

高雄醫學大學 101 學年度學士後醫學系招生考試試題

科目：英文

考試時間：80 分鐘

說明：一、「選擇題」用2B鉛筆在「答案卡」上作答，修正時應以橡皮擦擦拭，不得使用修正液（帶），未遵照正確作答方法而致電腦無法判讀者，考生自行負責。

二、「非選擇題」部分以「答案卷」作答，作答時不得使用鉛筆，違者該科答案卷不予計分；限用黑色或藍色墨水的筆書寫。

三、試題、答案卡及答案卷必須繳回，不得攜出試場。

I. Vocabulary. 20 points

A. Please choose the best answer to match with each underlined word.

【單選題】每題 1 分，共 20 題，答錯 1 題倒扣 0.25 分，倒扣至本大題零分為止，未作答，不給分亦不扣分。

- Many critics have charged that the CIA's covert activities have been immoral and hypocritical.
(A) emergent (B) traumatic (C) virile (D) congenial (E) secret
- Scientists speculate that the greatest impact on the increasing global temperature of the earth is caused by humans.
(A) digress (B) contemplate (C) detract (D) squander (E) dissent
- The Labor Union representatives asked the Mayor to endorse their strike by signing a letter of support.
(A) comply (B) undermine (C) approve (D) isolate (E) encompass
- I am a skeptic about the 12-year compulsory education plan; I need some more proof that it can work.
(A) pessimist (B) optimist (C) disbeliever (D) romanticist (E) realist
- Carbon is converted into diamonds under extreme pressure.
(A) banished (B) waned (C) astonished (D) clung (E) transformed

B. Please choose the best answer to complete each sentence.

- Lady Gaga's rise to fame was quite _____ — in just a few years, she was a household name.
(A) challenging (B) enabling (C) imaginary (D) modern (E) phenomenal
- The single most important _____ of your lifetime — the purchase of your first house — should not be conducted without the expertise and assistance of trained and licensed professionals.
(A) interpretation (B) transaction (C) stereotype (D) essence (E) query
- The summer sun in Kaohsiung can be _____, so it is important to apply some sun block to your skin before going out.
(A) brightening (B) deadly (C) glimmering (D) shining (E) scorching
- Cloud computing has been a popular _____ for the past few years, yet to many it remains a fuzzy concept.
(A) activity (B) buzzword (C) fantasy (D) pastime (E) runway
- When the New York Knicks lost their chance to play in the final game, _____ among the players and the fans was very low.
(A) affect (B) effect (C) impact (D) laughter (E) morale
- Drenching rain and seemingly bottomless mud _____ the work of the road construction crew.
(A) improvised (B) flaunted (C) designated (D) perused (E) hampered
- She suffered eight years for no fault of her own, being falsely accused of theft. Last month, the District Court finally _____ her of all the charges, thus relieving her and her family of a big load which they had carried for eight years.
(A) assailed (B) demoralized (C) tainted (D) absolved (E) resolved
- Since 1979, when satellite data first became available, regional temperature trends have _____ the notion of global warming: the statistical trend shows no change in the tropics and a decrease in temperature in Antarctica.
(A) alluded (B) refuted (C) coerced (D) emerged (E) provoked
- In their most recent performance, the Cloud Gate dancers gave us a fabulous performance that far _____ our expectation.
(A) assessed (B) bestowed (C) disclosed (D) surpassed (E) sustained
- The question of whether diplomats should be fully _____ from criminal prosecution, no matter what the alleged crime, is one that is neither new nor free from dispute.
(A) implicit (B) imminent (C) immune (D) impair (E) impress

16. In the recent French presidential elections, the incumbent Nicolas Sarkozy _____ defeat minutes after the polls closed.
 (A) accorded (B) conceded (C) receded (D) concocted (E) interceded
17. Ever since the publication of Charles Darwin's theory, people have questions whether evolution is _____ with faith in God.
 (A) compatible (B) complacent (C) tangible (D) capable (E) reticent
18. A report newly released estimates that food _____ cause \$14 billion in medical costs and lost wages in the United States yearly.
 (A) genomes (B) microbes (C) genes (D) pathogens (E) organisms
19. In a(n) _____, prompt and effective action must be taken to deal with a number of serious problems, now, in order to avoid disaster.
 (A) nutshell (B) significance (C) outcome (D) resource (E) choice
20. In many developing countries, rural-to-urban _____ is another cause of the increasing rate of child labor.
 (A) isolation (B) interrogation (C) migration (D) persuasion (E) integration

II. Grammar and Structure. 20 points

A. Please choose the best answer to complete the sentence.

【單選題】每題 1 分，共 20 題，答錯 1 題倒扣 0.25 分，倒扣至本大題零分為止，未作答，不給分亦不扣分。

21. Elizabeth Taylor was very active with her charity work _____ those suffering with AIDS.
 (A) in exchange for (B) in spite of (C) on behalf of (D) instead of (E) in case of
22. Stronger measures have been taken to _____ violent crimes and drug trafficking.
 (A) set up (B) bring down (C) give in (D) check out (E) hang up
23. Not only had her demeanor and interests changed, but also it seemed as if she _____ a completely different person after her accident.
 (A) would have become (B) might become (C) become (D) had lived (E) were becoming
24. According to sociologists, contemporary legends or folktales, _____ rather than ghosts and goblins, preserve the basic structure of classic horror tales.
 (A) which deals with current technology (B) dealing with current technology
 (C) thereby deals with current technology (D) deal with current technology
 (E) while it deals with current technology
25. Higher standards of health care mean people are living longer. _____, birth rates in many countries are declining, so the world's populations are aging.
 (A) Whereas (B) Meanwhile (C) While (D) Whenever (E) Regardless
26. The teacher's job is to make sure that indigenous students maintain their own language and culture, _____ it means that they learn English more slowly.
 (A) besides (B) after all (C) whether (D) whatever (E) even if
27. To become finalists in the competition for scholarships, the students must perform well on a second examination. _____, they must earn their principals' recommendation.
 (A) For example (B) As such (C) In fact (D) Although (E) In addition
28. When I walked in, Grandpa was sitting at the kitchen table, the newspaper _____ before him, his morning cup of coffee steaming in his mug.
 (A) spreading (B) spread (C) was spread (D) was spreading (E) was being spread
29. Difference may arise from a different set of values. One may value autonomy in the classroom while _____ may value cooperation.
 (A) others (B) some (C) the other (D) they (E) another
30. These _____ storms have reminded people of nature's awesome power.
 (A) killer (B) killing (C) kill (D) kills (E) killers

B. For each sentence, please choose one underlined part that contains faulty English.

31. In dealing with each other, the Native American tribes of the Great Plains used an intricate sign language that consisted of a series of mutually understanding gestures.
 A B C
 D E

32. Many people look forward to retire, seeing it as an opportunity to do all kinds of things they could never do while they were working.
A B C D E
33. The mystery that people tend to be exquisitely sensitive to the breath quality of their fellows and notorious bad at smelling their own still remains.
A B C D E
34. Many people will be healthier and wealthier if they got on their bikes. Not only would roads be less polluted, but cyclists could expect a longer life.
A B C D E
35. Since the conditions governing the transport of pets on trains is subject to modifications, it is advisable to check before travelling by visiting the Services section of the website.
A B C D E
36. Readers either love or hate Stephen King's unique writing style; few have no opinion of him.
A B C D E
37. The reason for her depression is because she had had an abortion and felt pangs of conscience afterwards.
A B C D E
38. The success of recent independent films like *Jump, Boys, The Road in the Air*, and *Let It Be* signal a new era for Taiwanese audiences and their preferences.
A B C D E
39. The economic system of countries such as Japan, Canada, Germany, and the United States is the free enterprise system—the privately enterprise system.
A B C D E
40. Some Vietnam veterans were disappointed with American public's negative perception of the war, they suffered severe mental problems when they returned to civilian life.
A B C D E

III. Reading Comprehension: Please read the following five excerpts/passages closely and then choose the best answer for each of the questions according to the contents. 40 points

【單選題】每題 2 分，共 20 題，答錯 1 題倒扣 0.5 分，倒扣至本大題零分為止，未作答，不給分亦不扣分。

Would you like to make thousands of dollars a month without working? Then Greg Cheney wants to talk to you. You can see Greg on television every day. He is always selling something. Now he has a new product. He calls it the “greatest diet pill in the world.” However, the “greatest diet pill” is really the “biggest scam” in the world.

“This is the easiest way in the world to make a fortune,” says Cheney in his TV commercial. “If you get 20 people to try this product, we will send you a thousand dollars,” the con artist promises. And some people believe him. “It sounded so good,” says Kelly Eagan. “I signed up the same day.”

The **rip-off** works like this. Cheney isn't really selling diet pills. He is selling websites that advertise diet pills. You buy a website. Then you wait for people to visit the website and buy the diet pills. However, the numbers don't work. The diet pills cost \$39.95 a bottle. Twenty bottles cost about \$800. How can Cheney pay the seller \$1,000 to make \$800? The answer is that he can't.

Cheney sells the websites for \$35. But most people pay much more than that. After you sign up, he sells you a lot more things. Cheney says the extra things bring more customers to the websites. However, Kelly Eagan paid him \$5,175 and only one person visited her site.

Cheney has a list of people who have made a lot of money. He says that he sends out checks every week—\$3,500, \$5,600, even \$22,782. But even some people on the list have lost money. For example, Susan Kauffman is on the moneymaker list. She

says she spent \$5,000 and sold about 23 bottles of diet pills. Igor Spilsak is on the list, too. He paid \$2,000 and sold six bottles of diet pills. However, in the commercial he says, “This is the easiest thing I’ve ever done and I’m making more than \$100 an hour.” Why did he lie? Cheney paid him \$600 to be in the commercial.

Cheney insists that you can make money if you work hard and don’t quit. However, it seems that one person is getting rich quick and that’s Greg Cheney.

41. Which of the following titles best summarizes the content of the passage?
- (A) The Easiest Way in the World to Make a Fortune
 - (B) How to Make a Lot of Money by Selling TV Commercial
 - (C) Greg Cheney on Television
 - (D) Using Diet Pills to Help People Get Rich Quick
 - (E) Get-Rich-Quick Scams: Get Rich or Get Conned?
42. Why does Cheney sell the websites?
- (A) Cheney wants to help people get rich quick.
 - (B) Cheney is kind enough to help people in need.
 - (C) Cheney just wants to get rich quick. He is doing so well for himself!
 - (D) People enjoy visiting the websites and buying the diet pills.
 - (E) People can make more than \$100 an hour.
43. The word **rip-off** (paragraph 3) means ____.
- (A) cheat, trick or scam (B) money (C) rule (D) the websites (E) the diet pills

Bacterial cells in the body outnumber human cells by a factor of 10 to 1. Yet only recently have researchers begun to elucidate the beneficial roles these microbes play in fostering health.

Some of these bacteria possess genes that encode for beneficial compounds that the body cannot make on its own. Other bacteria seem to train the body not to overreact to outside threats.

Advances in computing and gene sequencing are allowing investigators to create a detailed catalogue of all the bacterial genes that make up this so-called microbiome.

Unfortunately, the inadvertent destruction of beneficial microbes by the use of antibiotics, among other things, may be leading to an increase in autoimmune disorders and obesity.

44. What is the best title for this short essay?
- (A) How Bacteria in Our Bodies Protect Our Health
 - (B) Things that We Don’t Know about Our Bodies
 - (C) How Technology Changes Medical Research
 - (D) Stopping Using Antibiotics
 - (E) The Relationship between Bacteria and the Autoimmune Disorder
45. According to the passage, what beneficial roles do microbes play?
- I. Some bacteria have genes that may help improve human health.
 - II. Some bacteria may help the human body in fighting infections.
 - III. Some bacteria may function to help fight against autoimmune disorder.
- (A) I only (B) III only (C) I and II only (D) II and III only (E) I, II, and III
46. Which of the following does the author **NOT** say?
- (A) Scientists now find out that there are friendly and unfriendly bacteria living inside all of us.
 - (B) Scientists believe they can now decode the mysteries of the bacteria living inside our bodies.
 - (C) Researchers, now gaining a better understanding of bacteria, are starting to sort out who is in charge-microbes or people.
 - (D) The discovery of beneficial bacteria will help scientists end the war against bacteria.
 - (E) A new field of bacteria studies has opened up in recent years.

Research has shown that teacher-student interaction differs according to the gender of the student (the gender of the teacher does not seem to matter), although most teachers are unaware of any inequities. Studies consistently show that boys have more interventions with teachers than do girls. For example, it has been found that teachers are more responsive to the disruptive behavior of boys than girls and more likely to **reprimand** boys. When children request attention, teachers generally respond to boys with instructions and to girls with nurturance. In addition, girls receive more attention when they are physically close to the teacher, whereas boys are given attention at a distance.

