PAKISTAN ENGINEERING COUNCIL

Sample MCQs

Mechanical Engineering (Manufacturing Engineering)/ Industrial and Manufacturing Engineering

Please read all the instructions carefully and do not start the paper unless asked to do so.

1. Fill in your particulars (Name, Roll Number, PEC Registration Number, CNIC and Discipline) in BLOCK letters in the space provided.

2. You are not allowed to change your seat during the test.

3. Hand over your answer sheet to the invigilator at the end of each part and keep seated until allowed to leave the centre.

4. The examination is divided into three Parts viz Part-I, Part-II and Part-III, with 30 minutes break.

5. All questions are to be attempted and carry equal marks.

6. Passing marks for each part is 60%, and passing all three parts is mandatory to qualify EPE.

7. Use only the provided pencil to fill completely the correct choice circle on answer sheet.

8. Programmable calculator, laptop, mobile phone, iPod, and any storage device/electronic gadget are not allowed.

9. No extra sheet will be provided; any calculation may be worked out on the back of the paper.

10. No candidate is allowed to indulge in any Law and Order situation to affect the exam process, and responsible(s) will be disqualified.

11. Use of unfair means will also lead to disqualification.

Instructions for Part-I

This part is common to all disciplines, comprising 30 multiple choice questions of one mark each (Total Marks=30) with the duration of two hours.

Instructions for Part-II

This is a discipline based open book breadth examination, comprising 30 multiple choice questions of one mark each (Total Marks=30), with the duration of two hours.

Instructions for Part-III

This is a discipline based open book depth examination comprising 40 multiple choice questions of one mark each (Total Marks=40), with duration of three hours. The candidates will be allowed only for the specialized filed / area of practice, for which already applied at the time of application.

Mechanical Engineering (Manufacturing Engineering)/ Industrial and Manufacturing Engineering

Part-I

Total Marks: 30   **Total Time: 2 hours**

Name:	S/o, D/o, w/o:
Roll Number:	PEC Reg#:
CNIC:	Discipline:

- -

Q.1: Quality control is aimed at:

    a. Maintaining the desired quality
    b. Exceeding the desired quality
    c. Continuously improving the quality
    d. Following the quality

Q.2: Which of these is correct with respect to a product developed or a service performed?.

    a. Bad quality is acceptable, but bad grade is not.
    b. Bad grade is acceptable, but bad quality is not.
    c. Neither bad grade nor quality is acceptable.
    d. Grade and quality is the same thing.

Q.3: Project A has an internal rate of return (IRR) of 21 percent. Project B has an IRR of 7 percent. Project C has an IRR of 31 percent. Project D has an IRR of 25 percent. Which of these would be the BEST project?

    a. Project A
    b. Project B
    c. Project C
    d. Project D

Q.4: What characteristic best describes the cost baseline?

    a. Total budget for the project

b. Time phased budget for the project
c. Total budget for the project including the contingency budget
d. Total budget for the project including the contingency budget and the management reserve.

Q.5: Present worth is:

a. The discounted future cash flows to the present
b. The compounding present cash flows to the future
c. The current market value of the investment
d. The opportunity cost at the present value.

Q.6: The first preferred way to resolve a dispute between the contracting parties is:

a. Arbitration
b. Litigation
c. Negotiation
d. Mediation

Q.7: Following document define the legal rights and obligations of the parties and may be described as the regulations under which the contract will be performed.

a. Specifications
b. General Conditions of Contract
c. Special provisions
d. Bill of Quantities

Q.8: The minimum notice period for National Competitive bidding is:

a. 30 days
b. 45 days
c. 35 days
d. 15 days

Q.9: Tsunamis' is generated by:

a. Earthquake
b. Air currents
c. Tidal waves
d. Large Ocean waves

Q.10: Globalization has direct impact on:

a. National security
b. Economy
c. Society
d. All above

Q.11: The passive voice for the sentence "He is writing a letter" is;

a. A letter is wrote by him
b. A letter is written by him
c. A letter is being written by him
d. A letter is been written by him

Q.12: Choose the correct sentence

a. He is elder than me
b. He is older than me
c. He is ager than me
d. He is older than I

Q.13: Effective communication is

a. The transfer of message from sender to receiver
b. Sending of massage
c. Receiving of message
d. The transfer of message from sender to receiver and get the desired response.

