

Instrument Rating

Stage III Exam

Completely darken only one circle for each question on the answer form.

METEOROLOGY

1. What is the major motivating force causing atmospheric circulation?
 - A. Rotation of the earth
 - B. Source regions for large airmasses
 - C. Uneven heating of the earth's surface
2. What processes result in moisture being added to unsaturated air?
 - A. Melting and evaporation
 - B. Evaporation and sublimation
 - C. Condensation and latent heat of vaporization
3. A small or converging temperature/dewpoint spread usually results in
 - A. fog or low clouds.
 - B. low visibility and high winds.
 - C. middle-level clouds and heavy precipitation.
4. The greatest atmospheric instability occurs in an airmass that is
 - A. cold and dry.
 - B. warm and dry.
 - C. warm and moist.
5. As you ascend through the atmosphere, an increase of 1,000 feet results in an average temperature decrease of
 - A. 2°C.
 - B. 2°F.
 - C. 5.4°F.
6. What type of clouds are most likely to form in stable air?
 - A. Stratus
 - B. Cumulus
 - C. Altocumulus
7. With the approach and passage of a frontal system in the United States, what pressure and wind direction changes take place?
 - A. The pressure decreases as the front approaches, and the wind direction shifts to the left after frontal passage.
 - B. The pressure increases as the front approaches, and the wind direction shifts to the right after frontal passage.
 - C. The pressure decreases as the front approaches, and the wind direction shifts to the right after frontal passage.
8. What conditions are necessary for the formation of thunderstorms?
 - A. Unstable air, a lifting force, and high moisture levels
 - B. Unstable dry air near the surface with a temperature inversion aloft
 - C. High wind velocities aloft and a small temperature/dewpoint spread
9. During what stage does a thunderstorm reach the greatest intensity?
 - A. Mature
 - B. Cumulus
 - C. Dissipating

10. When landing behind a large jet aircraft, at what point on the runway should you plan your touchdown?
 - A. Before the jet's touchdown point
 - B. Beyond the jet's touchdown point
 - C. On the downwind side of the runway, before the jet's touchdown point
11. Which statement is true about the characteristics of microbursts?
 - A. An individual microburst typically lasts longer than 30 minutes from the time it strikes the ground until dissipation.
 - B. Microbursts are intense, localized downdrafts that can be as strong as 6,000 feet per minute and produce both vertical and horizontal wind shear.
 - C. The maximum horizontal wind velocity associated with microbursts is 25 knots near the surface resulting in a 75-knot shear as the wind changes to or from a headwind across the microburst.
12. In which of the following meteorological conditions is your aircraft likely to experience the highest rate of structural ice accumulation?
 - A. Freezing rain
 - B. Heavy wet snow
 - C. High humidity and freezing temperature

Use the aviation routine weather report (METAR) excerpt to answer questions 13 through 15.

AVIATION ROUTINE WEATHER REPORT

METAR KDEN 091545Z 35010KT 1/2SM -SNFG OVC005 6/5 A3012

METAR KLAR 090551Z 32025KT 1/2SM +SN OVC004 2/2 A3013

13. According to the METAR, what are the visibility and sky condition at Denver (KDEN)?
 - A. Visibility 1/2 nautical mile, heavy snow, 500 feet overcast
 - B. Visibility 1/2 statute mile, light snow and fog, 500 feet overcast
 - C. Visibility 1/2 statute mile, 5,000 feet overcast, temperature 6°F, dewpoint 5°F
14. What conditions are indicated by the METAR for Laramie, Wyoming (KLAR)?
 - A. Light blowing sand
 - B. Ceiling 400 feet overcast
 - C. Temperature/dewpoint spread of 4°C
15. What is the altimeter setting at Denver?
 - A. 30.10
 - B. 30.12
 - C. 30.33
16. Terminal aerodrome forecasts (TAFs) are generally issued
 - A. hourly.
 - B. twice daily.
 - C. four times daily.

Use the terminal aerodrome forecast (TAF) excerpt to answer questions 17 and 18.