It has also been found that the feedback received by boys and by girls on the intellectual quality of their work differs. For

example, boys receive considerable criticism for failing to obey the rules, whereas girls receive criticism related to their performance. Boys attribute their failure to do well to lack of effort, whereas girls attribute it to a lack of ability. Do some girls, then, give up trying to succeed when they reach high school due to the responses their elementary teachers have given them?

It is well established that girls generally perform better academically than boys in elementary school but falter in high school. For example, girls do not do as well as boys in science and math by the time they reach adolescence. In addition, girls typically take fewer advanced math classes than do boys in high school and college. Even though Title IX of the Educational Amendment Act of 1972 obliged schools to provide equal treatment for males and females, schools are still shortchanging girls according to a report by the AAUW. Although more girls are now involved in athletics, the contributions and experiences of females are not as visible as are those of males in textbooks. Furthermore, the pace of change is slow in gender-segregated enrollment patterns in vocational education, with girls primarily enrolled in office and business-training programs, and boys in programs leading to higher-paying trade jobs. Sexuality and the realities of sexual activity (pregnancy, disease, rape) are rarely discussed in schools, although, by law, sexual harassment is defined and consequences delineated.

Teachers must be trained to foster assertive and affiliative skills in both girls and boys. School curricula and textbooks should be monitored for gender stereotypes and provide positive role models for both girls and boys.

47. The main idea of the first paragraph is _____.
(A) boys and girls have different learning styles
(B) teachers are unaware of the differences between how boys and girls learn
(C) teachers work hard to give boys and girls equal treatment
(D) teachers interact differently with boys than with girls
(E) girls usually do better in primary schools, but in high schools their performance falls behind boys'
48. In the first paragraph, the word **reprimand** means _____.
(A) reprove (B) ignore (C) praise (D) stimulate (E) probe
49. According to the passage, when boys do poorly in school, they are likely to claim that the reason is _____.
(A) they got no help from the teacher
(B) they just didn't make an effort
(C) they were spoiled by their parents
(D) they were unable to do the work
(E) they were afraid to ask for directions
50. The main purpose of this passage is to _____.
(A) describe how gender differences relate to teacher-student interaction and student performance
(B) provide advice to teachers about how to guide boys and girls toward greater academic success
(C) persuade teachers to pay more attention to girls
(D) contrast the behavior patterns of boys and girls in school
(E) convince teachers to be more lenient in punishing boys
51. The tone of the last paragraph could be described as _____.
(A) ironic (B) indifferent (C) concerned (D) nostalgic (E) indignant
52. From the passage, you can conclude that the author believes _____.
(A) reprimanding boys in school does not result in much improved behavior
(B) if elementary school teachers treated girls differently, more of them would attempt harder courses in high school
(C) giving more time and attention to elementary school girls would not produce any real changes in their behavior or academic success
(D) Title IX has been successful in bringing about equal treatment of boys and girls in schools
(E) school teachers play a much important role than parents in shaping students' behavior
53. The pattern of organization for the second paragraph is _____.
(A) process (B) summary (C) contrast (D) description (E) argument

At the Massachusetts Institute of Technology, an experimental kitchen of the future is being built. The goal of the research project, called Counter Intelligence, is to design a "smart" kitchen with an **unobtrusive** computer system that forms a network between your kitchen appliances and a constantly updated database of all your food items and supplies. The technology for the project relies on Radio Frequency Identification, or RFID. Like the familiar bar codes seen on many products today, RFID tags are attached to groceries and other kitchen items. The RFID tags send signals via radio waves to a computer. However, unlike the bar codes, which use magnetic strips that must be read individually, RFID sensors can read many RFID tags at once, and from several feet away.

While the "smart" kitchen won't exactly cook dinner for you, it could make the task much easier. First, you will select

the recipe you want to make on a computer screen. Then, using RFID tags attached to food items throughout the room, the computer will tell you the location of each item needed for the recipe. If you have run out of one ingredient, the computer will suggest another ingredient you can use in its place, or suggest other recipes you can prepare with the ingredients you have in your kitchen. Then, using a built-in scale, the computer will measure each ingredient by weight and instruct you step-by-step on how to make the dish. As you are mixing the ingredients, the “smart” kitchen will automatically turn on your oven to the necessary temperature. Finally, the computer will keep track of each item you’ve used, and add it to your next shopping list. In addition, you will be able to get a nutritional report on the meal you’ve most prepared.

54. In line 2, the word **unobtrusive** is closest in meaning to _____.
(A) noticeable (B) luxurious (C) distracting (D) inconspicuous (E) ostentatious
55. Which of the following statements is **TRUE**, according to the reading?
(A) “Smart” kitchen technology has been applied to our everyday life.
(B) The “smart” kitchen computer system exists in a computer sitting on the kitchen counter.
(C) RFID technology uses magnetic strips to identify items in the “smart” kitchen.
(D) RFID tags can help the computer locate ingredients in the kitchen and help you select a recipe.
(E) In the “smart” kitchen, you don’t need to write your own shopping list.
56. What is the main idea of this reading? It explains the _____.
(A) differences and similarities between RFID and traditional bar codes
(B) multiple functions of a futuristic kitchen based on advanced technology
(C) development of Massachusetts Institute of Technology’s project
(D) procedure of preparing housewives’ favorite dishes and their ingredients
(E) possibility of a futuristic kitchen that can fix up meals for human beings
57. Which of the following functions is **NOT** mentioned in the “Smart Kitchen”?
(A) measuring (B) searching (C) recommending (D) teaching (E) cooking

Over the last decade, American men of all backgrounds have begun flocking to fields such as teaching, nursing and waiting tables that have long been the province of women. The trend began well before the crash, and appears to be driven by a variety of factors, including financial concerns, quality-of-life issues and a gradual erosion of gender stereotypes. The shift includes low-wage jobs as well. Nationally, two-thirds more men were bank tellers, almost twice as many were receptionists and two-thirds more were waiting tables in 2010 than a decade earlier.

Even more striking is the type of men who are making the shift. A study shows that from 1970 to 1990, men who took so-called pink-collar jobs tended to be foreign-born, non-English speakers with low education levels. Now the trend has spread among men of nearly all races and ages, more than a third of whom have a college degree. In fact, the shift is most pronounced among young, white, college-educated men.

In interviews, about two dozen men played down the economic considerations, saying that the stigma associated with choosing such jobs had faded, and that the jobs were appealing not just because they offered stable employment, but because they were more satisfying. Several men cited the same reasons for seeking out pink-collar work that have drawn women to such careers: less stress and more time at home.

Labor economists welcome the healthy results of changing gender roles at home, where men are shouldering more of the domestic burden. As attitudes in the family change, attitudes toward the workplace have changed. (Excerpted from the New York Times)

58. According to the passage, which is **NOT** a pink-collar job?
(A) bank teller (B) clinic nurse (C) supervisor (D) receptionist (E) school teacher
59. Which of the following is **NOT** a reason for men to choose a pink-collar’s job?
(A) good pay (B) job satisfaction (C) less stress (D) more quality time (E) stable environment
60. What is the relationship between changing gender roles and attitudes toward workplace according to the last paragraph?
(A) contrasting (B) interacting (C) parallel (D) separate (E) reverse

IV. Essay Writing. Please write in at least 200 words a well-organized essay arguing for or against the claim that “It is easier to maintain good relationships in social networking sites such as Facebook than face-to-face contexts.” 20 points

高雄醫學大學 101 學年度學士後醫學系招生考試試題

科目：普通生物學

考試時間：80 分鐘

說明：一、選擇題用 2B 鉛筆在「答案卡」上作答，修正時應以橡皮擦擦拭，不得使用修正液(帶)，未遵照正確作答方法而致電腦無法判讀者，考生自行負責。
二、試題及答案卡必須繳回，不得攜出試場。

I. 【單選題】1-50 題，每題 1 分，共計 50 分。答錯 1 題倒扣 0.25 分，倒扣至本大題零分為止，未作答，不給分亦不扣分。

1. Most of the neurons in the human brain are _____.
(A) sensory neurons (B) motor neurons (C) interneurons (D) auditory neurons (E) olfactory neurons
2. Contact of a sperm with signal molecules in the coat of an egg causes the sperm to undergo _____.
(A) mitosis (B) depolarization (C) apoptosis (D) vitellogenesis
(E) the acrosomal reaction
3. Only certain cells in the body are target cells for the steroid hormone aldosterone. Which of the following is the best explanation for why these are the only cells that respond to this hormone?
(A) Only target cells are exposed to aldosterone.
(B) Only target cells contain receptors for aldosterone.
(C) Aldosterone is unable to enter nontarget cells.
(D) Nontarget cells destroy aldosterone before it can produce its effect.
(E) Nontarget cells convert aldosterone to a hormone to which they do respond.
4. Which of the following is a local regulator responsible for activating an enzyme that relaxes smooth muscle cells?
(A) nitric oxide (B) prostaglandin F (C) epinephrine (D) A and B (E) A, B, and C
5. If a newborn were accidentally given a drug that destroyed the thymus, what would most likely happen?
(A) His cells would lack class I MHC molecules on their surface.
(B) His humoral immunity would be missing.
(C) Genetic rearrangement of antigen receptors would not occur.
(D) His T cells would not mature and differentiate appropriately.
(E) His B cells would be reduced in number and antibodies would not form.
6. A specialized function shared by the many cells lining the lungs and the lumen of the gut is _____.
(A) decreased oxygen demand due to the lack of oxygen in foods
(B) increased exchange surface provided by their membranes
(C) greater numbers of cell organelles contained within their cytoplasm
(D) greater protection due to increased cellular mass
(E) lowered basal metabolic rate due to cooperation between cells
7. What is proteomics?
(A) the linkage of each gene to a particular protein
(B) the study of the full protein set encoded by a genome
(C) the totality of the functional possibilities of a single protein
(D) the study of how amino acids are ordered in a protein
(E) the study of how a single gene activates many proteins
8. What is the difference between a linkage map and a physical map?
(A) For a linkage map, markers are spaced by recombination frequency, whereas for a physical map they are spaced by numbers of base pairs (bp).
(B) For a physical map, the ATCG order and sequence must be achieved, but not for the linkage map.
(C) For a linkage map, it is shown how each gene is linked to every other gene.
(D) For a physical map, the distances must be calculable in units such as nanometers.
(E) There is no difference between the two except in the type of pictorial representation.
9. What does transformation involve in bacteria?
(A) the creation of a strand of DNA from an RNA molecule
(B) the creation of a strand of RNA from a DNA molecule
(C) the infection of cells by a phage DNA molecule
(D) the type of semiconservative replication shown by DNA
(E) assimilation of external DNA into a cell

10. Males are more often affected by sex-linked traits than females because _____.
 (A) males are hemizygous for the X chromosome
 (B) male hormones such as testosterone often alter the effects of mutations on the X chromosome
 (C) female hormones such as estrogen often compensate for the effects of mutations on the X chromosome
 (D) X chromosomes in males generally have more mutations than X chromosomes in females
 (E) mutations on the Y chromosome often worsen the effects of X-linked mutations
11. Paracrine signaling _____.
 (A) involves secreting cells acting on nearby target cells by discharging a local regulator into the extracellular fluid
 (B) requires nerve cells to release a neurotransmitter into the synapse
 (C) occurs only in paracrine yeast cells
 (D) has been found in plants but not animals
 (E) involves mating factors attaching to target cells and causing production of new paracrine cells
12. Which of the following provides the best evidence of a biodiversity crisis?
 (A) the incursion of a non-native species. (B) increasing pollution levels.
 (C) decrease in regional productivity. (D) high rate of extinction. (E) climate change.
13. Which of the following is most likely to contribute to density-dependent regulation of populations?
 (A) the removal of toxic waste by decomposers (B) intraspecific competition for nutrients
 (C) earthquakes (D) floods (E) fires
14. Which of the following statements about the ocean pelagic biome is true?
 (A) The ocean is a vast, deep storehouse that always provides sustenance; it is the next "frontier" for feeding humanity.
 (B) Because it is so immense, the pelagic ocean biome is globally uniform.
 (C) Globally, more photosynthesis occurs in the ocean neritic biome than in the pelagic biome.
 (D) Pelagic ocean photosynthetic activity is disproportionately low in relation to the size of the biome.
 (E) The most abundant animals are vertebrate fishes.
15. A salmon returns to its home stream to spawn. What term best applies to this behavior?
 (A) sign stimulus (B) cognition (C) imprinting (D) classical conditioning
 (E) operant conditioning
16. Skeletal muscle contraction begins when calcium ions bind to _____.
 (A) energized cross-bridges (B) myosin (C) actin (D) tropomyosin
 (E) troponin
17. Short-term memory information processing usually causes changes in the _____.
 (A) brainstem (B) medulla (C) hypothalamus (D) hippocampus (E) cranial nerves
18. The blood-brain barrier _____.
 (A) is formed by tight junctions (B) is formed by oligodendrocytes
 (C) tightly regulates the intracellular environment of the CNS
 (D) uses chemical signals to communicate with the spinal cord
 (E) provides support to the brain tissue
19. An inhibitory postsynaptic potential (IPSP) occurs in a membrane made more permeable to _____.
 (A) potassium ions (B) sodium ions (C) calcium ions (D) ATP
 (E) all neurotransmitter molecules
20. From earliest to latest, the overall sequence of early development proceeds in which of the following sequences?
 (A) gastrulation → organogenesis → cleavage (B) ovulation → gastrulation → fertilization
 (C) cleavage → gastrulation → organogenesis (D) gastrulation → blastulation → neurulation
 (E) preformation → morphogenesis → neurulation
21. In humans, the follicular cells that remain behind in the ovary following ovulation become _____.
 (A) the ovarian endometrium that is shed at the time of the menses
 (B) a steroid-hormone synthesizing structure called the corpus luteum
 (C) the thickened portion of the uterine wall
 (D) swept into the fallopian tube
 (E) the placenta, which secretes cervical mucus
22. Oxytocin and antidiuretic hormone are synthesized in the _____.
 (A) hypothalamus (B) adenohypophysis (C) anterior pituitary (D) adrenal cortex (E) posterior pituitary
23. The cell-mediated immunity that destroys virally infected cells involves _____.
 (A) cytotoxic T cells (B) natural killer cells (C) helper T cells (D) macrophages (E) B cells

