Assistant Engineer (BPS-17) — 2025 · Solved Past Paper

Body: Balochistan Public Service Commission (BPSC) · **Post:** Assistant Engineer (BPS-17) · **Year:** 2025 · **Questions:** 70 in the original paper — **70 solved and verified**, none excluded · **Price:** Free

> **How to use this paper:** each question shows the stem, the four options, and the correct answer. Click “Why each option?” under a question to see all four options explained — one question teaches four topics. General Knowledge answers are as of the 2025 sitting.

Source note: testpointpk reproduction, 'BPSC Assistant Engineer Solved Past Paper 14-04-2025' (70 items, served order Q1–Q70) primary; no second source — every answer verified independently from domain knowledge, with web checks on the contested items. DISCIPLINE NOTE: the reproduction states NO discipline; the stems are mechanical engineering throughout (strength of materials, engineering materials, manufacturing processes, thermodynamics, fluid mechanics, theory of machines), so this sitting is filed as the Mechanical paper — the discipline is inferred from the stems, NOT an official fact. 3 printed-key corrections made openly (including Q9: the combined slip-and-creep limit is 3%, not 4%, corrected to D None of these; Q26: quartz is piezoelectric, not ferromagnetic). 5 PICK-ONE (Q17, Q38, Q42, Q53, Q70). All decisions by the assistant under the owner's 8 Nov 2026 delegation.

Question 1 Physics

Impulse gives a measure of the product of _____?

- A. Force and displacement
- B. Force and time ✓ **Correct answer**

- D. None of these

A. Wrong: force times displacement is work (or energy), not impulse.

B. Correct: impulse J = F × t, the product of the force applied and the time for which it acts, equal to the change of momentum.

C. Wrong: force times velocity is power, not impulse.

D. Wrong: force and time is among the options and is correct.

Question 2 Physics

The reciprocal of the resistivity of a material is called its?

- A. Impedance
- B. Conductivity ✓ **Correct answer**
- C. Admittance
- D. Resistance

A. Wrong: impedance is the total opposition to alternating current (resistance plus reactance), not the reciprocal of resistivity.

B. Correct: conductivity σ = 1/ρ, where ρ is resistivity; it measures how easily a material conducts electricity.

C. Wrong: admittance is the reciprocal of impedance in AC circuits, not of resistivity.

D. Wrong: resistance is the opposition itself (R = ρL/A), not its reciprocal.

Question 3 Engineering (Materials)

Percentage elongation during tensile test is indicative of _____?

- A. Fatigue strength
- B. Ductility ✓ **Correct answer**

- D. None of these

A. Wrong: fatigue strength is the stress a material survives under repeated loading; it is not measured by percentage elongation.

B. Correct: percentage elongation (the increase in gauge length at fracture, divided by the original length) is the standard measure of ductility — how far a material stretches before it breaks.

C. Wrong: malleability is the ability to be hammered or rolled into thin sheets; it is measured by reduction in area or by rolling, not by tensile elongation.

D. Wrong: ductility is among the options and is correct.

Question 4 Engineering (Materials)

Steel is more elastic than Rubber because _____?

- A. Its density is high
- B. Ratio of stress to strain is more ✓ **Correct answer**
- C. Ratio of stress to strain is less
- D. It is a metal

A. Wrong: elasticity does not depend on density; a dense material is not automatically more elastic.

B. Correct: the ratio of stress to strain is Young's modulus, and steel's modulus (about 200 GPa) is far larger than rubber's (about 0.01–0.1 GPa), so steel is far more elastic in the engineering sense — it takes far more stress to produce a given strain.

C. Wrong: steel's stress-to-strain ratio is much MORE than rubber's, not less.

D. Wrong: merely being a metal does not explain elasticity; the explanation is the higher modulus.

5 Engineering (Measurement)

The maximum allowable limit that a measurement may vary from the true value is called ____?

- A. Least error
- B. Permissible error ✓ **Correct answer**
- C. Expected error
- D. None of these

A. Wrong: the least count (or least error) is the smallest value an instrument can measure, not the maximum allowed deviation.

B. Correct: the permissible (allowable) error is the maximum error a measurement is allowed to have from the true value and still be accepted.