Q.14: Body language is form of;

a. Personality and attitudes
b. Non verbal communication
c. Individual preference for expression
d. The body expression

Q.15: Project feasibility report is aimed at;

a. Informing the people
b. Attracting the customer
c. Justifying the investment
d. Giving details of resources

Q.16: Research Proposal synopsis is developed at;

a. Final stage of research
b. Initial stage of research
c. Before approval of research proposal
d. In the middle of research

Q.17: Project monitoring is required:

    a. Before commencement of the project
    b. During implementation of the project
    c. After completion of the project
    d. At any stage of the project deemed necessary

Q.18: Re-appropriation Statement is form of

    a. Progress report
    b. Budget report
    c. Financial report
    d. Normal report

Q.19: PC-III (A) is used for

    a. For weekly progress report of public sector projects
    b. Monthly progress report of public sector projects
    c. Yearly progress report of public sector projects
    d. Quarterly progress report of public sector projects.

Q.20: Acquiring management and leadership skills are _____ for a Professional Engineer

    a. Wastage of time
    b. Not important
    c. Highly important
    d. Not necessary

Q.21: Engineering ethics refers to:

    a. The rules and standards given by an institution for Engineering practice
    b. The rules and regulation relating to obligations and rights of others.
    c. The professional regulation
    d. The rules and standards which govern the conduct of Engineers as professional Engineers.

Q.22: How many commandments are given in PEC Code of Ethics?

    a. 20
    b. 30
    c. 10
    d. 05

Q.23: As per PEC Code of Conduct a member shall report unethical professional practices of an engineer or a member with substantiating data to

a. Court of Law
b. Concerned Department
c. Pakistan Engineering Council
d. Law enforcing Agency

Q.24: When a member uses designs, plans, specifications, data and notes supplied to him by a client or an employer or are prepared by him in reference to such client or the employer's work such designs, plans, specifications, data and notes shall remain the property of the _____ and shall not be duplicated for any use without the express permission of the _____.

a. Member, Member
b. Client, Client
c. Member, Client
d. Client, Member

Q.25: As per PEC Code of Conduct to maintain, uphold and advance the honor and dignity of the engineering professional, a member shall do following except:

a. uphold the ideology of Pakistan
b. be honest, impartial and serve the country, his employer, clients and the public at large with devotion.
c. Uphold personal interest first
d. use his knowledge and skill for the advancement and welfare of mankind

Q.26: Conflicts are faced when:

a. There are more than one expected outcomes
b. There are more than one expected benefits and losses
c. There is choice between two or more moral values each having its own merits.
d. There are opposing outcomes.

Q.27: An example of a conflict of interest would be:

a. As a responsible official you make a decision about a contract award that will benefit you personally
b. You and a functional manager disagree with a task cost estimate
c. Your sponsor decides to cancel your project because it no longer supports the company strategy
d. Your personality conflicts with that of a key member of your project team.

Q.28: Adherence to professional ethics is _____ an engineer to society.

a. Not obligation of
b. An obligation of
c. Optional for
d. None of above

Q.29: While designing a project by an engineer, _____should be taken into account to protect cultural heritage

    a. All possible alternates
    b. No protection
    c. Minimum protection
    d. No care

Q.30: Close interpersonal relationships are characterized by high intimacy whereas distressed relationships tend to involve reciprocation of _____behaviour.

    a. positive
    b. negative
    c. normal
    d. casual

Answers:

1. a
2. b
3. c
4. b
5. a
6. c
7. a
8. d
9. a
10. d
11. c
12. b
13. d
14. b
15. c
16. c
17. b
18. c
19. b
20. c
21. d
22. c
23. c
24. b
25. c
26. c
27. a
28. b
29. a
30. b

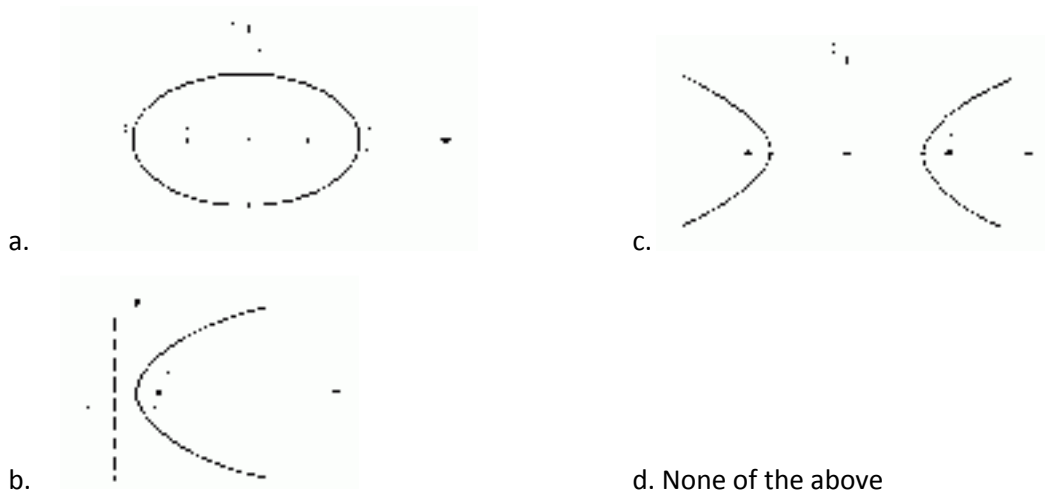# Part-II (Breadth of discipline)

Total Marks: 30   **Total Time: 2 hours**

(Sample MCQs= 28)

Q.1: You are allowed to choose four whole numbers from 1 to 10 (inclusive, without repeats). Which of the following is FALSE?

    a. The numbers 4, 5, 6, 7 have the smallest possible standard deviation.
    b. The numbers 1, 2, 3, 4 have the smallest possible standard deviation.
    c. The numbers 1, 5, 6, 10 have the largest possible standard deviation.
    d. The numbers 1, 2, 9, 10 have the largest possible standard deviation.

Q.2: Which of the following is a hyperbola ?

a.

c.

b.

d. None of the above

Q.3: A micron is:

    a. 1 mm
    b. 0.1 mm
    c. 0.01 mm
    d. 0.001 mm

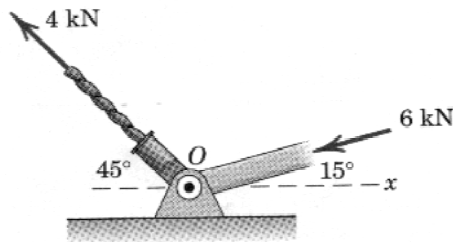**Q.4**: Draft or taper allowance in patterns is provided on:

    a. All sides of patterns
    b. All round surfaces of pattern
    c. All horizontal surfaces of the pattern
    d. All vertical surfaces of the pattern

Q.5: An $n \times n$ matrix is said to be symmetric if;

    a. If it is equal to its transpose
    b. If its determinant is equal to zero

c. If it is of 2nd order

d. None of the above

Q.6: The structural members, one of which is in tension and the other in compression, exert the indicated forces on joint "O". What is the angle θ of the resultant with the positive x-axis:

a. 141.6°
b. 151.6°
c. 161.6°
d. 171.6°

Q.7: A car comes to a complete stop from an initial speed of 50 miles/hr in a distance of 100 ft. With the same constant acceleration, what would be the stopping distance from an initial speed of 70 miles/hr?

a. 196 ft
b. 560 ft
c. 230 ft
d. 55 ft

Q.8: A bar of initial length of 152 mm is stretched to a length of 203 mm. What is the true strain in the direction of stretching?

a. 0.333
b. 0.2877
c. 0.500
d. 0.4055

Q.9: A better finish (lower roughness value) will tend to have which of the following effects on fatigue strength of a metal surface?

a. increase
b. decrease
c. no effect
d. none of the above

Q.10: In measurement and inspection for manufacturing, which one of the following fundamental physical quantities are we most concerned with?

a. electric current
b. length
c. light radiation
d. mass

Q.11: Which of the following elements is the most important alloying ingredient in steel?

a. Carbon
b. Chromium
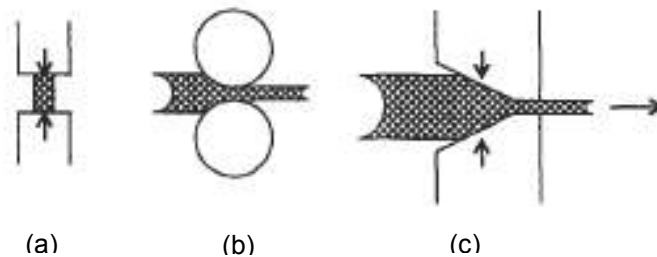c. Nickel
d. Molybdenum

Q.12: Which one of the following crystal structures has the fewest slip directions and therefore the metals with this structure are generally more difficult to deform at room temperature?

a. BCC
b. FCC
c. HCP
d. None of the above

Q.13: The shear strength of a metal is usually:

a. greater than
b. less than its tensile strength
c. all of the above
d. none of the above

Q.14: In the figure different metal forming processes are shown schematically. Which option best describe these processes?

(a)   (b)   (c)

a. drawing, forging, rolling
b. forging, drawing, rolling
c. rolling, drawing, forging
d. forging, rolling, drawing

Q.15: Which one of the following arcs welding processes uses a non consumable electrode?
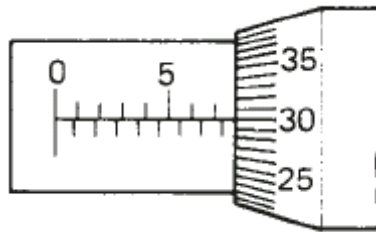
a. Flux Cored Arc Welding (FCAW)

b. Gas Metal Arc Welding (GMAW)
c. Gas Tungsten Arc Welding (GTAW)
d. Shielded Metal Arc Welding (SMAW)

Q.16: Speed in cycles/min in a shaper when stroke length is 200mm and cutting speed is 15m/min will be;

a. 20 cycles/min
b. 40 cycles/min
c. 75 cycles/min
d. 80 cycles/min

Q.17: In a micrometer given in the figure what is the correct value of the measurement?

a. 10.30 mm
b. 5.30 mm
c. 7.50 mm
d. 7.80 mm

Q.18: Which averaging method generally yields the higher value of surface roughness?

a. AA
b. RMS
c. CLA
d. none of the above

Q.19: The main constituent of moulding sand is

a. Carbon
b. Graphite
c. Clay
d. Silica

Q.20: The internal energy of a system is a function of only:

a. pressure
b. temperature (absolute)
c. volume
d. pressure and temperature

Q.21: If a certain amount of dry ice is mixed with same amount of water at 800C, the final temperature of mixture will be

a. 80^0C

b. 0⁰C
c. 40⁰C
d. 20⁰C

Q.22: A reversible engine working between the temperature limits of 600 K and 1200 K receives 50 kJ of heat. The work done by the engine will be:

a. 50 kJ
b. 100 kJ
c. 25 kJ
d. -25 kJ

Q.23: For a cylindrical rod with uniformly distributed heat sources, the thermal gradient dt/dr at half the radius location will be that at the surface:

a. One Fourth
b. One Half
c. Twice
d. Four Times

Q.24: In case of laminar flow over a plate the convective heat transfer coefficient:

a. Decreases with increase in free stream velocity
b. Increase with distance
c. Increases if higher viscosity fluid is used
d. Increases if a denser fluid is used

Q.25: A thin flat plate 2m by 2m is hanging freely in air. The temperature of the surrounding is 25°C. Solar radiation is falling on one side of the plate at the rate of 500W/m2. The temperature of the plate will remain constant at 30°C if the convective heat transfer coefficient (in W/m2 °C) is:

a. 25
b. 50
c. 100
d. 200

Q.26: Surface tension of a fluid

a. Depends on the forces of molecular attraction
b. Is inversely proportional to fluid density
c. Is zero when fluid is at rest
d. Is result of interaction between viscosity and atmospheric pressure

Q.27: The centre of buoyancy always coincides with:

a. Centre of gravity of the body
b. Centroid of the volume displaced

c. Metacentre
d. None of the above

Q.28: Geometric similarity between model and prototype means

a. The similarity of discharge
b. The similarity of linear dimension
c. Te similarity of motion
d. The similarity of forces

Answers:

1. c
2. c
3. d
4. d
5. a
6. d
7. a
8. b
9. b
10. b
11. a
12. c
13. b
14. d
15. c
16. b
17. d
18. b
19. d
20. b
21. b
22. c
23. b
24. d
25. a
26. a
27. b
28. b

Part-III

(Depth: Manufacturing Engineering/ Industrial & Manufacturing Engineering)

Total Marks/ MCQs: 40   **Total Time: 3 hours**

(Sample MCQs = 20)

Q.1: Three Dimensional representation of an object is termed as:

   a. Automated drafting
   b. Engineering analysis
   c. Geometric Modelling
   d. All of the above

Q.2: CAE and CAM are linked through:

   a. A common database and communication system
   b. NC tape programming and automated design
   c. Assembly automation and tool production
   d. Parts production and testing

Q.3: Which item best describes a CAM technology?

   a. Numerical control
   b. Documentation
   c. Drafting
   d. Geometric modelling

Q.4: g08 is used for;

   a. preparing the contouring system for a point-to-point operation
   b. linear interpolation in contouring systems
   c. circular interpolation, clockwise
   d. causes machine to accelerate smoothly

Q.5: A line is defined by its end points (0, 0) and (2, 3) in a two-dimensional graphics system. It is desired to translate the line by 2 units in the x-direction and 3 units in the y-direction. The new line would have following end points:

   a. (3, 4) and (4, 7)
   b. (2, 3) and (4, 6)
   c. (0, 0) and (2, 3)
   d. none of the above

Q.6: Productivity increases when

a. inputs increase while outputs remain the same
b. inputs decrease while outputs remain the same
c. outputs decrease while inputs remain the same
d. inputs and outputs increase proportionately

Q.7: A work operation of three elements has been analyzed using stopwatch time study techniques. The following data were collected. Management has decided to allow a 20% allowance. Determine the standard time for the operation.

Job Element	Performance Rating	Observations (min./part)			
		1	2	3	4
1	0.80	.13	.14	.15	.16
2	0.90	.22	.24	.27	.25
3	1.00	.30	.30	.30	.30

a. .690
b. .637
c. .796
d. .600

Q.8: What is the critical path time for a small maintenance project which consists of the following job activities?

Job	Initial and Final Node	Duration (hours)
a	(1,2)	2
b	(2,3)	3
c	(2,4)	5
d	(3,5)	4
e	(4,5)	1

a. 15 hours
b. 08 hours
c. 09 hours
d. 10 hours

Q.9: The person responsible for assigning the resources to a project is most often:

a. The project management
b. The Human Resources Department
c. The line manager
d. The executive sponsor

Q.10: You are the project manager of ABC project. Mid-way through the project a key component was stolen. This was not planned for. The team met after the event and managed to make the product work without the stolen component. This is an example of:

a. Risk mitigation
b. Transfer of risk
c. Work-around
d. Accepting the consequences passively.

Q.11: In a production turning operation, the foreman has decided that the single pass must be completed on the cylindrical work-piece in 5.0 min. The piece is 400 mm long and 150 mm in diameter. Using a feed = 0.30 mm/rev and a depth of cut = 4.0 mm, what cutting speed must be used to meet this machining time requirement?

a. 1257.0 m/min
b. 125.7 m/min
c. 12.57 m/min
d. 125.7 m/s

Q.12: In a surface grinding operation the wheel diameter = 150 mm and the in-feed = 0.07 mm. The wheel speed = 1450 m/min, work speed = 0.25 m/s, and the cross-feed = 5 mm. The number of active grits per area of wheel surface C = 0.75 grits/mm^2. What is the average length per chip?

a. 3.24 mm
b. 4.24 mm
c. 5.24 mm
d. 6.24 mm

Q.13: In an electrochemical machining operation, the frontal working area of the electrode is 2.5 in^2. The applied current = 1500 amps, and the voltage = 12 volts. The material being cut is pure aluminium, whose specific removal rate C = 0.000126 in^3/A-min. If the resistivity of the electrolyte = 6.2 ohm-in, what is the working gap?

a. 0.0032 in
b. 1.0032 in
c. 2.0032 in
d. 3.0032 in

Q.14: A metal removal rate of 0.01 in^3/ min is achieved in a certain EDM operation on a pure iron work part. What is the metal removal rate would be achieved in this EDM operation? (T$_m$ = 2802$\square$F for iron)

a.   3.424 A
b.   34.24 A
c.   342.4 A
d.   39.24 A

Q.15: The cutting force and thrust force have been measured in an orthogonal cutting operation: Fc = 300 lb and Ft = 291 lb. The rake angle = 10$\square$, the width of the cut = 0.200 in, the chip thickness before the cut = 0.015, and the chip thickness ratio = 0.4. What is the coefficient of friction in the operation?

a. 2.291
b. 3.291
c. 1.891
d. 1.380

Q.16: If an activity on the critical path takes longer than anticipated, then:

a. Activities not on the critical path have additional slack.
b. Activities not on the critical path have less slack.
c. Additional critical path activities will appear.
d. None of the above.

Q.17: If there is a 40 percent chance of making Rs 100,000 and a 60 percent chance of losing Rs 150,000, then the expected monetary outcome in Rupees is:

a. 50,000.
b. –50,000.
c. 90,000.
d. –90,000.

Q.18: In Total Productive Maintenance, Unplanned Down Time Losses include;

    a. Equipment Breakdown
    b. Change Over
    c. Shift Changes
    d. Options (a) & (b)

Q.19: Elements of TQM includes

    a. Total Employee Involvement
    b. Customer Focus
    c. Leadership
    d. All the above

Q.20: The EHS Model based on PDCA Cycle starts from:

    a. Planning
    b. Policy
    c. Implementation & Operations
    d. Management Reviews

Answers:

1.	c
2.	b
3.	a
4.	d
5.	b
6.	b
7.	c
8.	c
9.	c
10.	c
11.	b
12.	a
13.	a
14.	b
15.	d
16.	a
17.	b
18.	d
19.	d
20.	a