24. The Bohr shift on the oxygen-hemoglobin dissociation curve is produced by changes in _____.
 (A) the partial pressure of oxygen (B) the partial pressure of carbon monoxide
 (C) hemoglobin concentration (D) temperature (E) pH
25. Hypoglycemia, or low levels of glucose in the blood of a healthy human, is "corrected" by a(n) _____.
 (A) increase in the secretion of insulin
 (B) increase in the secretion of glucagon
 (C) increase in the secretion of both insulin and glucagon
 (D) decrease in the secretion of both insulin and glucagon
 (E) increase in the secretion of thyroid hormones
26. Standard metabolic rate (SMR) and basal metabolic rate (BMR) are _____.
 (A) used differently: SMR is measured during exercise, whereas BMR is measured at rest
 (B) used to compare metabolic rate between hibernating and nonhibernating states
 (C) both measured across a wide range of temperatures for a given species
 (D) both standard measurements of fat metabolism in mammals
 (E) both measured in animals in a resting and fasting state
27. The transduction pathway that activates systemic acquired resistance in plants is initially signaled by _____.
 (A) antisense RNA (B) Pfr phytochrome (C) salicylic acid (D) abscisic acid
 (E) red, but not far-red, light
28. The asexual production of seeds from a diploid cell, allow hybrid plants to pass on their desirable genomes intact to their offspring is called _____.
 (A) apomixis (B) dioecious (C) etiolation (D) phyllotaxy (E) statoliths
29. A flowering plant with a deleterious mutation in microsporogenesis would most likely _____.
 (A) fail to produce sepals (B) fail to produce petals
 (C) fail to produce anthers (D) fail to produce pollen
 (E) fail to produce ovules
30. In which vertebrates is fertilization exclusively internal?
 (A) chondrichthyans, osteichthyans, and mammals
 (B) amphibians, mammals, and reptiles
 (C) chondrichthyans, osteichthyans, and reptiles
 (D) reptiles and mammals
 (E) reptiles and amphibians
31. The term *homoplasy* is most applicable to which of the following features?
 (A) the legless condition found in various lineages of extant lizards
 (B) the five-digit condition of human hands and bat wings
 (C) the β hemoglobin genes of mice and of humans
 (D) the fur that covers Australian moles and North American moles
 (E) the bones of bat forelimbs and the bones of bird forelimbs
32. Telomerase is an enzyme can solve the problem of replication at the ends of linear chromosomes. How does it work?
 (A) Repetitive sections of DNA can range from a single nucleotide to hundreds of nucleotides. Three nucleotides of smaller is a microsatellite.
 (B) It adds 5' cap and 3' polyA on chromosome that resists degradation by nucleases.
 (C) It works like regular DNA polymerase (3'-5') except does not need DNA template strand to direct synthesis. Uses intrinsic RNA strand to synthesize GGGTTA sequence.
 (D) It causes specific double-strand DNA breaks and rejoins the blunt ends on both strands.
 (E) It adds numerous methylated GC pairs which resist hydrolysis and maintain chromosome integrity.
33. Taxol is an anticancer drug extracted from the bark of the Pacific yew tree. It disrupts microtubule formation by binding to microtubules and accelerating their assembly from tubulin. Taxol must affect _____.
 (A) the formation of the chromatid assembly (B) the anaphase of the cell cycle
 (C) the formation of the centrioles (D) the S phase of the cell cycle
 (E) the formation of the mitotic spindle
34. Which of the following statements about plant hormones differing from hormones in animals is correct?
 (A) Plant hormones are synthesized from two or more different molecules.
 (B) Animal hormones are primarily for mating and embryonic development.
 (C) Plant hormones interact primarily with intracellular receptors.
 (D) Animal hormones are found in much greater concentration.
 (E) Plant hormones may travel in air or through vascular systems.

35. Which of the following statements about photosynthesis is correct?
 (A) The splitting of water yields molecular carbon dioxide as a by-product.
 (B) The electron vacancies in P680⁺ are filled by electrons derived from water.
 (C) The ATP required for the Calvin cycle comes from reactions initiated in photosystem I.
 (D) Photosystem I passes electrons to the thylakoid membrane electron transport chain.
 (E) Cyclic electron flow also supplements the supply of ATP and NADPH.
36. Which of the following techniques uses the amino acid sequences of polypeptides to predict a protein's three-dimensional structure?
 (A) X-ray crystallography (B) two-dimensional electrophoresis
 (C) bioinformatics (D) gas chromatography mass spectrometry
 (E) NMR spectroscopy
37. Which one is the correct description of community ecology?
 (A) Testing both biotic and abiotic factors.
 (B) The study of interactions between organisms and their environment.
 (C) All members of a species in same habitat.
 (D) The study of how behavior contributes to the differential survival and reproduction of organisms.
 (E) Patterns of species change and succession.
38. In muscular-skeletal systems, which one is the correct description?
 (A) Arthropod exoskeletons are composed primarily of calcium carbonate.
 (B) A skeleton that relies on muscular force exerted against water is termed an endoskeleton.
 (C) Skeletal muscles are striated, voluntary, and have unbranched fibers.
 (D) Each skeletal muscle cell constitutes a single motor unit.
 (E) The thick filament is composed almost entirely of actin molecules.
39. In fungi, which one is the correct description?
 (A) Wildlife benefit from endophytes because the endophytes cause more luxuriant plant growth.
 (B) All materials passing from one hyphal cell to another must diffuse across the septal wall.
 (C) Lichens are monophyletic.
 (D) Many kinds of ascomycetes and basidiomycetes have lost the ability to reproduce sexually.
 (E) Conidia are sexual spores produced by mushrooms.
40. In Taiwan, farmers harvest banana when the fruit is green. Then, it is shipped to other countries. Before marketing, with what kind of plant hormone is the fruit treated?
 (A) Abscisic acid (B) Ethylene (C) Auxins (D) Gibberellins (E) Cytokinins
41. In octopus, what kind of respiratory pigment can be found?
 (A) Hemocyanin (B) Hemoglobin (C) Hemophilia (D) Hemochromatosis (E) Ferritin
42. Why does the S-type strain of *Streptococcus pneumoniae* cause pneumonia?
 (A) Unable to defend the immune system
 (B) Surrounded by a polysaccharide capsule
 (C) Able to grow and move
 (D) Inactivated by the immune system
 (E) Unable to form colony
43. In monohybrid crosses, the phenotype ratio 1:2:1 indicates _____.
 (A) linkage disequilibrium (B) pleiotropy (C) incomplete dominance
 (D) three alleles for each trait (E) epistatic effect
44. In *E. coli* mating system, Hfr type could be a genetic donor and F⁻ could be a genetic recipient. After the mating between Hfr and F⁻ type cells, the F⁻ recipient _____.
 (A) becomes Hfr (B) becomes H⁺ (C) becomes F⁻ (D) gets episome (E) remains F⁻
45. In the lactose operon of *E. coli*, which one is the description of the product of the *lacI* gene?
 (A) Transcriptional activator protein (B) β-Galactosidase (C) Induces lac operon transcription
 (D) Binds to the RNA polymerase (E) Binds to the operator
46. In DNA cloning experiments, which vectors can be keeping the largest DNA fragments?
 (A) Plasmid (B) Bacteriophage lambda (C) Ti plasmid
 (D) YACs (E) Cosmids
47. The mountain area of the Central Taiwan was deforested by the 921 earthquake in 2000 and has been recovered today. It is an example of _____.
 (A) secondary succession (B) primary succession (C) climax succession
 (D) arrival and speciation (E) seral accumulation

48. In human endocrine systems, which one is **NOT** correct description?
 (A) Metamorphosis in flatfishes and in amphibians is controlled by growth hormone.
 (B) Vitamin D is a hormone produced in part by exposure to sunlight.
 (C) If blood sodium levels rise sharply above normal limits the heart will release more atrial natriuretic peptide.
 (D) Insulin's effects on reducing blood glucose levels are counteracted by glucagon's actions, which increase blood glucose.
 (E) It would be reasonable to assume that environmental cues such as photoperiod and temperature might regulate animal reproduction.
49. In flowering plant, which one of the following is true characteristic of the gametophyte stage?
 (A) It is the obvious stage such as an oak tree. (B) Megasporangium (C) Seed embryo (D) Gamete producing
 (E) Diploid
50. In eukaryotes there are several different types of RNA polymerase. Which type is involved in transcription of mRNA for a globin protein?
 (A) ligase (B) RNA polymerase I
 (C) RNA polymerase II (D) RNA polymerase III (E) primase

II. 【單選題】 51-75 題，每題 2 分，共計 50 分。答錯 1 題倒扣 0.5 分，倒扣至本大題零分為止，未作答，不給分亦不扣分。

51. In many ways, the regulation of the genes of a particular group of viruses will be similar to the regulation of the host genes. Therefore, which of the following would you expect of the genes of the bacteriophage?
 (A) regulation via acetylation of histones (B) positive control mechanisms rather than negative
 (C) control of more than one gene in an operon (D) reliance on transcription activators
 (E) utilization of eukaryotic polymerases
52. A researcher found a method she could use to manipulate and quantify phosphorylation and methylation in embryonic cells in culture. One of her colleagues suggested she try increased methylation of C nucleotides in a mammalian system. Which of the following results would she most likely see?
 (A) increased chromatin condensation (B) decreased chromatin concentration
 (C) abnormalities of mouse embryos (D) decreased binding of transcription factors
 (E) inactivation of the selected genes
53. During splicing, which molecular component of the spliceosome catalyzes the excision reaction?
 (A) protein (B) DNA (C) RNA (D) lipid (E) sugar
54. A cross between homozygous purple-flowered and homozygous white-flowered pea plants results in offspring with purple flowers. This demonstrates _____.
 (A) the blending model of genetics (B) true-breeding (C) dominance (D) a dihybrid cross
 (E) the mistakes made by Mendel
55. If cells in the process of dividing are subjected to colchicine, a drug that interferes with the functioning of the spindle apparatus, at which stage will mitosis be arrested?
 (A) anaphase (B) prophase (C) telophase (D) metaphase (E) interphase
56. Testosterone functions inside a cell by _____.
 (A) acting as a signal receptor that activates ion-channel proteins
 (B) binding with a receptor protein that enters the nucleus and activates specific genes
 (C) acting as a steroid signal receptor that activates ion-channel proteins
 (D) becoming a second messenger that inhibits adenylyl cyclase
 (E) coordinating a phosphorylation cascade that increases glycogen metabolism
57. Tay-Sachs disease is a human genetic abnormality that results in cells accumulating and becoming clogged with very large and complex lipids. Which cellular organelle must be involved in this condition?
 (A) the endoplasmic reticulum (B) the Golgi apparatus (C) the lysosome
 (D) mitochondria (E) membrane-bound ribosomes
58. Which of the following is an example of Batesian mimicry?
 (A) an insect that resembles a twig
 (B) a butterfly that resembles a leaf
 (C) a nonvenomous snake that looks like a venomous snake
 (D) a fawn with fur coloring that camouflages it in the forest environment
 (E) a snapping turtle that uses its tongue to mimic a worm, thus attracting fish