C. Wrong: an expected error is the error one anticipates on average; it is not the defined maximum allowable limit.

D. Wrong: permissible error is among the options and is correct.

Question 6 Engineering (Thermodynamics)

Thermal diffusivity is _____?

- A. A mathematical formula
- B. A physical property of the material ✓ **Correct answer**
- C. A configuration for heat conduction
- D. None of these

A. Wrong: thermal diffusivity is a quantity ($\alpha = k/\rho cp$), not a formula; it is defined by a formula but is itself a property.

B. Correct: thermal diffusivity measures how fast heat spreads through a material (thermal conductivity divided by density times specific heat) and depends only on the material.

configuration is a shape or arrangement (like a slab or a cylinder); thermal diffusivity is not an arrangement.

D. Wrong: a physical property of the material is among the options and is correct.

Question 7 Engineering (Manufacturing)

Process used for casting gas turbine blades is _____?

- A. Investment moulding ✓ **Correct answer**
- B. Sand casting
- C. Die casting
- D. None of these

A. Correct: gas turbine blades, with their complex airfoil shapes and internal cooling passages, are cast by investment (lost-wax) casting, which gives the fine detail and smooth surface they need.

B. Wrong: sand casting is too coarse for the thin, precise shape of a turbine blade.

C. Wrong: die casting suits small non-ferrous parts in large numbers; turbine blades are high-temperature superalloys cast by investment moulding.

D. Wrong: investment moulding is among the options and is correct.

Question 8 Engineering (Manufacturing)

Which is the most widely used metal for castings?

- A. Cast iron ✓ **Correct answer**
- B. Aluminum
- C. Brass
- D. Magnesium alloys

A. Correct: cast iron (especially grey cast iron) is the most widely used casting metal — cheap, fluid when molten, easy to cast, and good in compression, used for engine blocks,

ls and pipes.

B. Wrong: aluminium is widely cast (and light), but by tonnage and breadth of use it is behind cast iron.

C. Wrong: brass is cast for fittings and decorative parts, but far less widely than cast iron.

D. Wrong: magnesium alloys are cast for light specialist parts, but in much smaller quantities than cast iron.

Question 9 Engineering (Machine Design)

The combined effect of slip and creep should not exceed ____?

- A. 4%
- B. 1.5%
- C. 2.5%
- D. None of these ✓ **Correct answer**

A. Wrong: the standard textbook limit is 3%, not 4% (the printed key A is wrong — see verification summary).

B. Wrong: the standard limit is 3%, not 1.5%.

C. Wrong: the standard limit is 3%, not 2.5%.

D. Correct: in belt drives the combined effect of slip and creep is called simply "slip", and the textbook rule is that it should not exceed three percent — and 3% is not among the options, so "None of these" is the answer. Printed-key correction: testpointpk keys A '4%'; corrected to D 'None of these' (see verification summary).

Question 10 Engineering (Machine Design)

Rivets are generally specified by _____?

- A. Shape of head

- C. Diameter of shank ✓ **Correct answer**
- D. None of these

A. Wrong: the head shape (snap, countersunk, pan) describes the rivet type, but the rivet is specified (sized) by its shank, not its head shape.

B. Wrong: the head diameter follows from the shank diameter; the specification is the shank.

C. Correct: rivets are specified by the diameter of the shank (and its length) — that is the size that fixes the hole and the strength.

D. Wrong: diameter of shank is among the options and is correct.

Question 11 Engineering (Materials)

Steel can be hardened quickly by the process of _____?

- A. Carbonizing
- B. Induction hardening ✓ **Correct answer**
- C. Nitriding
- D. None of these

A. Wrong: carbonizing (carburizing) is a slow case-hardening process in which carbon diffuses into the surface over hours; it is not a quick hardening method.

B. Correct: induction hardening heats only the surface layer in seconds with a high-frequency induction coil, then quenches it — the fastest way to harden a steel surface.

C. Wrong: nitriding is also a slow diffusion process (nitrogen into the surface over many hours) and hardens only a thin case.

D. Wrong: induction hardening is among the options and is correct.

12 Engineering (Materials)

In carbon steel, the presence of small quantities of sulphur improves ____?

- A. Machinability ✓ **Correct answer**
- B. Weldability
- C. Formability
- D. None of these

A. Correct: small amounts of sulphur form manganese sulphide inclusions that break the chip into short pieces, so the steel cuts freely — free-cutting steels are deliberately made with added sulphur.

B. Wrong: sulphur HURTS weldability; it causes hot cracking in welds.

C. Wrong: sulphur does not improve formability; it makes the steel less ductile (hot shortness).

D. Wrong: machinability is among the options and is correct.

Question 13 Engineering (Materials)

Cast iron is _____?

- A. Resilient
- B. Tough
- C. Wear resistant ✓ **Correct answer**
- D. None of these

A. Wrong: resilience is the ability to absorb elastic energy and spring back; cast iron is brittle and not notably resilient.

B. Wrong: cast iron is brittle, not tough — it fractures with little plastic deformation.

C. Correct: the graphite flakes in grey cast iron act as a solid lubricant and the hard structure resists abrasion, so cast iron is valued for wear resistance (machine slideways,

D. Wrong: wear resistant is among the options and is correct.

Question 14 Engineering (Materials)

The slag from the blast furnace consists of _____?

- A. Calcium and ferrous silicates ✓ **Correct answer**
- B. Aluminum and ferrous silicates
- C. Calcium and aluminum
- D. None of these

A. Correct: blast-furnace slag is mainly calcium silicate (lime, CaO, combining with silica, SiO2, from the ore and coke ash), with iron compounds — the textbook description of the slag as calcium and ferrous silicates.

B. Wrong: alumina is only a minor part of the slag; the main base is lime (calcium), not aluminium.

C. Wrong: the slag is not a mixture of calcium and aluminium metals; it is a silicate slag, mostly calcium silicate.

D. Wrong: calcium and ferrous silicates is among the options and is correct.

Question 15 Physics

Iron has the unique characteristic of being _____?

- A. Ferroelectric
- B. Dielectric
- C. Ferromagnetic ✓ **Correct answer**
- D. None of these

A. Wrong: ferroelectric materials (like barium titanate) hold a permanent electric polarisation; iron does not.

dielectric is an electrical insulator; iron is a conductor.

C. Correct: iron is the classic ferromagnetic material — it is strongly attracted to magnets and can itself be magnetised, which is why it is used in transformer cores and electromagnets.

D. Wrong: ferromagnetic is among the options and is correct.

Question 16 Engineering (Manufacturing)

For wire drawing operation, the work material should be _____?

- A. Resilient
- B. Ductile ✓ **Correct answer**
- C. Tough
- D. None of these

A. Wrong: resilience is about recovering elastically; wire drawing is a large plastic deformation, so resilience is not the property needed.

B. Correct: wire drawing pulls a rod through a die to reduce its diameter, which needs the metal to stretch plastically without breaking — that is ductility.

C. Wrong: toughness helps a material absorb energy, but the property that lets it be drawn into a long thin wire is ductility, not toughness.

D. Wrong: ductile is among the options and is correct.

Question 17 Engineering (Materials)

The area under the stress-strain curve represents _____?

- A. Energy required to cause failure
- B. Breaking strength of material
- C. Toughness of material ✓ **Correct answer**
- D. None of these

n substance: the area is exactly the energy absorbed per unit volume before fracture, which is why this item is a pick-one rather than a clean verified item; it is not the standard name.

B. Wrong: breaking strength is the stress at the fracture point (a single point on the curve), not the area under it.

C. Picked: the total area under the curve is the modulus of toughness.

D. Wrong: toughness is among the options and is correct.

Question 18 Engineering (Materials)

The tendency of a material to fracture without appreciable deformation is called ____?

- A. Toughness
- B. Plasticity
- C. Brittleness ✓ **Correct answer**
- D. None of these

A. Wrong: toughness is the ability to absorb energy and deform plastically before fracturing — the opposite of fracturing without deformation.

B. Wrong: plasticity is the ability to deform permanently without breaking — the opposite of this tendency.

C. Correct: brittleness is exactly the tendency to fracture with little or no plastic deformation (glass and cast iron are the classic examples).

D. Wrong: brittleness is among the options and is correct.

Question 19 Engineering (Materials)

Modulus of elasticity is defined as the ratio of _____?

- A. Axial stress to volumetric strain

- C. Axial stress to axial strain ✓ **Correct answer**
- D. None of these

A. Wrong: axial stress divided by volumetric (bulk) strain is the bulk modulus, not Young's modulus.

B. Wrong: the ratio of lateral strain to axial strain is Poisson's ratio; axial stress over lateral strain is not the modulus of elasticity.

C. Correct: Young's modulus E = axial stress / axial strain (stress and strain in the same direction), the slope of the linear part of the stress-strain curve.

D. Wrong: axial stress to axial strain is among the options and is correct.

Question 20 Physics

The Moment of inertia (MOI) of a body does not depend upon _____?

- A. Angular velocity of the body ✓ **Correct answer**
- B. Shape of the body
- C. Axis of rotation of the body
- D. None of these

A. Correct: the moment of inertia depends on the mass distribution ($I = \Sigma mr^2$); how fast the body spins does not change it.

B. Wrong: shape fixes how mass is distributed, so the moment of inertia DOES depend on shape.

C. Wrong: the moment of inertia is defined about a particular axis, so it DOES depend on which axis is chosen.

D. Wrong: angular velocity is among the options and is correct.

First Law of motion gives the definition of _____?

- A. Rest
- B. Motion
- C. Velocity
- D. Inertia ✓ **Correct answer**

A. Wrong: the first law is not a definition of rest alone; it covers both rest and uniform motion.

B. Wrong: the first law does not define motion in general; it states when motion does or does not change.

C. Wrong: velocity is defined as rate of change of displacement, not by the first law.

D. Correct: Newton's first law (a body stays at rest or in uniform motion unless acted on by a force) is the law of inertia — it defines the property of inertia, the resistance of a body to any change in its state of motion.

Question 22 Engineering (Materials)

Which of the following processes is not adopted for increasing the fatigue strength of a material? Better surface condition, Cold working, Hot working, Shot peening

- A. Better surface condition
- B. Cold working
- C. Hot working ✓ **Correct answer**
- D. Shot peening

A. Wrong as the answer: a better (smoother, polished) surface removes the scratches and notches where fatigue cracks start, so it DOES increase fatigue strength.

B. Wrong as the answer: cold working puts compressive residual stresses in the surface, which DOES increase fatigue strength.

hot working (forging or rolling at high temperature) causes scaling and decarburisation of the surface and does not put in the compressive surface stresses that raise fatigue strength — it is not adopted for increasing fatigue strength.

D. Wrong as the answer: shot peening hammers the surface with small shot, leaving compressive residual stress, which DOES increase fatigue strength.

Question 23 Engineering (Materials)

Silica is _____?

- A. A metallic alloy
- B. A composite material
- C. A ceramic material ✓ **Correct answer**
- D. None of these

A. Wrong: silica (SiO_2) contains no metal as its main constituent and is not an alloy of metals.

B. Wrong: a composite is a combination of two or more distinct materials (like fibre in resin); silica is a single compound.

C. Correct: silica (silicon dioxide, the main constituent of sand and glass) is an inorganic, non-metallic compound — a ceramic.

D. Wrong: a ceramic material is among the options and is correct.

Question 24 Engineering (Materials)

Select the alloy used for manufacture of food processing machinery?

- A. Pewter
- B. Monel metal ✓ **Correct answer**
- C. Alenco
- D. None of these

Pewter (a tin alloy) is used for tableware and ornaments, not for food-processing machinery.

B. Correct: Monel (nickel-copper alloy) resists corrosion from food acids and salts, is strong and non-toxic, and is used for food-processing equipment, dairy plant and chemical plant.

C. Wrong: "Alenco" is not a standard alloy used for food-processing machinery.

D. Wrong: Monel metal is among the options and is correct.

Question 25 Engineering (Materials)

Monel metal is an alloy of _____?

- A. Nickel and copper ✓ **Correct answer**
- B. Copper and chromium
- C. Nickel and chromium
- D. None of these

A. Correct: Monel is a nickel-copper alloy (about 67% nickel, 30% copper), known for corrosion resistance.

B. Wrong: copper and chromium is not Monel; chromium with copper gives chromium-copper alloys, a different family.

C. Wrong: nickel and chromium is the basis of nichrome (heating elements) and of stainless steels, not of Monel.

D. Wrong: nickel and copper is among the options and is correct.

Question 26 Engineering (Materials)

Quartz is a _____ material.

- A. Ferromagnetic

- C. Piezoelectric ✓ **Correct answer**
- D. None of these

A. Wrong: ferromagnetic materials (iron, nickel, cobalt) are strongly magnetic; quartz is silicon dioxide and is not magnetic at all (the printed key A is wrong — see verification summary).

B. Wrong: quartz is very weakly diamagnetic, but that is not the property it is known and used for.

C. Correct: quartz is the classic piezoelectric material — squeezing it generates an electric charge, and applying a voltage makes it vibrate at a precise frequency (the basis of quartz watches and sonar transducers).

D. Wrong: piezoelectric is among the options and is correct. Printed-key correction: testpointpk keys A 'Ferromagnetic'; corrected to C 'Piezoelectric' (see verification summary).

Question 27 Engineering (Materials)

Addition of sulphur to steel increases its _____?

- A. Corrosion resistance
- B. Wear resistance
- C. Machinability ✓ **Correct answer**
- D. None of these

A. Wrong: sulphur does not protect steel from corrosion; if anything it makes it worse.

B. Wrong: sulphur does not harden steel or improve wear resistance.

C. Correct: sulphur forms manganese sulphide inclusions that break the chip short, so the steel cuts freely and tools last longer (the same fact as Q12).

achinability is among the options and is correct.

Question 28 Engineering (Materials)

During normalizing operation, the steel castings are cooled in _____?

- A. Furnace itself
- B. Air ✓ **Correct answer**
- C. Oil bath
- D. None of these

A. Wrong: cooling slowly inside the furnace is annealing, not normalizing.

B. Correct: normalizing means heating the steel above its critical temperature and cooling it in still air — faster than annealing, giving a finer grain and stronger steel.

C. Wrong: cooling in oil is quenching (hardening), which is much faster and makes the steel hard and brittle.

D. Wrong: air is among the options and is correct.

Question 29 Engineering (Materials)

Cold worked components are generally subjected to the following process to relieve stresses?

- A. Tempering
- B. Annealing ✓ **Correct answer**
- C. Austempering
- D. None of these

A. Wrong: tempering relieves stresses in HARDENED (quenched) steel; cold-worked parts are stress-relieved by annealing.

B. Correct: cold working leaves large internal (residual) stresses; stress-relief annealing — heating to a moderate temperature and cooling slowly — removes them and restores

C. Wrong: austempering is a heat treatment that produces bainite in steel; it is not the stress-relief treatment for cold-worked parts.

D. Wrong: annealing is among the options and is correct.

Question 30 Engineering (Materials)

Mild steel belongs to the category of _____?

- A. No carbon steel
- B. Low carbon steel ✓ **Correct answer**
- C. Medium carbon steel
- D. None of these

A. Wrong: mild steel does contain carbon (about 0.05–0.25%); pure iron with no carbon is not mild steel.

B. Correct: mild steel is a low-carbon steel (roughly 0.05–0.25% carbon), which is why it is soft, ductile and easy to weld.

C. Wrong: medium-carbon steels have about 0.25–0.6% carbon and are harder and stronger than mild steel.

D. Wrong: low carbon steel is among the options and is correct.

Question 31 Engineering (Materials)

Silicon in cast iron _____?

- A. Makes the castings unsound
- B. Promotes the formation of graphite ✓ **Correct answer**
- C. Aids fusibility and fluidity
- D. None of these

icon does not make castings unsound; in proper amounts it improves the iron.

B. Correct: silicon is a graphitiser — it pushes carbon in cast iron to separate out as graphite flakes instead of staying combined as cementite, which is what makes grey cast iron soft and machinable.

C. Wrong: silicon's key role in cast iron is graphitisation, not making the metal more fluid (that is mainly a matter of carbon and temperature).

D. Wrong: promotes the formation of graphite is among the options and is correct.

Question 32 Engineering (Materials)

Pig iron may be basic or acidic depending upon its _____?

- A. Slag content
- B. Sulphur
- C. Phosphorus
- D. Silicon ✓ **Correct answer**

A. Wrong: slag is the waste that floats on the molten iron, not a property of the pig iron itself; basic vs acid pig iron is not graded by slag content (the printed key A is wrong — see verification summary).

B. Wrong: sulphur content matters for steel quality, but it is not what defines basic vs acid pig iron.

C. Wrong: phosphorus is removed in the basic process, but the basic/acid grading of the pig iron itself is set by its silicon content.

D. Correct: basic pig iron is low-silicon (about 0.75–1.25% Si) and acid pig iron is high-silicon (about 2–2.5% Si); the silicon content is the standard basis of the classification. Printed-key correction: testpointpk keys A 'Slag content'; corrected to D 'Silicon' (see verification summary).

33 Engineering (Materials)

Pick up the material with highest ductility? Tin, Lead, Gold, Copper

- A. Tin
- B. Lead
- C. Gold ✓ **Correct answer**
- D. Copper

A. Wrong: tin is soft but its ductility is far below gold's.

B. Wrong: lead is soft and malleable but not the most ductile of the four.

C. Correct: gold is the most ductile metal — it can be drawn into the finest wire (a single gram can be drawn into kilometres of wire) and is also the most malleable.

D. Wrong: copper is very ductile (the usual wire metal), but gold beats it.

Question 34 Engineering (Mechanics)

The maximum bending moment in a simply supported beam carrying two unequal concentrated loads occurs _____?

- A. Under the heavier load ✓ **Correct answer**
- B. At the mid span
- C. Under any of the loads
- D. None of the above

A. Correct: for two unequal concentrated loads on a simply supported beam, the bending moment diagram peaks under the heavier load, where the shear force changes sign.

B. Wrong: the maximum is at mid-span only for symmetric loading (for example a central load or a uniform load); with two unequal loads it is not at mid-span.

C. Wrong: the maximum is under the HEAVIER load specifically, not under either load indiscriminately.

nder the heavier load is among the options and is correct.

Question 35 Engineering (Materials)

The impact strength of a material is an index of its _____?

- A. Resistance to failure under reversal of stresses
- B. Hardness
- C. Toughness ✓ **Correct answer**
- D. None of these

A. Wrong: resistance to failure under reversed stresses is fatigue strength, measured by fatigue tests, not by impact tests.

B. Wrong: hardness is resistance to indentation or scratching; an impact test does not measure it.

C. Correct: impact strength (measured by the Charpy or Izod test, the energy absorbed in breaking a notched specimen) is the standard index of toughness — the ability to absorb energy suddenly without fracturing.

D. Wrong: toughness is among the options and is correct.

Question 36 Engineering (Materials)

The point on the stress-strain curve at which the cross-sectional area of the test specimen starts decreasing is called the _____?

- A. Ultimate stress point ✓ **Correct answer**
- B. Elastic limit
- C. Upper yield point
- D. None of these

A. Correct: at the ultimate tensile strength the specimen begins to neck — its cross-section starts to decrease locally — and the load the specimen can carry starts to fall.

e elastic limit is the point up to which the material returns to its original shape; the cross-section does not start decreasing there.

C. Wrong: the upper yield point is where yielding suddenly begins (in mild steel); necking starts much later, at the ultimate point.

D. Wrong: ultimate stress point is among the options and is correct.

Question 37 Engineering (Materials)

Toughness of a material signifies _____?

- A. Brittleness
- B. Strength ✓ **Correct answer**
- C. Softening
- D. None of these

A. Wrong: brittleness is the opposite of toughness — a brittle material absorbs almost no energy before it breaks.

B. Correct: toughness is defined in the textbooks as the strength with which a material opposes rupture — the combination of strength and ductility that lets it absorb energy before breaking; of the options offered, strength is the intended answer (see verification summary).

C. Wrong: softening (loss of hardness) is not what toughness signifies.

D. Wrong: strength is among the options and is correct.

Question 38 Physics

Which of the following is a dimensional quantity? Shear stress, Bulk modulus, Poisson's ratio, Strain

- A. Shear stress ✓ **Correct answer**
- B. Bulk modulus

- D. Strain

A. Picked: shear stress is force per unit area, so it has dimensions ($ML^{-1}T^{-2}$).

B. Also dimensional: bulk modulus is pressure divided by volumetric strain, so it too has units of pressure — which is why this item is a pick-one rather than a clean verified item.

C. Wrong: Poisson's ratio is lateral strain divided by axial strain, a pure number with no dimensions.

D. Wrong: strain is change in length divided by original length, a pure number with no dimensions.

Question 39 Engineering (Materials)

Which of the following is the most elastic material? Steel, Rubber, Sponge, Glass

- A. Steel ✓ **Correct answer**
- B. