到的 F_1 种子分别种下,植株成熟后进行自交,得到 F_2 种子;

③将 F_2 种子种下,植株成熟后分别观察统计 F_2 所有果实性状及比例。

I. 若 F_2 植株上果实形状为三角形:卵圆形=15:1,则包内种子基因型为 AABB;

II. 若 F_2 植株上果实形状为三角形:卵圆形约=27:5,则包内种子基因型为 AaBB;

III. 若 F_2 植株上果实形状为三角形:卵圆形=3:1,则包内种子基因型为 aaBB;

26. (1)A (2)物质循环和能量流动 (3)E

(4)减少 减少 (5)乙的减少,甲的增多

(6)能源和物质资源的浪费;增加 CO_2 排放量;引起环境污染;容易引起病虫害传播;农业成本高 C 纤维素酶

高考生物模拟试卷(三)答案

一、单项选择题(本题包括 20 小题,每小题 2 分,共 40 分。每小题只有一个选项最符合题意。)

1~5 DCCAD 6~10 CDBAC 11~15 BABAA 16~20 CADDB

二、非选择题(本题包括 6 小题,共 60 分。)

21. (1)光反应 色素的数量

(2)酶的活性 (3)三碳化合物(或 C_3 或糖类)

(4)适当降低温室内的温度 因为在该光照强度以下,低温(15°C)时植物的净光合作用强度大于高温(25°C)时的净光合作用强度

(5)甲

22. (1)①取材不当,应取若干只健康状况良好且相同的成年小白鼠

②不符合单一变量原则,应将两组小鼠均置于 0°C 环境中

③实验结果与结论描述有误,应按探究式实验书写预测实验结果和结论