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Certified Electronic Fetal Monitoring

NCC EFM

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Topic Break Down

Topic	No. of Questions
Topic 1, Maternal-Fetal Physiology	22
Topic 2, Fetal Assessment	77
Topic 3, Maternal Assessment	6
Topic 4, Clinical Management	35
Topic 5, Communication and Documentation	5
Total	145

QUESTION NO: 1

A fetal heart rate tracing is abnormal. A change in maternal position and oxygen administration do not correct the pattern. Following birth, a fetal cord blood sample is taken:

pH = 7.25

PaCO₂ = 46 mm Hg

PaO₂ = 20 mm Hg

HCO₃ = 22 mEq/L

Base deficit = -4 mEq/L

These results are best interpreted as:

- A. Acidosis
- B. Hypoxia
- C. Normal

ANSWER: C

Explanation:

Normal is the best interpretation. The pH of 7.25 is within the expected range for an umbilical arterial cord sample at term. The PaCO₂ of 46 mm Hg and bicarbonate concentration of 22 mEq/L are also consistent with normal fetal acid-base status. Most importantly, the reported base deficit of 4 mEq/L (expressed in the stem as -4) does not indicate a clinically significant metabolic acidemia. Metabolic acidemia associated with an increased risk of neonatal complications is generally characterized by a much lower arterial pH, commonly below 7.00, together with a base deficit of at least 12 mmol/L. A PaO₂ near 20 mm Hg is expected in umbilical arterial blood because fetal oxygen tension is physiologically much lower than postnatal arterial oxygen tension. Thus, although the intrapartum tracing was abnormal and warranted evaluation, these cord values do not demonstrate acidemia at birth. Cord blood gas interpretation should emphasize both pH and the metabolic component, represented by base deficit, rather than interpreting the tracing or oxygen value alone. See the [NCBI StatPearls review of cord blood gas analysis](#) and [ACOG guidance on umbilical cord blood gas and acid-base analysis](#).

QUESTION NO: 2

A woman in labor has been pushing for 4 hours. For the last 2 hours, there have been recurrent variable decelerations. Variability has evolved from moderate to minimal. Cervical exam is 10/100%/+2, fetal head OP. There has been no fetal descent for the last 45 minutes. Based on the tracing shown, the most reasonable approach is

- A. cesarean birth
- B. continued pushing
- C. vacuum-assisted vaginal birth

ANSWER: A

Explanation:

Cesarean birth is the most reasonable approach because the overall clinical picture supports expedited delivery for a fetus with a deteriorating intrapartum status in the setting of second-stage arrest. Recurrent variable decelerations are commonly associated with intermittent umbilical-cord compression. When variability changes from moderate to minimal during ongoing recurrent decelerations, the tracing warrants prompt assessment and corrective measures, because minimal variability can reduce confidence that the fetus is maintaining adequate oxygenation and neurologic reserve. The prolonged duration of pushing, lack of descent for 45 minutes, and persistent occiput-posterior position add evidence that spontaneous vaginal birth is not imminent. Although the head is at a low station, an attempted operative vaginal birth requires a clinician with appropriate expertise, accurate assessment of fetal position, and a high likelihood of immediate successful delivery. In this scenario, arrested descent with an occiput-posterior head and a concerning evolving fetal heart rate pattern make a rapid,

reliable route of delivery especially important. Cesarean birth therefore addresses both the lack of labor progress and the need to avoid further delay if fetal compromise is developing. The standardized fetal heart rate category framework and management principles are described by [ACOG's guidance on intrapartum fetal heart rate tracings](#) and [StatPearls' review of variable decelerations](#).

QUESTION NO: 3

(Full question statement)

Interobserver reliability in interpretation of fetal heart rate tracings is greatest when the tracing is:

- A. Abnormal
- B. Indeterminate
- C. Normal

ANSWER: C

Explanation:

Normal is correct because a normal (Category I) fetal heart rate tracing is defined by a relatively discrete, consistently applied set of observable features: a baseline of 110–160 beats per minute, moderate baseline variability, no late decelerations, and no variable decelerations. Accelerations and early decelerations may be present or absent without changing the Category I designation. These well-delineated criteria make normal tracings more readily and consistently identified by different qualified observers, producing the greatest interobserver reliability.

This principle is important in electronic fetal monitoring because the terminology provides a common language for describing baseline rate, variability, accelerations, and decelerations before assigning an overall category. Consistent recognition of the reassuring combination of moderate variability and absence of recurrent concerning decelerations supports agreement in both documentation and clinical communication. The three-tier fetal heart rate classification system and its standardized definitions are described in ACOG's [Intrapartum Fetal Heart Rate Monitoring guidance](#) and the NICHD workshop report available through [PubMed Central](#).

QUESTION NO: 4

The baseline fetal heart rate decreases with gestational age as a result of an increase in:

- A. Catecholamine production
- B. Intrinsic ventricular rate
- C. Parasympathetic tone

ANSWER: C

Explanation:

Parasympathetic tone is correct because maturation of the fetal autonomic nervous system progressively increases vagal influence on the sinoatrial node as gestation advances. The sinoatrial node is the fetal heart's normal pacemaker, and greater vagal (parasympathetic) activity slows its firing rate. Consequently, the expected baseline fetal heart rate gradually declines over the course of pregnancy, while remaining within the generally accepted normal baseline range of 110 to 160 beats per minute. This maturational change is physiologic and is reflected in fetal heart rate interpretation: autonomic development affects both baseline rate and the development of variability. The NICHD terminology document notes that fetal heart rate patterns are influenced by gestational age and describes the standardized assessment of baseline rate and variability used in clinical interpretation. The American College of Obstetricians and Gynecologists also identifies the baseline as a central component of fetal heart rate tracing assessment. Thus, increasing parasympathetic tone is the mechanism that explains the lower average baseline fetal heart rate seen with increasing gestational age. See the [ACOG guidance on fetal surveillance](#) and the [NICHD workshop report on fetal heart rate monitoring definitions](#).

QUESTION NO: 5

Uterine contraction intensity is manually measured by degree of uterine:

- A. Indentation
- B. Muscle strength
- C. Pain

ANSWER: A

Explanation:

Indentation is correct because manual assessment of uterine contraction intensity is performed by palpating the uterine fundus at the peak of a contraction and determining how readily the uterus can be indented. This tactile finding is documented qualitatively as mild, moderate, or strong. A mildly intense contraction feels soft and is easily indented; a moderate contraction is firmer and more difficult to indent; and a strong contraction feels very firm or rigid and is not readily indented. This method is particularly important with external uterine monitoring, because an external tocodynamometer identifies contraction timing and relative duration but does not directly quantify intrauterine pressure or intensity in mm Hg. Palpation therefore provides the bedside estimate of contraction intensity and should be interpreted with the overall fetal heart rate tracing and clinical circumstances. Quantitative contraction pressure and resting tone require an intrauterine pressure catheter when its use is clinically appropriate. NCC's EFM resources describe assessment of uterine activity and the distinction between external monitoring and internal pressure measurement; see the [NCC Electronic Fetal Monitoring certification overview](#). Additional clinical guidance on evaluating contraction patterns and uterine activity is available from [ACOG's intrapartum fetal heart rate tracing guidance](#).

QUESTION NO: 6

During labor, a patient develops sudden constant abdominal pain and dark vaginal bleeding. The uterus is firm and tender to palpation. The fetal heart rate tracing changes from moderate variability to recurrent late decelerations. The most likely cause is:

- A. Placental abruption
- B. Placenta previa
- C. Ruptured vasa previa

ANSWER: A

Explanation:

Placental abruption is correct. Placental abruption commonly presents with vaginal bleeding, uterine tenderness, increased uterine tone, and evidence of acute fetal compromise. Separation of the placenta reduces the surface available for maternal-fetal exchange and can produce recurrent late decelerations or a more severe fetal heart rate abnormality.

Placenta previa typically causes painless bright red bleeding with a soft, nontender uterus. Ruptured vasa previa often follows membrane rupture and is associated with rapid fetal deterioration despite stable maternal vital signs.

QUESTION NO: 7

An electronic fetal monitoring factor that best correlates with fetal well-being is:

- A. Absence of decelerations
- B. Baseline heart rate 140–150 bpm
- C. Presence of variability

ANSWER: C

Explanation:

Presence of variability is the electronic fetal monitoring characteristic that best correlates with fetal well-being. Baseline variability reflects the moment-to-moment interplay between the fetal autonomic nervous system and cardiac function. When variability is present—particularly when it is moderate, defined as an amplitude range of 6 to 25 beats per minute—it provides reassuring evidence that the fetus has an intact central nervous system and is not experiencing significant hypoxemia or metabolic acidemia at that time. This makes variability a particularly valuable indicator of fetal oxygenation and neurologic integrity during intrapartum surveillance. The NICHD standardized fetal heart rate terminology identifies moderate variability as a key reassuring feature, and ACOG similarly notes that moderate baseline variability reliably predicts the absence of fetal metabolic acidemia. Variability must be interpreted in the full clinical and tracing context, including uterine activity and evolving fetal heart rate patterns, but its presence remains the strongest single feature in this question for correlating with current fetal well-being. See ACOG's [Intrapartum Fetal Heart Rate Monitoring guidance](#) and the NICHD workshop report indexed by [PubMed](#).

QUESTION NO: 8

Based on the tracing shown, the first action should be to



- A. administer vibroacoustic stimulation
- B. assess maternal temperature
- C. palpate for contractions

ANSWER: C

Explanation:

Palpate for contractions is the appropriate first action because accurate interpretation of fetal heart rate changes depends on establishing the actual uterine activity occurring at the same time. Direct abdominal palpation can promptly confirm whether contractions are present, assess their relative frequency and duration, and help determine whether the external uterine activity signal is incomplete or unreliable. It also provides immediate clinical information about uterine relaxation between contractions, which is important when deciding whether uterine activity may be contributing to the observed fetal heart rate pattern. This bedside assessment allows the clinician to correlate the tracing with the patient's physiologic status before selecting a more specific intervention. Standardized fetal heart rate assessment requires evaluation of uterine contractions together with baseline rate, variability, accelerations, and decelerations; the relationship of fetal heart rate findings to contractions is central to categorizing and managing an intrapartum tracing. The NCC EFM examination tests this integrated assessment approach, and ACOG likewise describes uterine activity as an essential component of fetal heart rate tracing evaluation. See the [NCC Electronic Fetal Monitoring certification information](#) and ACOG's [guidance on intrapartum fetal heart rate tracings](#).

QUESTION NO: 9

What is the appropriate interpretation of this tracing?



- A. Marked variability
- B. Multiple prolonged accelerations
- C. Tachycardia with variable decelerations

ANSWER: A

Explanation:

Marked variability is the appropriate interpretation because the fetal heart rate tracing shows wide, irregular beat-to-beat fluctuations around the baseline, with an amplitude greater than 25 beats per minute. Under the standardized NICHD fetal heart rate terminology used in electronic fetal monitoring education and NCC examination content, baseline variability is assessed visually as the amplitude of fluctuations in the baseline fetal heart rate. Marked variability is specifically defined as fluctuations exceeding 25 beats per minute. The tracing's baseline is approximately within the normal range, while its prominent feature is the unusually broad oscillation of the fetal heart rate rather than a sustained baseline elevation or a discrete episodic pattern. Variability reflects fetal autonomic nervous system activity and should be described using the standardized absent, minimal, moderate, or marked categories. Accurate identification of marked variability requires evaluating the amplitude of the baseline fluctuations over the selected tracing segment and distinguishing this baseline characteristic from accelerations or decelerations. This terminology supports consistent clinical communication and appropriate ongoing assessment in labor. The NICHD standardized definitions are described in the 2008 workshop report, available through [PubMed](#). NCC identifies electronic fetal monitoring as a certification specialty and provides examination resources at the [NCC certification examinations page](#).

QUESTION NO: 10

Patient safety is enhanced when alarms:

- A. Are determined by the unit leaders
- B. Can be called by anyone
- C. Occur infrequently

ANSWER: B

Explanation:

“Can be called by anyone” is correct because reliable obstetric safety systems depend on every team member having the authority and responsibility to speak up, activate an escalation process, and obtain additional help when a maternal or fetal safety concern is recognized. At the bedside, the person who first identifies a concerning fetal heart rate pattern, maternal deterioration, or another urgent condition should not need to wait for a leader’s approval before communicating the concern and mobilizing appropriate resources. This approach reduces delays in assessment, intervention, and emergency response.

Team communication principles support a shared safety culture in which staff use clear escalation language, closed-loop communication, and rapid assistance when needed. In perinatal care, this includes promptly notifying the appropriate clinician and activating unit-specific emergency or rapid-response processes according to policy. Empowering all members of the care team to call for help helps address time-sensitive risks and supports situational awareness during labor and birth. The Agency for Healthcare Research and Quality's TeamSTEPPS framework describes team structures and communication practices that promote this type of mutual support and escalation: [AHRQ TeamSTEPPS](#). ACOG also emphasizes standardized systems and team-based readiness, recognition, response, and reporting in obstetric safety work: [ACOG Alliance for Innovation on Maternal Health](#).

QUESTION NO: 11

Fetal respiratory acidosis is most likely to present with which of the following fetal heart rate decelerations?

- A. Early
- B. Late
- C. Variable

ANSWER: C

Explanation:

Variable is correct because variable decelerations are classically associated with intermittent umbilical cord compression. Cord compression can transiently reduce fetoplacental blood flow and impair placental removal of fetal carbon dioxide. Retention of carbon dioxide raises the fetal partial pressure of carbon dioxide and lowers pH, producing respiratory acidosis. This is particularly relevant when variable decelerations are recurrent, deep, prolonged, or accompanied by other concerning features, because repeated interruptions in effective gas exchange increase the likelihood that carbon dioxide clearance will be inadequate.

Respiratory acidosis reflects an acute disturbance in ventilation or carbon dioxide exchange and may occur before significant depletion of buffer base. If the hypoxic or perfusion-related stress becomes sustained, anaerobic metabolism can add a metabolic component; therefore, fetal acid-base status must always be interpreted in the clinical context and not from a deceleration pattern alone. The standardized definition of variable decelerations and their relationship to cord compression are described in the NICHD fetal heart rate monitoring terminology workshop proceedings: [NICHD Workshop Report](#). Further physiologic context for intrapartum electronic fetal monitoring is available from [ACOG guidance on intrapartum fetal heart rate tracings](#).

QUESTION NO: 12

A reliable indicator of fetal oxygenation is fetal

- A. heart rate accelerations
- B. movement
- C. regular sleep–wake cycles

ANSWER: A

Explanation:

Fetal heart rate accelerations are a reliable reassuring indicator of fetal oxygenation at the time they are observed. An acceleration represents a transient increase in fetal heart rate, usually associated with fetal movement, and depends on an intact central nervous system and autonomic response. This response requires sufficient fetal oxygen reserve; therefore, accelerations provide evidence that the fetus is not experiencing significant metabolic acidemia at that point in time. In standardized fetal heart rate interpretation, accelerations are defined as visually apparent abrupt increases from the baseline, with the required amplitude and duration varying by gestational age. Their presence supports fetal well-being and is a reassuring feature of either an antepartum nonstress test or intrapartum tracing. Clinical interpretation remains contextual: accelerations offer information about current fetal status and should be considered with baseline rate, variability,

decelerations, uterine activity, and the overall maternal-fetal clinical picture. The NICHD fetal monitoring terminology identifies accelerations as a defined fetal heart rate characteristic, while ACOG guidance recognizes accelerations as reassuring evidence in fetal surveillance. See the [ACOG guidance on antepartum fetal surveillance](#) and the [NICHD workshop report on fetal heart rate monitoring terminology](#).

QUESTION NO: 13

This tracing has lasted for 20 minutes in a woman who is 6 cm dilated. The most appropriate intervention is:



- A. Delivery
- B. Fetal scalp stimulation
- C. Intravenous bolus of D5% Lactated Ringers

ANSWER: B

Explanation:

Fetal scalp stimulation is the most appropriate next intervention for a patient in active labor with a persistent indeterminate tracing characterized by minimal variability and no recurrent decelerations. This maneuver can be performed during a vaginal examination and provides a timely bedside assessment of fetal neurologic responsiveness. A resulting fetal heart rate acceleration is reassuring because it is strongly associated with the absence of significant metabolic acidemia at that time. In practical terms, an acceleration after scalp stimulation supports continued observation and labor management while the clinician continues to evaluate the overall fetal heart rate pattern and clinical context.

Minimal variability is an indeterminate, or Category II, feature rather than by itself a definitive indication for immediate operative delivery. In a tracing that has persisted for 20 minutes, fetal scalp stimulation is especially useful because it seeks additional information about current fetal acid-base status without delaying assessment. The test is interpreted in conjunction with the complete tracing, labor progress, maternal condition, and any evolving decelerations. NCC fetal monitoring education follows the NICHD standardized terminology and emphasizes assessment of Category II patterns using the full clinical picture. Guidance on intrapartum fetal heart rate tracing interpretation and management is available from [ACOG](#) and the [NICHD terminology overview](#).

QUESTION NO: 14

The factor that differentiates a prolonged deceleration from bradycardia is:

- A. Baseline rate
- B. Length of time it lasts
- C. Relationship to contractions

ANSWER: B

Explanation:

Length of time it lasts is correct because the NICHD standardized fetal heart rate terminology distinguishes these patterns primarily at the 10-minute threshold. A prolonged deceleration is a visually apparent decrease in fetal heart rate from the baseline of 15 beats per minute or more that lasts at least 2 minutes but less than 10 minutes. If the decreased rate persists for 10 minutes or longer, it is no longer classified as a deceleration; it represents a change in the baseline. When that new baseline is below 110 beats per minute for at least 10 minutes, the pattern is classified as fetal bradycardia.

Thus, a tracing may initially meet the definition of a prolonged deceleration, but its classification changes if the reduction continues to the 10-minute mark. This duration-based distinction is important for accurate standardized communication, documentation, and interpretation of fetal heart rate patterns. The rate itself helps establish whether the new baseline meets the definition of bradycardia, but the duration determines whether an observed decrease remains a prolonged deceleration or has become a baseline change. These definitions are reflected in the NICHD nomenclature adopted in professional guidance on intrapartum fetal heart rate monitoring. See [ACOG's Intrapartum Fetal Heart Rate Monitoring guidance](#) and the [NICHD workshop report](#).