59. A patient who has a parasitic worm infection and another patient responding to an allergen such as ragweed pollen have which of the following in common?
- (A) an increase in cytotoxic T cell number
 - (B) suffering from anaphylactic shock
 - (C) risking development of an autoimmune disease
 - (D) suffering from a decreased level of innate immunity
 - (E) an increase in the levels of IgE
60. Endothermy is _____.
- (A) a characteristic of most animals found in tropical zones
 - (B) a characteristic of animals that have a fairly constant body temperature
 - (C) a term equivalent to cold-blooded
 - (D) a characteristic of mammals but not of birds
 - (E) seen only in insects and in certain predatory fishes
61. In a Hardy-Weinberg population with two alleles, A and a , that are in equilibrium, the frequency of the allele a is 0.3. What is the percentage of the population that is homozygous for this allele?
- (A) 0.09
 - (B) 0.49
 - (C) 0.9
 - (D) 9.0
 - (E) 49.0
62. By karyotype analysis, a woman is found to have 47 chromosomes, including one extra X chromosome. What kind of phenotype for her is expected?
- (A) normal female
 - (B) sterile female
 - (C) enlarged genital structures
 - (D) albino
 - (E) color blindness
63. Which one of following statements is **FALSE**?
- (A) In a species that has a chromosome number of $2n = 16$, each cell has eight homologous pairs.
 - (B) An error in either egg or sperm meiotic anaphase might result in a human zygote with 45 chromosomes.
 - (C) Single, haploid (n) sets of chromosomes in ovum and sperm unite during fertilization, forming a diploid ($2n$), single-celled zygote.
 - (D) At sexual maturity, ovaries and testes produce diploid gametes by meiosis.
 - (E) If a cell of a usually diploid species with 42 chromosomes per cell is triploid, this cell would be expected to have 63 chromosomes in 21 sets of 3.
64. Which of the following structures is primarily involved in the detoxification of many poisons and drugs in liver and therefore abundant in liver cells?
- (A) Golgi apparatus
 - (B) smooth ER
 - (C) chemical
 - (D) rough ER
 - (E) transport vesicles
65. In systematics and phylogeny, which one is the correct description?
- (A) A phylogenetic tree is actually a theory that depicts the evolutionary relationships among species.
 - (B) A paraphyletic group contains groups of species with different common ancestors.
 - (C) Morphology is a term that refers to similarities among various species that occur because the species are derived from a common ancestor.
 - (D) Where a branching point in a phylogenetic tree is called a clade.
 - (E) A phylogenetic tree is then being used as a cladogram.
66. In animal circulatory systems, which one is the correct description?
- (A) Hemophilia results from a deficiency in platelets.
 - (B) The meshwork that forms the fabric of a blood clot mostly consists of fibrinogen.
 - (C) Reduced levels of hemoglobin in the blood result in the condition of anemia.
 - (D) During cellular maturation, mammalian erythrocytes lose their plasma membrane.
 - (E) The primary function served by erythrocytes is defense against pathogens.
67. In animal digestion and absorption, which one is the correct description?
- (A) The small intestine releases the hormone secretin in response to acid.
 - (B) Fats packaged in chylomicrons pass directly from epithelial cells to the bloodstream.
 - (C) In the stomach, proteins are cleaved into amino acids by aminopeptidases.
 - (D) All sugars are absorbed via secondary active transport.
 - (E) In omnivores, including humans, the cecum is an important organ for digestion of cellulose.
68. In the cells of the nervous system, which one is the correct description?
- (A) Ionotropic receptors act by activating G proteins in target cells.
 - (B) Metabotropic receptors act by initiating changes in second messenger systems in target cells.
 - (C) Action potentials are typically also graded potentials.
 - (D) Electrical synapses transmit signals using neurotransmitters.
 - (E) Most of the cells in your brain are neurons.

69. Which one is the correct description of the invertebrates?
- (A) The two body forms of some *Radiata* is an example of alternation of generations.
 - (B) The nervous system of a cnidarian consists of a central ganglion leading into a nerve net.
 - (C) Scorpions do not lay eggs but rather give birth to live young.
 - (D) All Platyhelminthes are parasitic.
 - (E) Millipedes have a thousand legs whereas centipedes have only a hundred legs.
70. Between two genes in same chromosome, recombination frequency is 0.025. What is the distance between two genes on the linkage map?
- (A) 0.025 cM
 - (B) 0.25 cM
 - (C) 1.25 cM
 - (D) 2.50 cM
 - (E) 5.00 cM
71. Which one is the correct description of salt and water balance in animal?
- (A) Sodium and potassium ions can easily diffuse through the lipid bilayer of plasma membranes.
 - (B) Sweat has a higher salt concentration than the blood does in humans.
 - (C) Animals that do not control internal water concentration also typically do not control the concentrations of ions like sodium and potassium.
 - (D) Transport of salts against their concentration gradients is energetically expensive.
 - (E) The filtrate that leaves the proximal convoluted tubule is much more concentrated than the blood in humans.
72. In species interaction, which one is the correct description of allelopathy?
- (A) Amensalism
 - (B) The secretion of toxins into the environment by plant roots or leaves
 - (C) Commensalism
 - (D) Mutualism
 - (E) The movement of genes from one species to another
73. In biodiversity, which one is the correct description of ecosystem diversity?
- (A) The amount of genetic variation that occurs within and between populations.
 - (B) Only the amount of genetic variation that occurs between species.
 - (C) Includes trophic diversity and process diversity.
 - (D) Defines the species diversity and morphology of an ecosystem.
 - (E) Refers to the structure and function within an ecosystem.
74. In the cross $Aa Bb CC Dd Ee \times Aa Bb Cc Dd EE$, in which all genes undergo independent assortment, what proportion of offspring are expected to be homozygous dominant for all five genes?
- (A) $(1/4)$
 - (B) $(1/4)^2$
 - (C) $(1/4)^3$
 - (D) $(1/4)^4$
 - (E) 0
75. In gymnosperms and angiosperms, which one is the correct description?
- (A) All gymnosperms are wind-pollinated.
 - (B) The fossil record shows that angiosperms evolved directly from the Gnetophytes.
 - (C) Horizontal gene transfer is restricted to prokaryotes and protists.
 - (D) The fossil record shows that pollen cones of conifers have become increasingly complex through their evolutionary history.
 - (E) Stamens and carpals are, in fact, modified sporangia-bearing leaves.

高雄醫學大學 101 學年度學士後醫學系招生考試試題

科目:有機化學

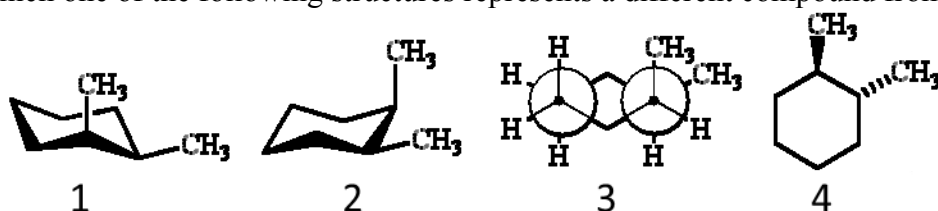
考試時間: 80 分鐘

說明:一、選擇題用 2B 鉛筆在「答案卡」上作答,修正時應以橡皮擦擦拭,不得使用修正液(帶),未遵照正確作答方法而致電腦無法判讀者,考生自行負責。
二、試題及答案卡必須繳回,不得攜出試場。

I. Choose one correct answer for the following questions

【單選題】每題 1 分,共計 60 分,答錯 1 題倒扣 0.25 分,倒扣至本大題零分為止,未作答,不給分亦不扣分。

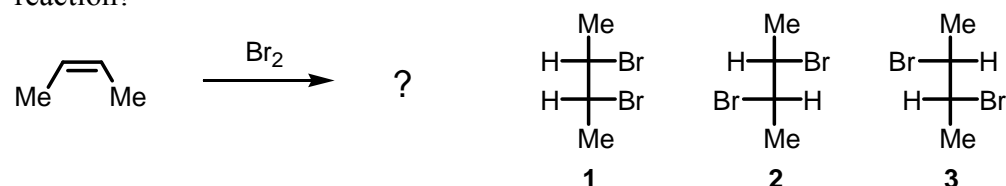
- According to atomic theory:
 - The nucleus is positively charged
 - The nucleus contains both charged and uncharged particles
 - The electrons contribute very little to the total mass of the atom
 - The electrons are located in the atomic space outside the nucleus
 - All of the above.
- A coenzyme frequently encountered in transamination reactions is
 - Tetrahydrofolate
 - Pyridoxal phosphate
 - Thiamine pyrophosphate
 - Biotin
 - NADH
- Which one of the following structures represents a different compound from the other three?



- 1
 - 2
 - 3
 - 4
 - All of the above are the same.
- Which of the standard amino acids is achiral?
 - Lysine
 - Proline
 - Valine
 - Alanine
 - Glycine
 - Which of the following Newman projections does **not** represent 2-methylhexane?
 -
 -
 -
 -

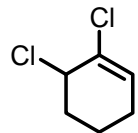
(A) 1 (B) 2 (C) 3 (D) 4 (E) both 2 and 3

- 2,3-Dibromobutane can exist three stereoisomers as shown below. What stereoisomers would be formed by the following reaction?

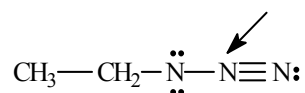


- 1 only
 - 2 only
 - 3 only
 - 1 and 2
 - 2 and 3
- In the following structures, the protons pointed by arrow (on C2) which belong to diastereotopic hydrogens.
 -
 -
 -
 -
 - None of the above.

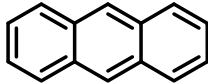
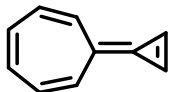
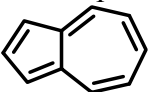
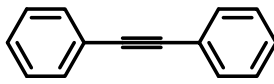
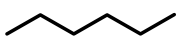
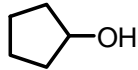

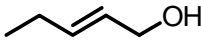
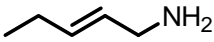
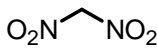
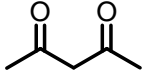
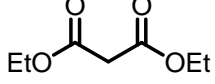
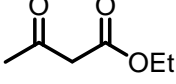
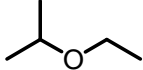
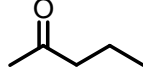
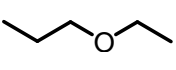
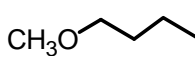
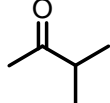
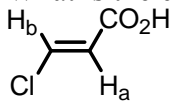
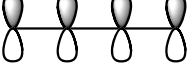
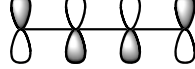
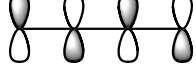
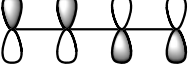
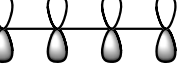

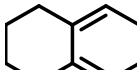

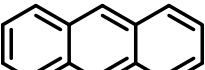
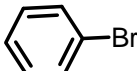
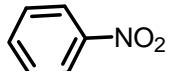
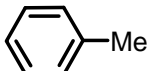

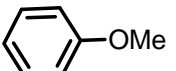
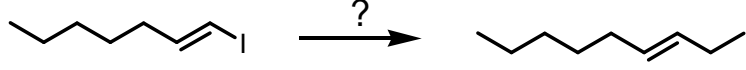



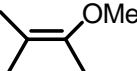
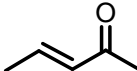


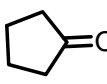
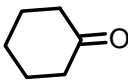
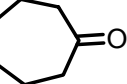
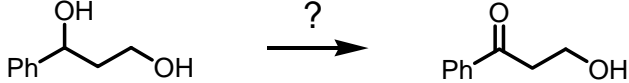
- What is the **correct** IUPAC systematic name for the following compound?



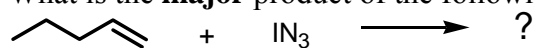
- 1,2-Dichlorocyclohexene
 - 2,3-Dichlorocyclohexene
 - 1,6-Dichlorocyclohexene
 - 1,2-Dichloro-2-cyclohexene
 - None of the above.
- What is the formal charge on the nitrogen atom indicated with the arrow in the following compound?



- 0
 - 1
 - +1
 - 2
 - +2
- Which of the following nucleophiles reacts with MeI in greatest rate in an aqueous solution?
 - MeO[⊖]
 - MeOH
 - HO[⊖]
 - CH₃CO₂[⊖]
 - MeS[⊖]

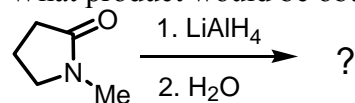
11. Which of the following compounds would have a greater dipole moment than you expect?
 (A)  (B)  (C)  (D)  (E) None of the above.
12. Compound **A**: $M^+ = 86$, IR absorption: 3400 cm^{-1} , ^{13}C NMR spectral data: Broadband-decoupled ^{13}C NMR: δ 30.2, 31.9, 61.8, 114.7, 138.4, DEPT-90: δ 138.4; DEPT-135: δ 138.4, negative peaks at δ 30.2, 31.9, 61.8, 114.7. What is the structure of compound **A**?
 (A)  (B)  (C)  (D)  (E) 
13. In the following, which one is the **most** acidic compound?
 (1)  (2)  (3)  (4)
 (A) 1 (B) 2 (C) 3 (D) 4 (E) 2 = 3
14. Compound **I** has a molecular formula $\text{C}_5\text{H}_{10}\text{O}$, and ^1H -NMR data shown below: δ 0.95 (d, $J = 7\text{ Hz}$, 6H), 2.10 (s, 3H), 2.43 (m, 1H). What structure fits compound **I**?
 (A)  (B)  (C)  (D)  (E) 
15. What is the coupling constant for the H_a and H_b protons in the ^1H NMR spectra of the following compound?

 (A) 0 Hz (B) 3 Hz (C) 7 Hz (D) 10 Hz (E) 15 Hz
16. Which of the following orbital represents the HOMO of 1,3-butadiene in ground state?
 (A)  (B)  (C)  (D)  (E) 
17. Which of the following dienes would **not** react with a dienophile in a Diels-Alder reaction?
 (A)  (B)  (C)  (D)  (E) None of the above.
18. Arrange the following compounds in order of increasing reactivity to electrophilic aromatic substitution reaction.
 (1)  (2)  (3)  (4)  (5)
 (A) 2 < 3 < 4 < 1 < 5 (B) 1 < 2 < 4 < 3 < 5 (C) 2 < 4 < 1 < 3 < 5 (D) 2 < 1 < 4 < 3 < 5 (E) 2 < 4 < 1 < 5 < 3
19. Which of the following reactions could **not** produce the desired product?
 (A) $\text{CH}_3\text{CH}_2\text{CH}=\text{CH}_2 + \text{HBr} \longrightarrow \text{CH}_3\text{CH}_2\overset{\text{Br}}{\underset{\text{Cl}}{\text{C}}}\text{HCH}_3$ (B) $\text{CH}_3\text{CH}_2\text{CH}=\text{CH}_2 + \text{HBr} \xrightarrow{\text{ROOR}} \text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{Br}$
 (C) $\text{CH}_3\text{CH}_2\text{CH}=\text{CH}_2 + \text{HCl} \longrightarrow \text{CH}_3\text{CH}_2\overset{\text{Cl}}{\underset{\text{Br}}{\text{C}}}\text{HCH}_3$ (D) $\text{CH}_3\text{CH}_2\text{CH}=\text{CH}_2 + \text{HCl} \xrightarrow{\text{ROOR}} \text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{Cl}$
 (E) None of the above.
20. Select the **most** reasonable formula for the compounds with the following mass spectral data: M^+ at m/z 101 with a minor $M+1$ peak.
 (A) $\text{C}_5\text{H}_9\text{Cl}$ (B) $\text{C}_5\text{H}_{12}\text{N}_2$ (C) $\text{C}_6\text{H}_{15}\text{N}$ (D) $\text{C}_9\text{H}_{12}\text{O}$ (E) $\text{C}_6\text{H}_9\text{S}$
21. What reagent should be used for the following reaction?

 (A) $\text{CH}_3\text{CH}_2\text{MgBr}$ (B) $\text{CH}_3\text{CH}_2\text{Li}$ (C) $(\text{CH}_3\text{CH}_2)_2\text{Zn}$ (D) $\text{CH}_3\text{CH}_2\text{B}(\text{OH})_2$ (E) $(\text{CH}_3\text{CH}_2)_2\text{CuLi}$
22. Which of the following alkenes is **most** reactive toward ozonolysis?
 (A)  (B)  (C)  (D)  (E) 
23. Which of the following ketones show **strong** characteristic band at 1815 cm^{-1} ?
 (A)  (B)  (C)  (D)  (E) 
24. In aromatic nitration reactions, nitric acid (HNO_3) is used in conjunction with the stronger acid, sulfuric acid, H_2SO_4 , to form an intermediate. Which of the following could be the formula for this intermediate?
 (A) NO_3^- (B) H_3SO_4^+ (C) H_2NO_3^+ (D) HNO_2 (E) NO
25. What is the **best** reagent for the following reaction?

 (A) PCC (B) $\text{Na}_2\text{Cr}_2\text{O}_7, \text{H}_2\text{SO}_4$ (C) DMSO, $(\text{COCl})_2$ then Et_3N (D) MnO_2 (E) H_2CrO_4

26. What is the **major** product of the following reaction?



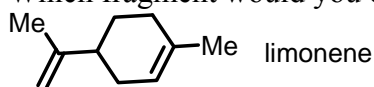
- (A) CCCC(I)C[N+]=[N-] (B) CCCC(I)C[N-]=[N+] (C) CCCC(I)C[N-]=[N+] (D) CCCC(I)C[N+]=[N-] (E) None of the above.

27. What product would be obtained by the following reaction?



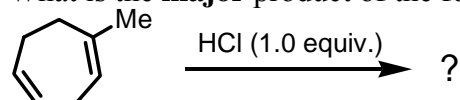
- (A) CN1CCCC1 (B) CCCCN (C) CCCCO (D) CCCC(=O)N (E) None of the above.

28. Which fragment would you expect to be the base peak in the mass spectrum of limonene?



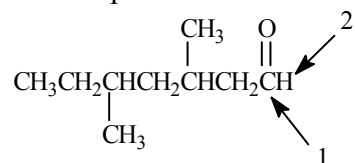
- (A) $m/z = 136$ (B) $m/z = 121$ (C) $m/z = 93$ (D) $m/z = 68$ (E) $m/z = 49$

29. What is the **major** product of the following reaction?



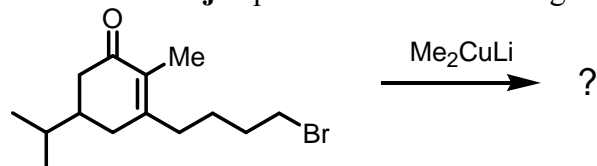
- (A) CC1(Cl)C=CC=CC1 (B) CC1=CC(Cl)C=CC1 (C) CC1=CC=CC(Cl)C1 (D) CC1=CC=CC(Cl)C1 (E) CC1(Cl)C2C=CC2C1

30. Which of the following would correctly describe the respective ^{13}C NMR and 1H NMR spectra for the indicated atoms for the compound shown below?



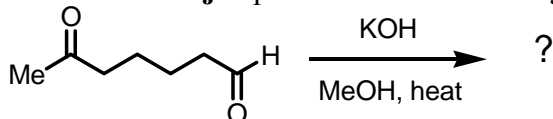
- (A) Atom 1 would produce a peak at 205 ppm and atom 2 would appear as doublet
 (B) Atom 1 would produce a peak at 175 ppm and atom 2 would appear as a singlet
 (C) Atom 1 would produce a peak at 205 ppm and atom 2 would appear as a triplet
 (D) Atom 1 would produce a peak at 175 ppm and atom 2 would appear as a triplet
 (E) Atom 1 would produce a peak at 175 ppm and atom 2 would appear as a doublet

31. What is the **major** product of the following reaction?



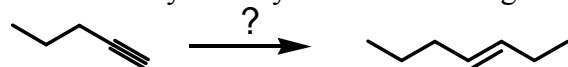
- (A) CC(C)C1=CC(=O)C(C)C1(C)CCCC (B) CC(C)C1=CC(=O)C(C)C1CCCCC (C) CC(C)C1=CC(=O)C(C)C1CCCCC (D) CC(C)C1=CC(=O)C(C)C1(C)CCCC (E) CC(C)C1=CC(=O)C(C)C1(C)CCCC

32. What is the **major** product of the following reaction?



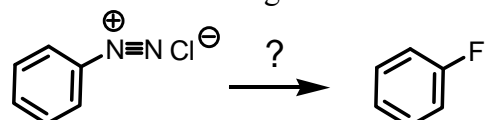
- (A) CC(=O)C1=CC=CC1 (B) CC(=O)C1=CC=C1 (C) CC(=O)C1=CC=C1 (D) CC(=O)C1=CC=CC1 (E) None of the above.

33. How would you carry out the following transformation?



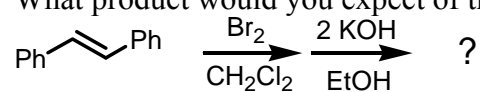
- (A) 1. (a) NaOH, (b) CH3CH2Br; 2. Na, NH3(l) (B) 1. Na, NH3(l); 2. (a) CH3MgBr, (b) CH3CH2Br
 (C) 1. (a) NaNH2, (b) CH3CH2Br; 2. H2, Lindlar's catalyst (D) 1. (a) NaNH2, (b) CH3CH2Br; 2. Na, NH3(l)
 (E) 1. (a) BuLi, (b) CH3CH2Br; 2. H2, Lindlar's catalyst

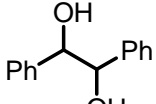
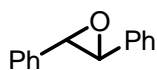
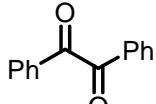
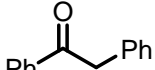
34. What is the **best** reagent for the following transformation?



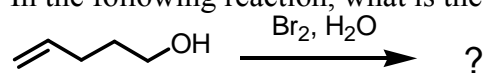
- (A) HF (B) CuF (C) HBF₄ (D) Bu₄NF (E) F₂

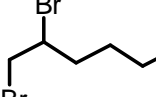
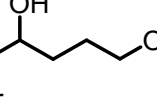
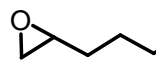
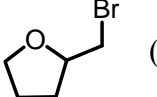
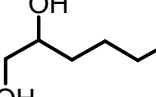
35. What product would you expect of the following transformation?



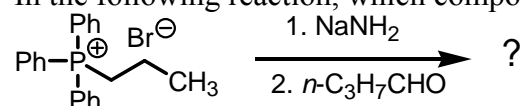
- (A)  (B)  (C) $\text{Ph}-\text{C}\equiv\text{C}-\text{Ph}$ (D)  (E) 

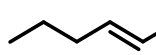
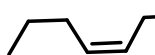
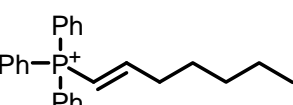
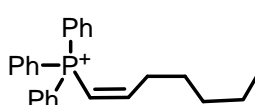
36. In the following reaction, what is the **major** product?



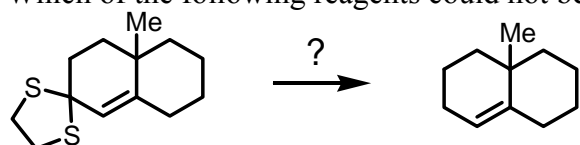
- (A)  (B)  (C)  (D)  (E) 

37. In the following reaction, which compound is the **major** product?



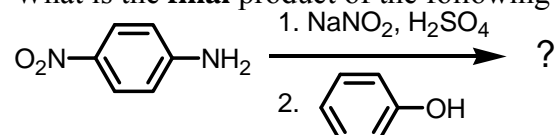
- (A) No reaction (B)  (C)  (D)  (E) 

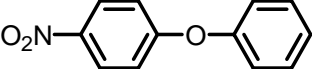
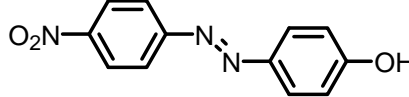
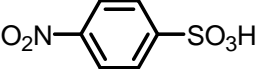
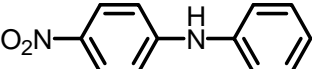
38. Which of the following reagents could not be applied to the following transformation?



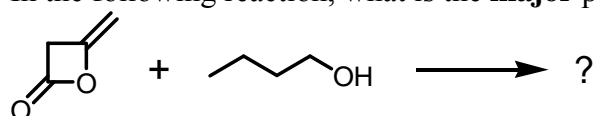
- (A) $\text{HgCl}_2, \text{CaCO}_3, \text{acetone}$ (B) $\text{NiCl}_2, \text{NaBH}_4, \text{DMF}$ (C) Raney-Ni, EtOH
(D) $n\text{-Bu}_3\text{SnH}, \text{AIBN}, \text{benzene}$ (E) All of the above work well.

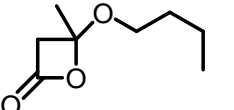
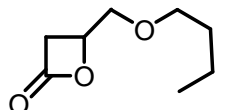
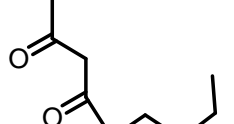
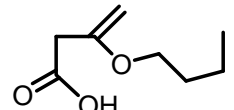
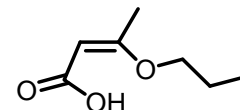
39. What is the **final** product of the following reaction?



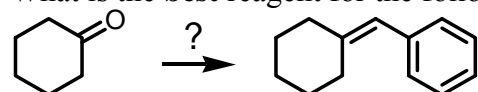
- (A)  (B)  (C) 
(D)  (E) None of the above.

40. In the following reaction, what is the **major** product?



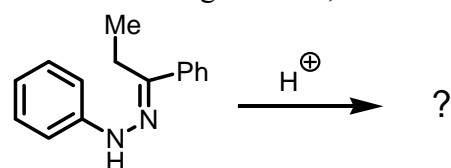
- (A)  (B)  (C)  (D)  (E) 

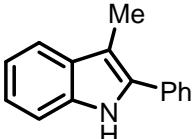
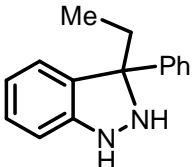
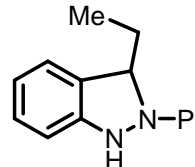
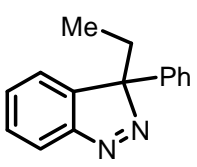
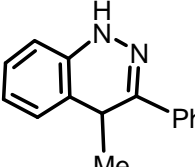
41. What is the **best** reagent for the following transformation?



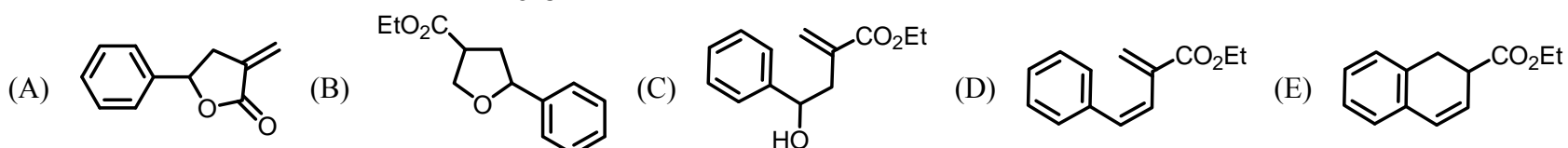
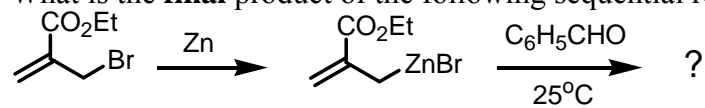
- (A) 1. PhMgBr , ether 2. H_3O^+ (B) PhCH_2MgBr , ether 2. H_3O^+ (C) $\text{Ph}_3\text{P}=\text{CHPh}$, THF
(D) $(\text{PhCH}_2)_2\text{CuLi}$ (E) All of the above work well.

42. In the following reaction, which compound is the **major** product?

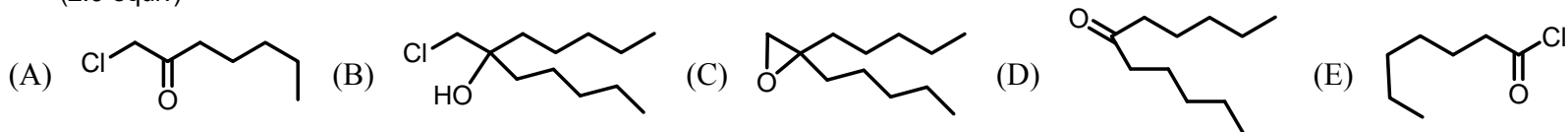
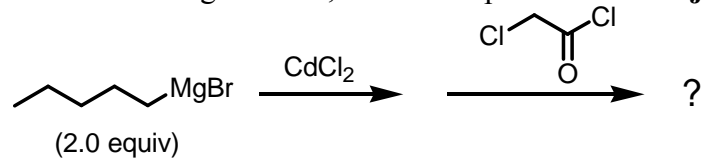


- (A)  (B)  (C)  (D)  (E) 

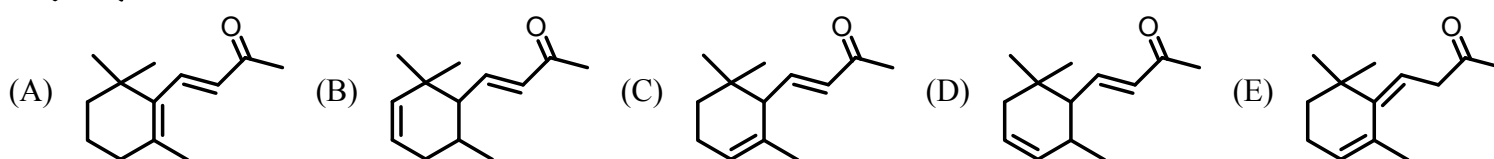
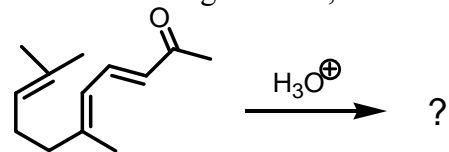
43. What is the **final** product of the following sequential reactions?



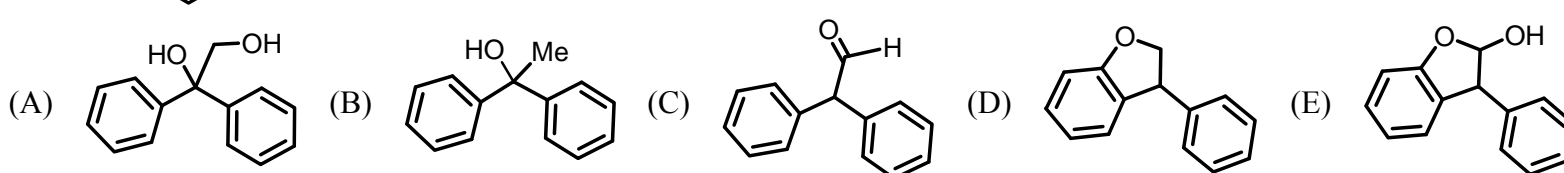
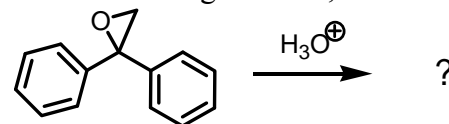
44. In the following reaction, which compound is the **major** product?



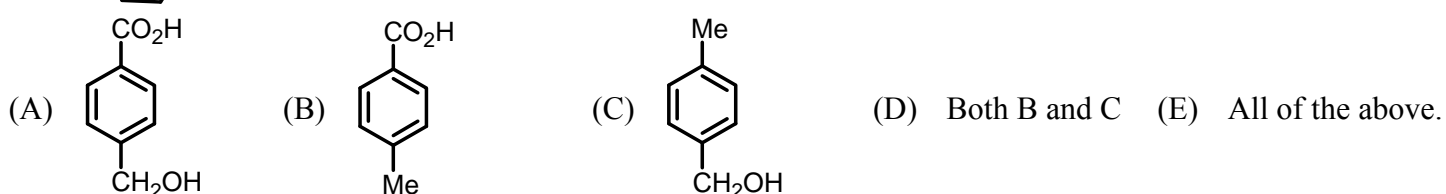
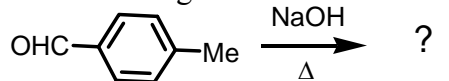
45. In the following reaction, what is the **major** product?



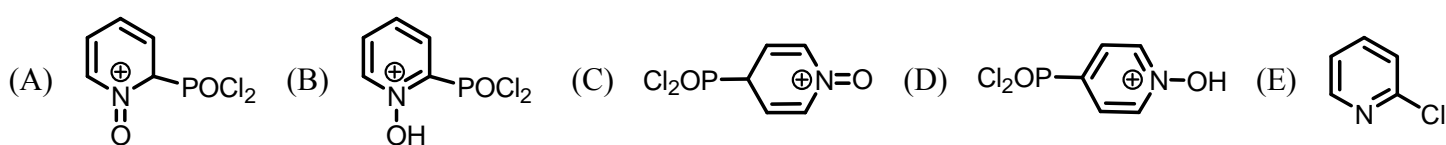
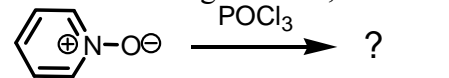
46. In the following reaction, which compound is the **major** product?



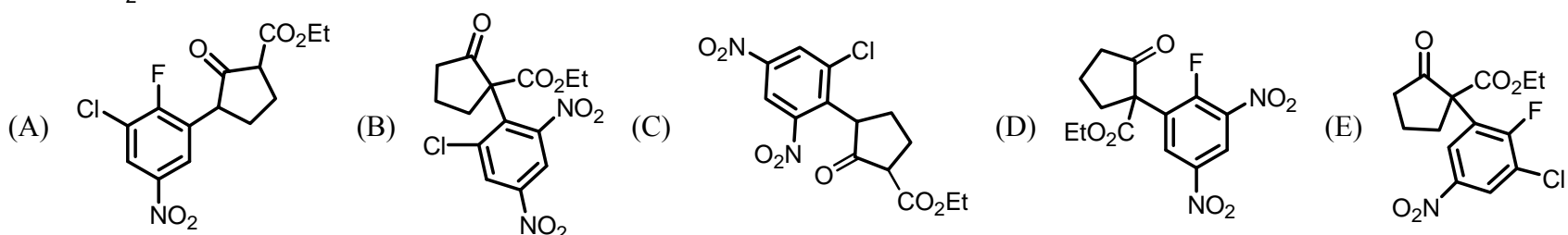
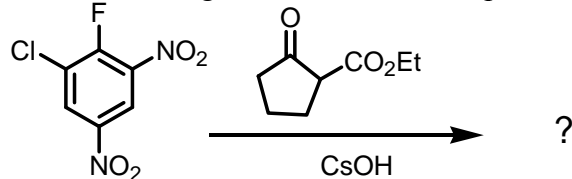
47. The following substance is heated in the presence of aqueous NaOH. The product of the reaction is:



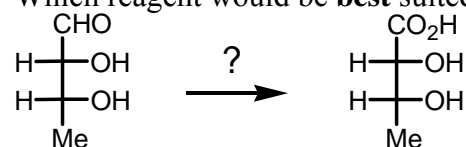
48. In the following reaction, which compound is the **major** product?



49. In the following reaction, which compound is the **major** product?

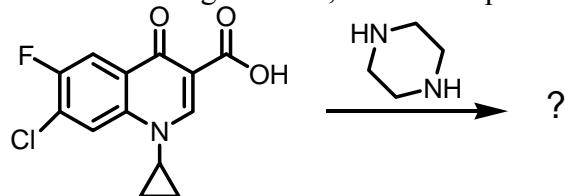


50. Which reagent would be **best** suited for the transformation shown?



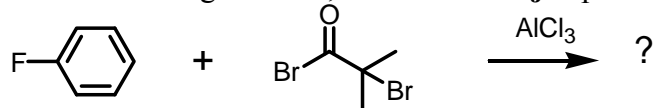
- (A) alkaline Cu^{2+} in H_2O (B) Ag^+ in $\text{H}_2\text{O}/\text{NH}_3$ (C) H_2 , with Ni catalyst
 (D) NaNO_3 at 0°C (E) NaBH_4 in H_2O

51. In the following reaction, which compound is the **major** product?



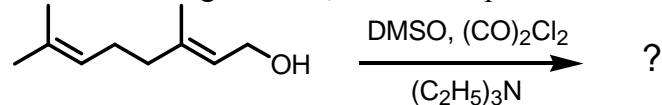
- (A) (B) (C)
 (D) (E)

52. In the following reaction, what is the **major** product?



- (A) (B) (C) (D) (E)

53. In the following reaction, which compound is the **major** product?

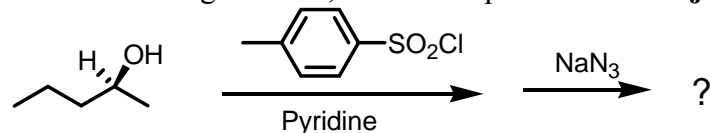


- (A) (B) (C)
 (D) (E)

54. Which of the following reaction is called Suzuki-Miyaura coupling reaction?

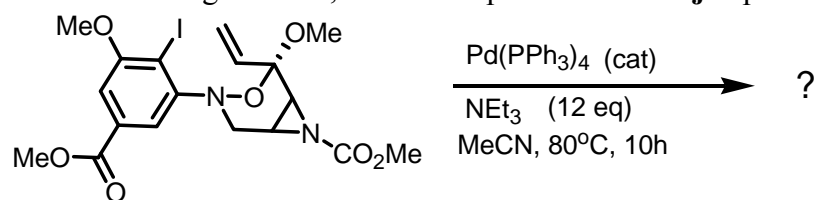
- (A) (B)
 (C) (D)
 (E) None of the above.

55. In the following reaction, which compound is the **major** product?



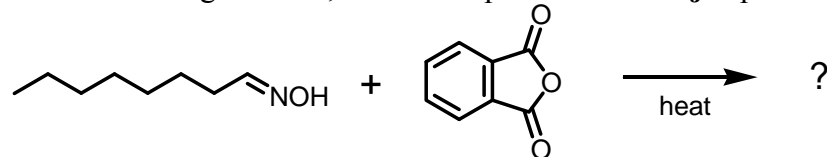
- (A) (B) (C) (D) (E)

56. In the following reaction, which compound is the **major** product?



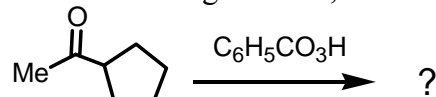
- (A)
- (B)
- (C)
- (D)
- (E) None of the above.

57. In the following reaction, which compound is the **major** product?



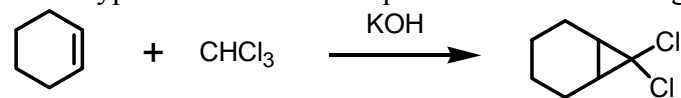
- (A)
- (B)
- (C)
- (D)
- (E)

58. In the following reaction, which compound is the **major** product?



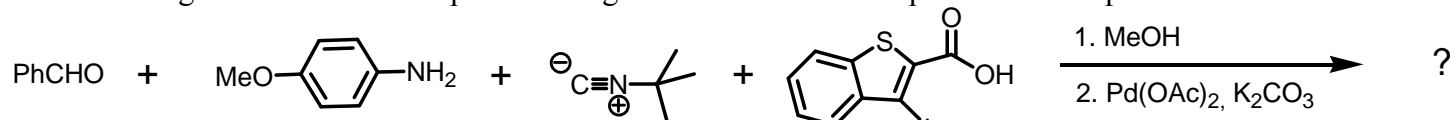
- (A)
- (B)
- (C)
- (D)
- (E)

59. What type of intermediate is present in the following reaction?



- (A) Carbocation (B) Carbanion (C) Free radical (D) Carbene (E) This reaction has no intermediate.

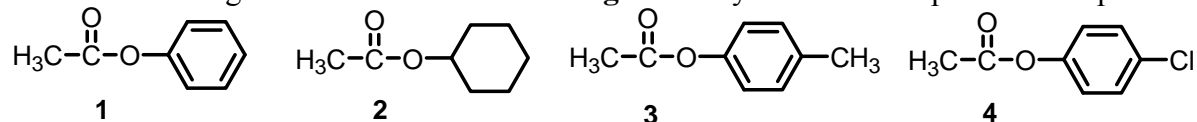
60. The following reaction is an example of the Ugi-Heck reaction. What product can be produced?



- (A)
- (B)
- (C)
- (D)
- (E)

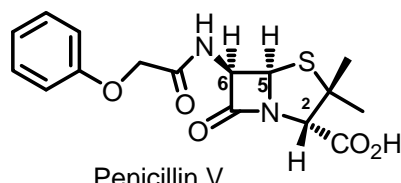
【單選題】每題 2 分，共計 40 分，答錯 1 題倒扣 0.5 分，倒扣至本大題零分為止，未作答，不給分亦不扣分。

61. List the following esters in order of **decreasing** reactivity in the first step of a nucleophilic acyl substitution reaction:



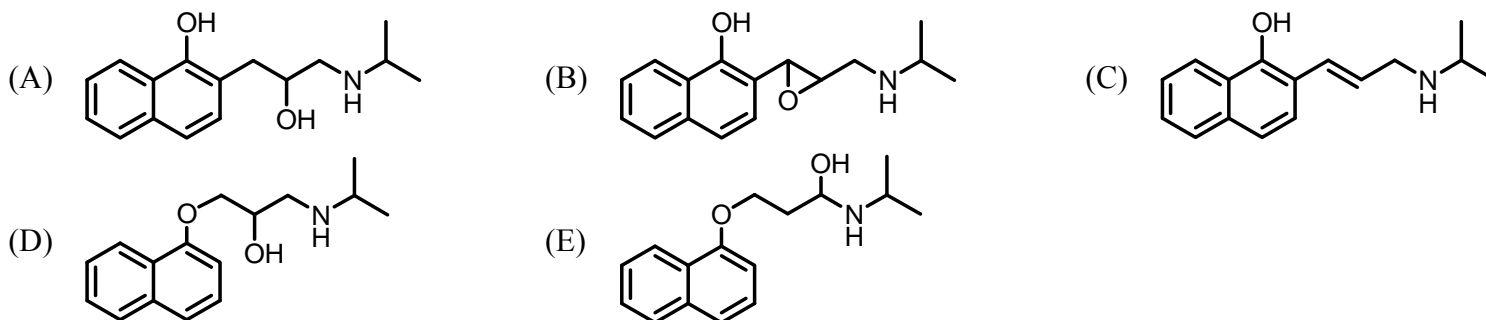
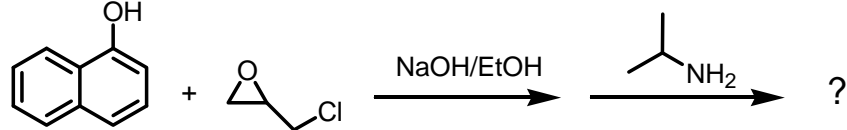
- (A) 2>3>1>4 (B) 4>1>3>2 (C) 2>4>1>3 (D) 3>1>4>2 (E) 4>2>1>3

62. The chiral centers in the structure of penicillin V are indicated (C-2, C-5, and C-6). In the following assignments which one is **wrong**?

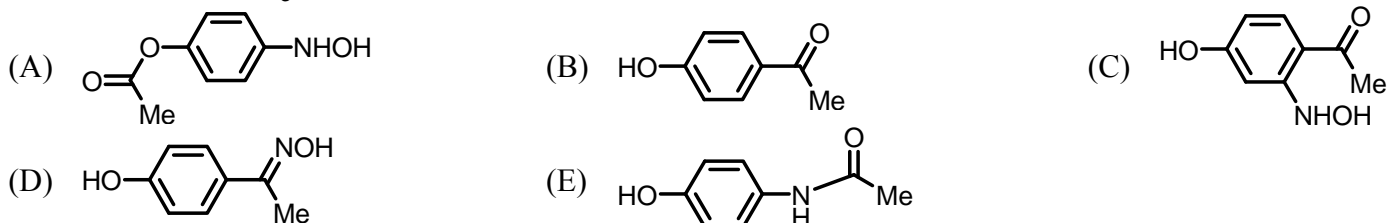
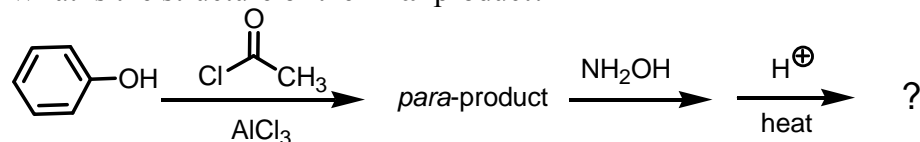


- (A) 2S (B) 5R (C) 6R (D) 6S (E) None of the above.

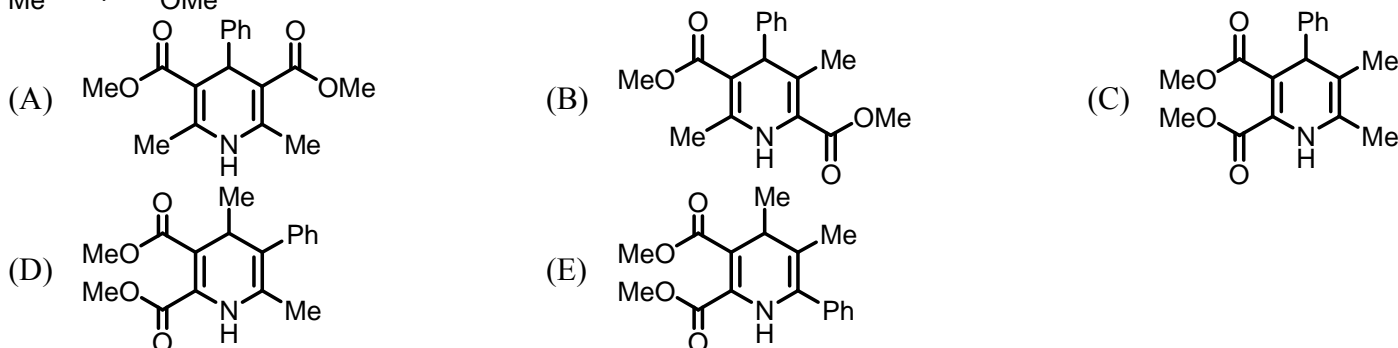
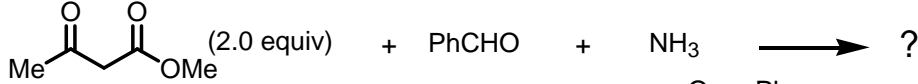
63. What is the structure of the **final** product?



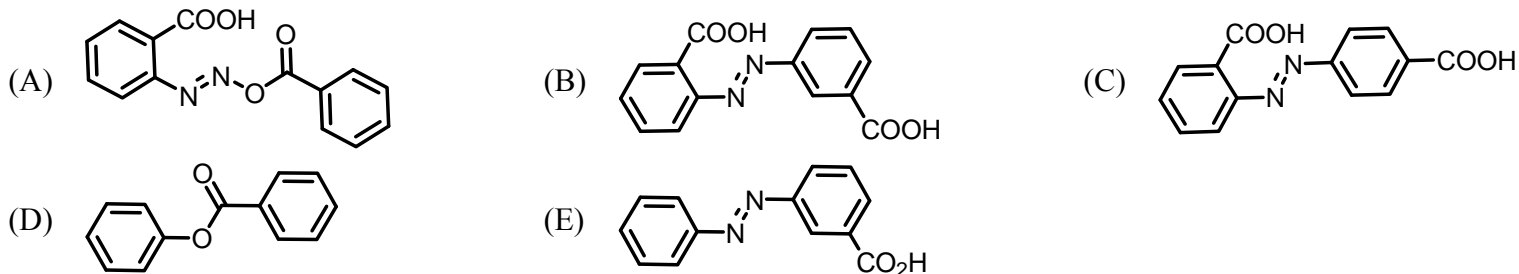
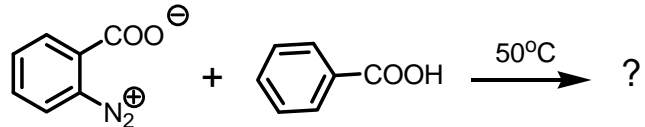
64. What is the structure of the **final** product?



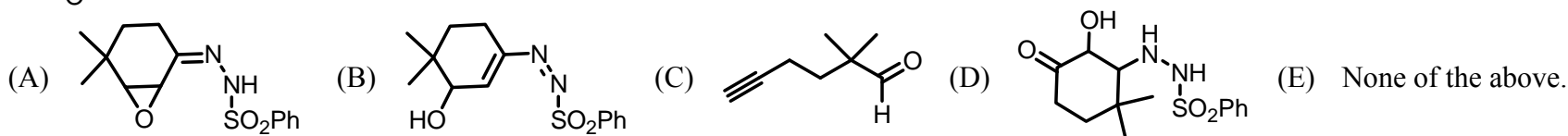
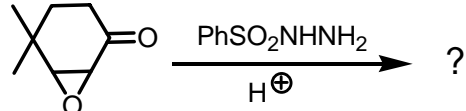
65. What is the **major** product of the following four components' reaction?



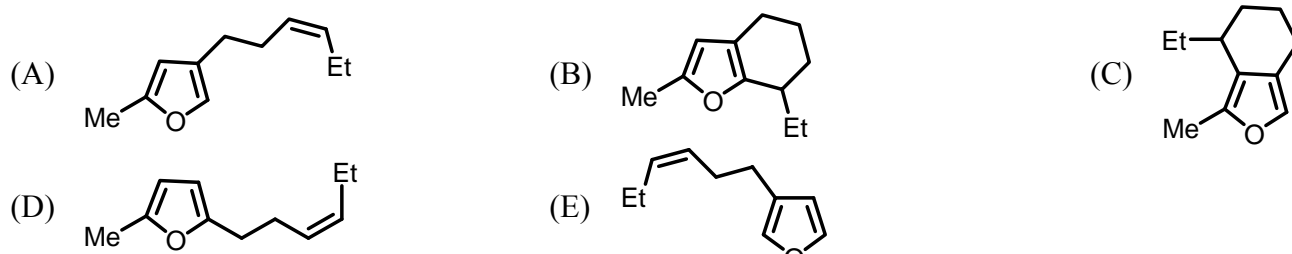
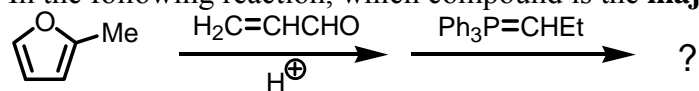
66. In the following reaction, which compound is the **major** product?



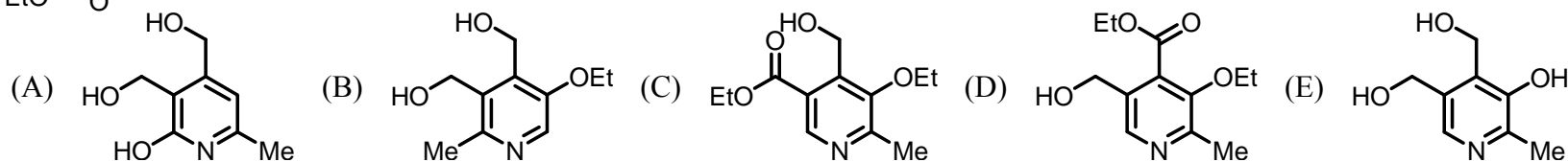
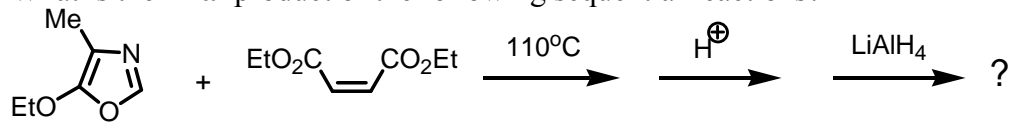
67. What is the **major** product of the following reaction?



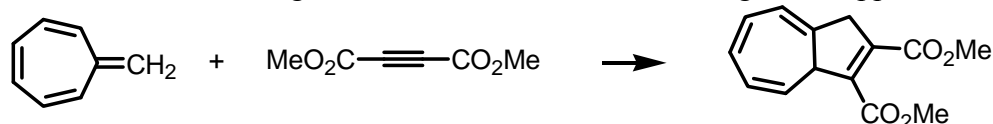
68. In the following reaction, which compound is the **major** product?



69. What is the **final** product of the following sequential reactions?

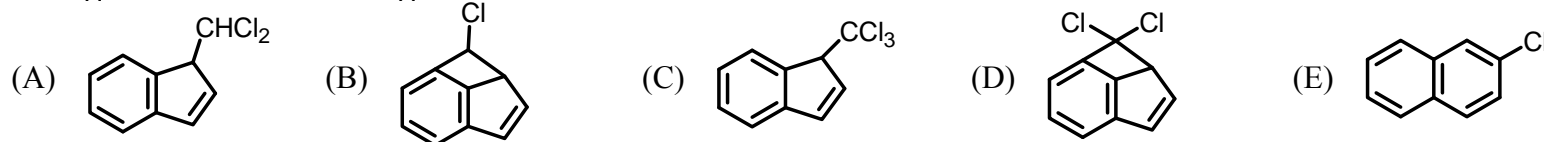
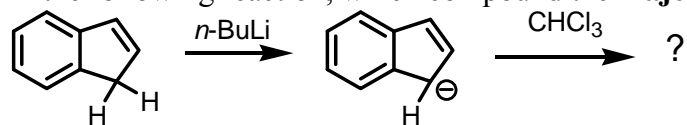


70. Consider the reaction given below, which of the following is **not** applicable to this reaction?

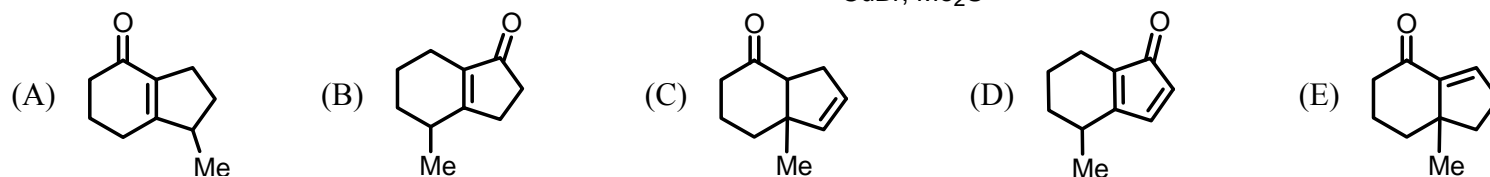
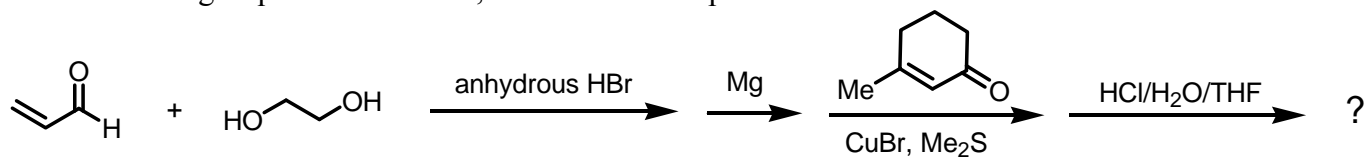


- (A) An example of cycloaddition reaction
 (B) Bond formation is suprafacial
 (C) Bond formation is antarafacial
 (D) Prefer under thermal conditions
 (E) All of these apply to this reaction.

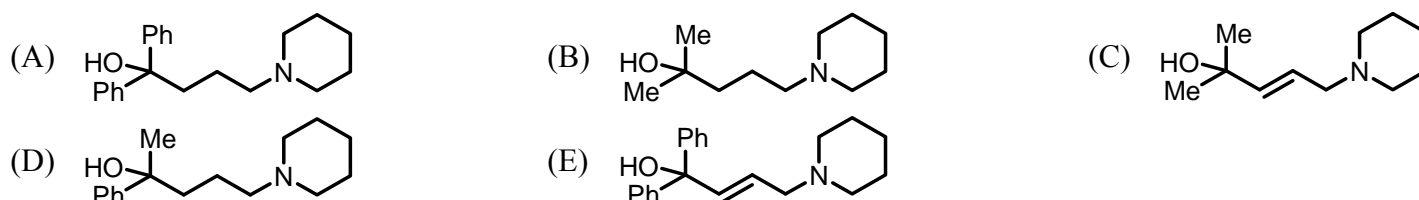
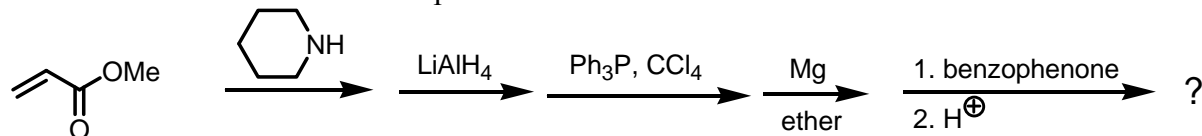
71. In the following reaction, which compound the **major** product?



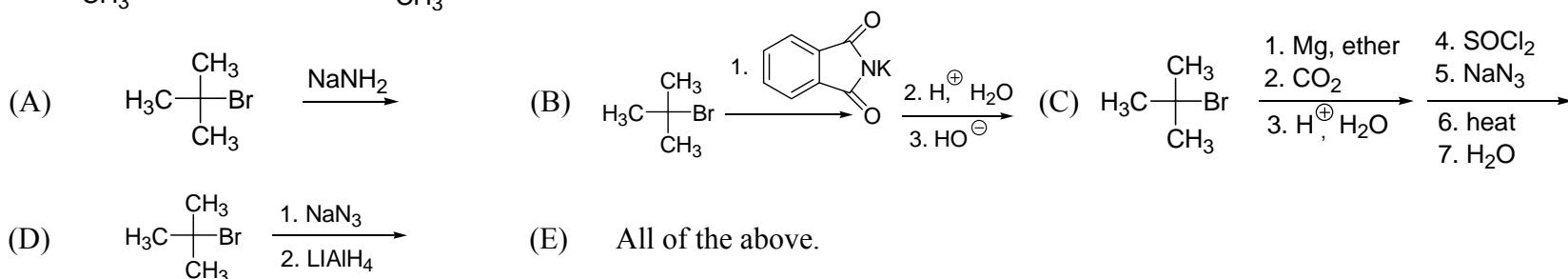
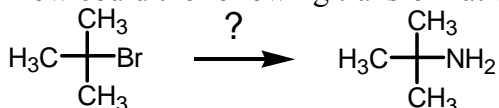
72. In the following sequential reactions, what is the **final** product?



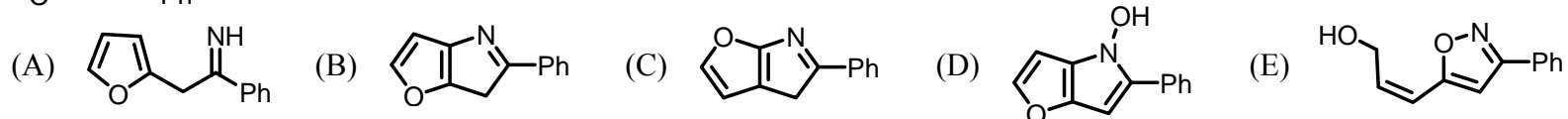
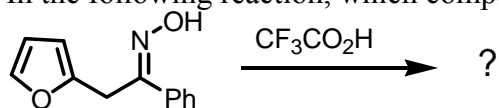
73. What is the structure of the **final** product?



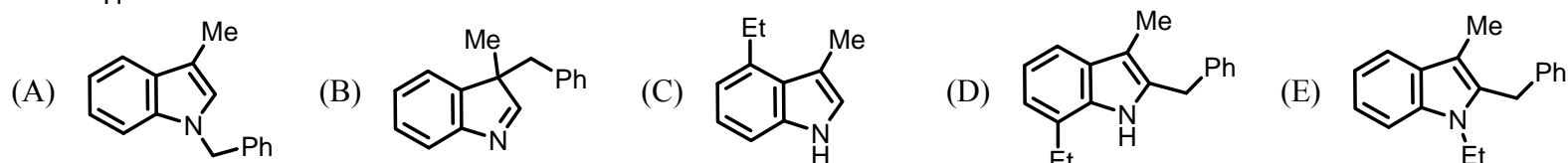
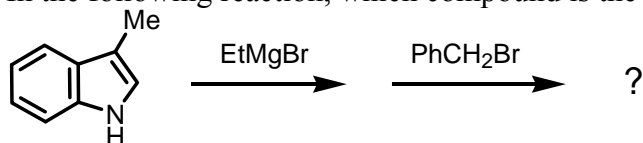
74. How could the following transformation be accomplished?



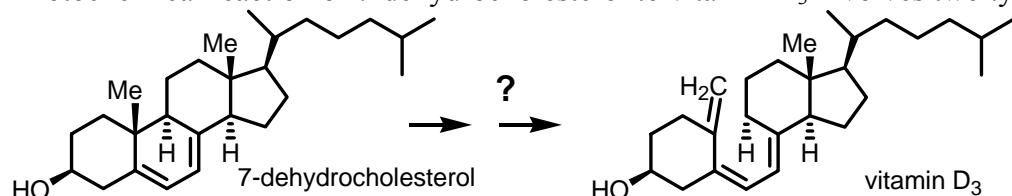
75. In the following reaction, which compound is the **major** product?



76. In the following reaction, which compound is the **major** product?

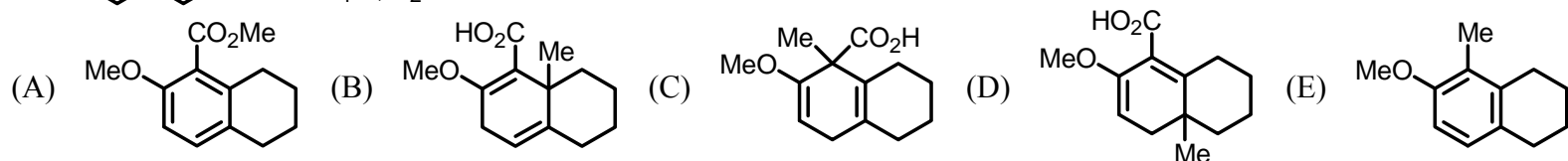
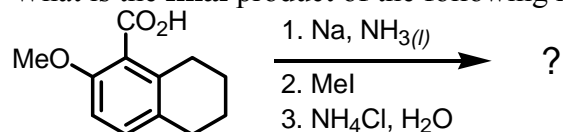


77. Photochemical reaction of 7-dehydrocholesterol to vitamin D₃ involves two types of pericyclic reactions. What are those?

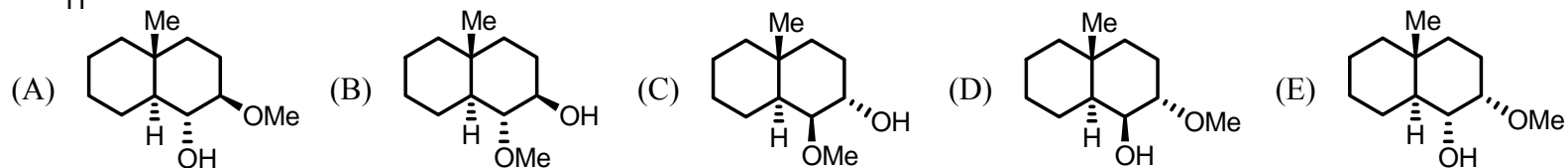
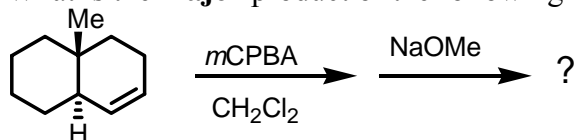


- (A) Electrocyclic reaction and sigmatropic rearrangement (B) Electrocyclic reaction and ene reaction
(C) Cycloaddition and electrocyclic reactions (D) Cycloaddition reaction and sigmatropic rearrangement
(E) Ene reaction and sigmatropic rearrangement.

78. What is the **final** product of the following reaction?



79. What is the **major** product of the following transformation?



80. What is the **final** product?