TERMINAL AERODROME FORECAST

TAF

KCYS 292332Z 292424 25010KT 2SM SHSN SCT010 SCT025

FM1700 29025KT P6SM SCT120

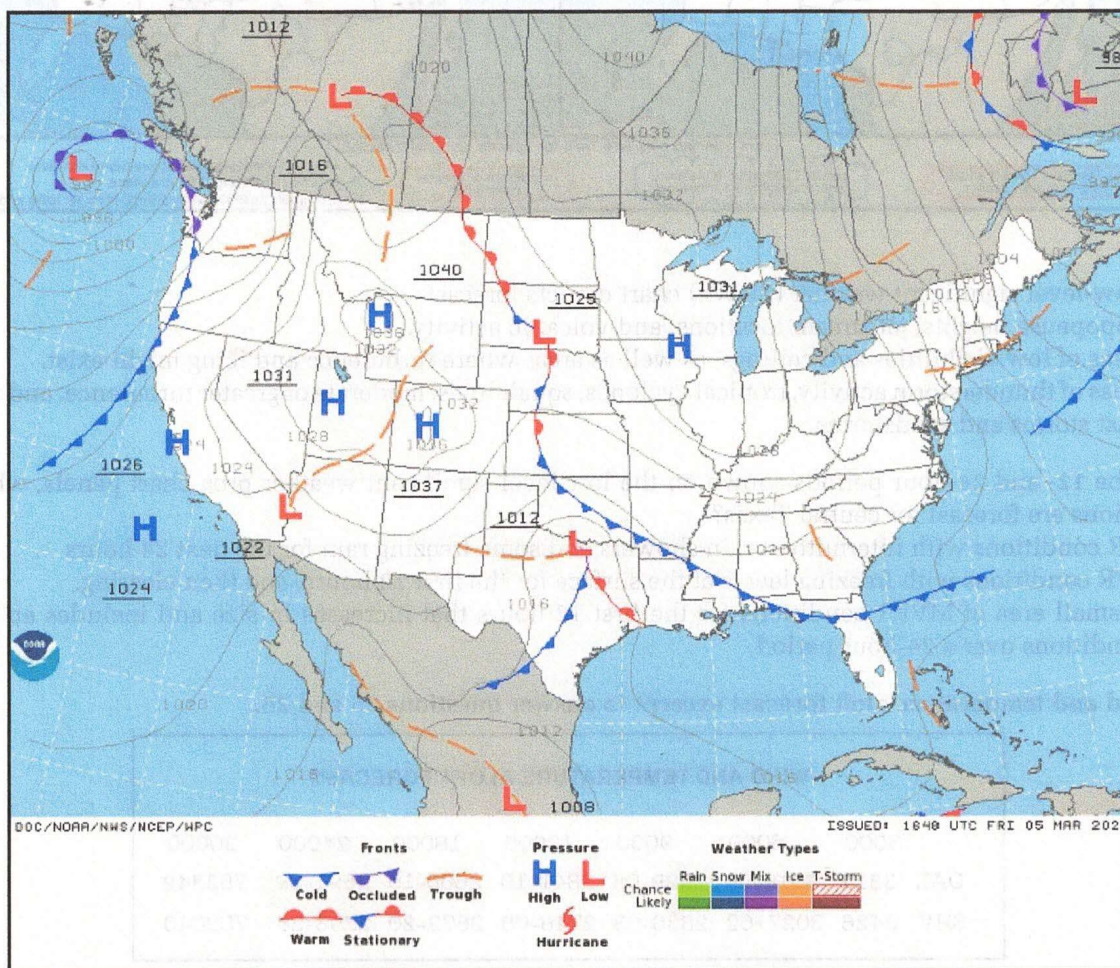
KCFR 292335Z 292424 24015KT P6SM BLSN BKN030

FM0300 SCT060 BKN140

FM1200 SCT050 BKN100

17. According to the terminal forecast, what conditions can you expect at Cheyenne (KCYS) at 1700Z?
 - A. Wind 290° at 25 knots, VFR conditions
 - B. Visibility more than 6 miles, ceiling 1,200 feet
 - C. Wind 290° at 25 knots, visibility less than 6 miles
18. Between 0300Z and 1200Z, the ceiling at Casper (KCPR) is forecast to be
 - A. 3,000 feet AGL.
 - B. 6,000 feet AGL.
 - C. 14,000 feet AGL.
19. What information is provided by a convective outlook (AC)?
 - A. A forecast of level 5 and 6 thunderstorm activity, including direction of movement and cloud tops.
 - B. Areas where there is a slight, moderate or high risk of severe thunderstorms, as well as areas of general thunderstorm activity.
 - C. Areas where there is a slight, moderate or high risk of thunderstorms in which surface winds are 45 knots or higher, with hail 1/2 inch or more in diameter.

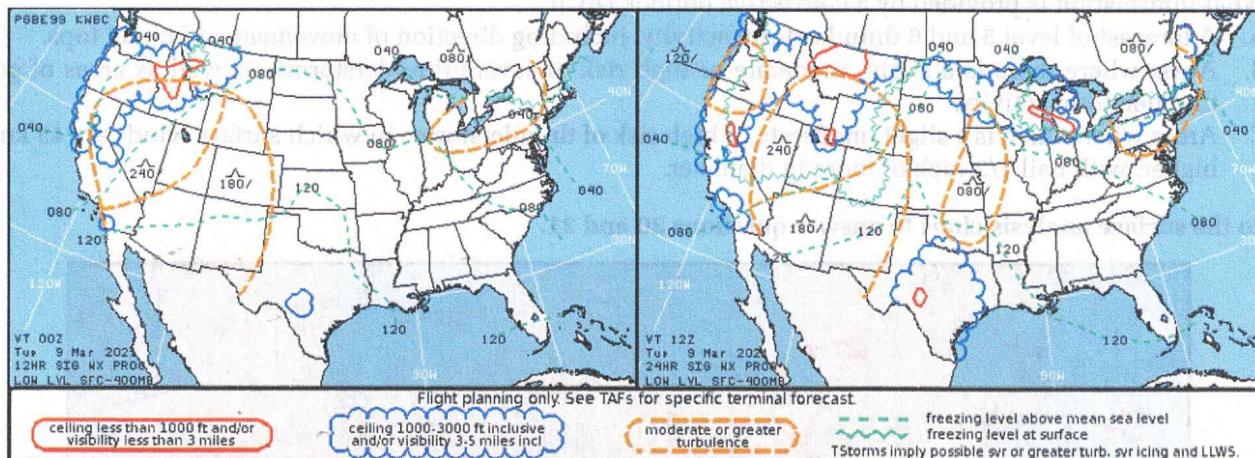
Refer to the surface analysis chart to answer questions 20 and 21.



20. By reviewing this surface analysis chart, you can
 - A. obtain a picture of atmospheric pressure patterns at the earth's surface.
 - B. identify areas of heavy precipitation along your route of flight.
 - C. recognize areas of observed and estimated ceiling and visibility across the continental United States.
21. According to this surface analysis chart,
 - A. an occluded front is positioned over southern Texas.
 - B. A warm front extends from southern Alabama to northern Florida.
 - C. an area of high pressure exists over Minnesota, Iowa, and Wisconsin.

22. What weather information will you find on a ceiling and visibility analysis (CVA) graphic?
- Forecast ceiling and visibility using color-coded station models to designate the flight categories of VFR, MVFR, IFR, LIFR
 - A real-time display of current observed ceiling and visibility using color-coded shading to indicate widespread areas of VFR, MVFR, IFR, and LIFR weather
 - A real-time display of current observed ceiling and visibility using color-coded station models to designate the flight categories of VFR, MVFR, IFR, and LIFR conditions and shading to show areas of IFR weather

Use the U.S. low-level significant weather (SigWx) chart to answer questions 23 and 24.



23. This low-level significant weather (SigWx) chart depicts forecast
- tropopause heights, jet stream locations, and volcanic activity.
 - areas of low visibilities and ceilings, as well as areas where turbulence and icing might exist.
 - areas of thunderstorm activity, tropical cyclones, squall lines, moderate or greater turbulence, and widespread dust storms and sandstorms.
24. Over the 12- and 24-hour periods shown on the low-level significant weather prog chart panels, what weather conditions are forecast for central Texas?
- IFR conditions with intermittent rain showers and some freezing rain for the next 24 hours
 - VFR conditions with freezing levels at the surface for the first 12 hours, and then clearing.
 - A small area of MVFR conditions for the first 12 hours that increases in size and includes an area of IFR conditions over a 24-hour period.

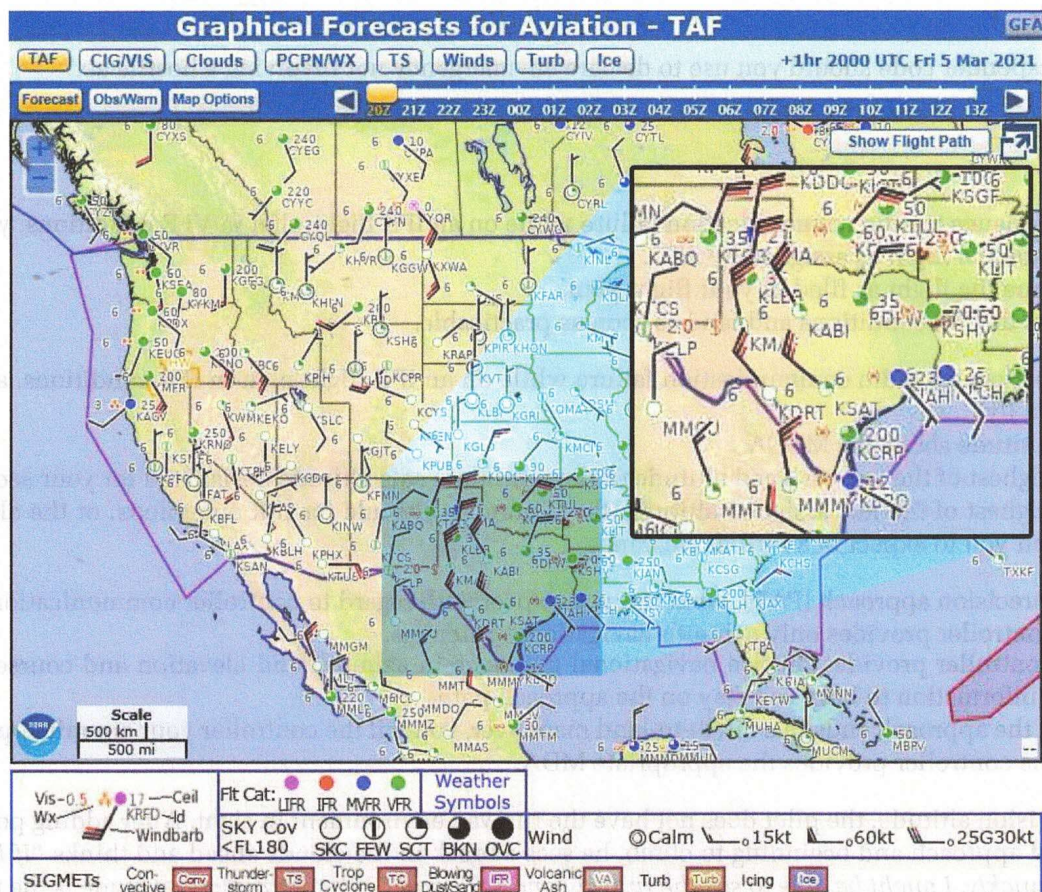
Use the wind and temperature aloft forecast excerpt to answer questions 25 and 26.

WIND AND TEMPERATURE ALOFT FORECAST							
	3000	6000	9000	12000	18000	24000	30000
DAL	3317	3018-00	2929-05	2841-10	2666-19	2591-29	752342
SHV	3426	3027+02	2835-03	2746-08	2672-20	2598-28	752640

25. Between what approximate altitudes could you anticipate structural icing over Shreveport (SHV) if the cloud bases are at 6,000 feet with tops at 9,000 feet?
- 4,000 feet to 7,000 feet
 - 6,000 feet to 9,000 feet
 - 6,000 feet to 12,000 feet
26. What is the forecast wind direction, speed, and air temperature at 10,000 feet MSL over Dallas (DAL)?
- 284°/39 knots, -9°C
 - 287°/33 knots, -7°C
 - 290°/33 knots, -5°C

27. What statement is true regarding graphical AIRMETs (G-AIRMETs)?
- G-AIRMETs present graphical weather depictions of potential areas of severe thunderstorms, tornadoes, hail, and rain.
 - G-AIRMET depict forecast surface pressure systems, fronts, and precipitation at discrete times no more than 3 hours apart for a period of up to 12 hours into the future.
 - G-AIRMETs depict a variety of weather conditions, including areas of IFR ceilings and visibility, mountain obscuration, icing, freezing levels, turbulence, low-level wind shear, and strong surface winds.

Refer to the graphical forecasts for aviation (GFA) figure to answer questions 28 and 29.



28. Which statement is true regarding this graphical forecasts for aviation (GFA) figure?
- The chart primarily focuses on high-altitude flights.
 - Each full barb on the wind direction arrow represents 5 knots of wind.
 - The slider bar allows you to select a specific hour for the forecast weather.
29. What weather conditions might you expect over southeastern Texas?
- IFR conditions and calm winds
 - Marginal VFR (MVFR) conditions with winds out of the southeast
 - VFR conditions with winds out of the northwest at 20 knots gusting to 25 knots

IFR FLIGHT CONSIDERATIONS

30. To operate in IFR conditions, you must have enough fuel to complete the flight to the first airport of intended landing and then
- hold for 15 minutes prior to performing an approach, and fly after that for 45 minutes at normal cruising speed.
 - fly from that airport to the alternate airport (if required), and fly after that for 30 minutes at normal cruising speed.
 - fly from that airport to the alternate airport (if required), and fly after that for 45 minutes at normal cruising speed.
31. What transponder code should you use to declare an emergency not involving a hostile act?
- 7500
 - 7600
 - 7700
32. If you experience a radio communication failure while on an IFR flight plan in VFR conditions, you should
- continue the flight as assigned by ATC.
 - continue the flight as filed in your flight plan.
 - remain in VFR conditions and land as soon as practicable.
33. If you experience a radio communication failure while on an IFR flight plan in IFR conditions, at what altitude should you fly?
- Any altitude above the MOCA
 - The highest of the last assigned altitude or the minimum safe altitude designated for your sector of flight
 - The highest of the last assigned altitude, the minimum altitude for IFR operations, or the altitude ATC has advised you to expect in a further clearance
34. During a precision approach (PAR), what can you expect with regard to controller communications?
- The controller provides only azimuth navigational guidance.
 - The controller provides precise navigational guidance in azimuth and elevation and course deviation and trend information to help you stay on the approach path.
 - When the approach ends in a circle-to-land maneuver, you tell the controller your aircraft approach category, and the controller provides the appropriate MDA.
35. At the decision altitude, the pilot does not have the runway environment in sight. After adding power to perform the missed approach and beginning to climb, he sees a break in the clouds ahead and thinks "*If I cut power and descend quickly, I might be able to see the runway and still land.*" What hazardous attitude is the pilot exhibiting and what is the antidote?
- Attitude—Anti-authority; Antidote—It could happen to me. *The weather conditions could get worse so I should start heading for my alternate airport immediately.*
 - Attitude—Resignation; Antidote—I can make a difference. *I might not get another chance to land if I continue the missed approach so it would be safer to try to land now.*
 - Attitude—Impulsivity; Antidote—Not so fast. Think first. *Descending under these circumstances is dangerous. A safe option is to continue the missed approach and request another approach or clearance to the alternate airport.*

Refer to the NTSB report excerpt to answer questions 36, 37, and 38.

From the files of the NTSB...

A pilot, who poorly performed instrument procedures on a recent check flight, took off in a company Seneca that was notorious for its navigation and communication equipment problems. Another pilot said that the company sometimes put pressure on pilots to fly airplanes with equipment problems, which probably contributed to the pilot's decision to fly.

Nearing his destination, ATC cleared the pilot for the ILS Runway 4 approach at North Bend, Oregon, at approximately nine miles north of the North Bend VOR. He was told to cross the VOR at or above 3,700 feet MSL. About 14 minutes later, the pilot called North Bend Flight Service and reported that the localizer needle on his receiver did not seem to be moving. When the airplane was 11 miles south of the airport, Seattle Center cleared him to descend from 5,000 to 3,000 feet MSL and to fly a heading of 360°. After a heading change to 035°, the pilot stated that the needle was centered. At the outer marker, he was at 2,000 feet MSL and said he would "try to get down." He delayed following the published missed approach in a failed attempt to find the airport. Approximately two minutes later, he reported that he was at 800 feet. That was his last transmission. The aircraft wreckage was found three miles north-northeast of the airport.

36. Which is an example of a step in the ADM process that the pilot did not effectively perform?
- Recognize a change — The pilot did not notice that the localizer needle was inoperative.
 - Monitor the outcome — After making the correct decision to continue the ILS approach with an inoperative localizer, the pilot failed to monitor the instruments.
 - Define the problem — The pilot failed to define the problem as malfunctioning avionics equipment that could affect his ability to perform an ILS approach and fly safely under IFR conditions.
37. What are three risk factors that the pilot could have recognized and mitigated using the 5Ps?
- Pilot:** Training/Experience — The pilot was not instrument current.
Plan: Airport Conditions — NOTAMs indicated that the localizer was out of service.
Programming: Avionics Airworthiness — The pilot did not properly set the correct localizer frequency.
 - Pilot:** Training/Experience — The pilot did not perform instrument procedures well on a recent check flight.
Programming: Avionics Airworthiness — The avionics equipment was not working properly.
Plan: Mission — The pilot felt pressure to complete the flight as planned.
 - Passengers:** Flexibility — The company insisted the pilot complete the flight due to passenger commitments.
Plan: Weather Limitations — Because of a strong crosswind that exceeded the pilot's personal limitation, he could not maintain the localizer course.
Plane: Performance — The airplane did not have the performance required to climb and clear terrain in the area.
38. What actions could you take to manage tasks and maintain situational awareness prior to and during an instrument approach to help prevent this type of accident?
- Follow the checklists in the POH to set up avionics, confirm instructions with ATC, and be alert for similar call signs.
 - Perform the majority of head-down tasks prior to takeoff, follow standard operating procedures such as avionics flows, and hand-fly the airplane while setting up for the approach.
 - Follow standard operating procedures such as approach briefings, using avionics flows, and performing the 5P check, and request assistance from ATC in the event of an equipment malfunction.

39. What resources can you use to determine if a preferred IFR route is available for a specific flight?
- A. *Jeppesen Airway Manual* and NOTAMs
 - B. Chart Supplement's Airport/Facility Directory and *Jeppesen Airway Manual*
 - C. *Aeronautical Information Manual* and Chart Supplement's Airport/Facility Directory
40. An alternate airport is not required if the destination airport has a prescribed instrument approach and the weather at your ETA plus/minus 1 hour is forecast to be at or above
- A. circling minimums.
 - B. the MEA or MOCA, whichever is highest.
 - C. a 2,000-foot ceiling and visibility at least three miles.
41. When you are completing the FAA flight plan form for an IFR flight, the requested cruising altitude represents the
- A. initial cruising altitude.
 - B. lowest altitude to be used.
 - C. lowest MEA for the route of flight.

STAGE III

EXAM ANSWER FORM

DATE OF TEST			TEST TITLE OR NO.	TEST GRADE
MONTH	DAY	YEAR		
LAST NAME			FIRST NAME	
INSTRUCTIONS FOR MARKING THE ANSWER FORM. Completely darken only circle for each. DO NOT USE (X) OR (✓) Use black lead pencil. To make corrections completely erase incorrect response. Questions are arranged in vertical sequence as indicated by the arrow.				



- | | | | | | | | | | | | | | | | |
|----|-----|-----|-----|----|-----|-----|-----|----|-----|-----|-----|-----|-----|-----|-----|
| 1 | (A) | (B) | (C) | 26 | (A) | (B) | (C) | 51 | (A) | (B) | (C) | 76 | (A) | (B) | (C) |
| 2 | (A) | (B) | (C) | 27 | (A) | (B) | (C) | 52 | (A) | (B) | (C) | 77 | (A) | (B) | (C) |
| 3 | (A) | (B) | (C) | 28 | (A) | (B) | (C) | 53 | (A) | (B) | (C) | 78 | (A) | (B) | (C) |
| 4 | (A) | (B) | (C) | 29 | (A) | (B) | (C) | 54 | (A) | (B) | (C) | 79 | (A) | (B) | (C) |
| 5 | (A) | (B) | (C) | 30 | (A) | (B) | (C) | 55 | (A) | (B) | (C) | 80 | (A) | (B) | (C) |
| 6 | (A) | (B) | (C) | 31 | (A) | (B) | (C) | 56 | (A) | (B) | (C) | 81 | (A) | (B) | (C) |
| 7 | (A) | (B) | (C) | 32 | (A) | (B) | (C) | 57 | (A) | (B) | (C) | 82 | (A) | (B) | (C) |
| 8 | (A) | (B) | (C) | 33 | (A) | (B) | (C) | 58 | (A) | (B) | (C) | 83 | (A) | (B) | (C) |
| 9 | (A) | (B) | (C) | 34 | (A) | (B) | (C) | 59 | (A) | (B) | (C) | 84 | (A) | (B) | (C) |
| 10 | (A) | (B) | (C) | 35 | (A) | (B) | (C) | 60 | (A) | (B) | (C) | 85 | (A) | (B) | (C) |
| 11 | (A) | (B) | (C) | 36 | (A) | (B) | (C) | 61 | (A) | (B) | (C) | 86 | (A) | (B) | (C) |
| 12 | (A) | (B) | (C) | 37 | (A) | (B) | (C) | 62 | (A) | (B) | (C) | 87 | (A) | (B) | (C) |
| 13 | (A) | (B) | (C) | 38 | (A) | (B) | (C) | 63 | (A) | (B) | (C) | 88 | (A) | (B) | (C) |
| 14 | (A) | (B) | (C) | 39 | (A) | (B) | (C) | 64 | (A) | (B) | (C) | 89 | (A) | (B) | (C) |
| 15 | (A) | (B) | (C) | 40 | (A) | (B) | (C) | 65 | (A) | (B) | (C) | 90 | (A) | (B) | (C) |
| 16 | (A) | (B) | (C) | 41 | (A) | (B) | (C) | 66 | (A) | (B) | (C) | 91 | (A) | (B) | (C) |
| 17 | (A) | (B) | (C) | 42 | (A) | (B) | (C) | 67 | (A) | (B) | (C) | 92 | (A) | (B) | (C) |
| 18 | (A) | (B) | (C) | 43 | (A) | (B) | (C) | 68 | (A) | (B) | (C) | 93 | (A) | (B) | (C) |
| 19 | (A) | (B) | (C) | 44 | (A) | (B) | (C) | 69 | (A) | (B) | (C) | 94 | (A) | (B) | (C) |
| 20 | (A) | (B) | (C) | 45 | (A) | (B) | (C) | 70 | (A) | (B) | (C) | 95 | (A) | (B) | (C) |
| 21 | (A) | (B) | (C) | 46 | (A) | (B) | (C) | 71 | (A) | (B) | (C) | 96 | (A) | (B) | (C) |
| 22 | (A) | (B) | (C) | 47 | (A) | (B) | (C) | 72 | (A) | (B) | (C) | 97 | (A) | (B) | (C) |
| 23 | (A) | (B) | (C) | 48 | (A) | (B) | (C) | 73 | (A) | (B) | (C) | 98 | (A) | (B) | (C) |
| 24 | (A) | (B) | (C) | 49 | (A) | (B) | (C) | 74 | (A) | (B) | (C) | 99 | (A) | (B) | (C) |
| 25 | (A) | (B) | (C) | 50 | (A) | (B) | (C) | 75 | (A) | (B) | (C) | 100 | (A) | (B) | (C) |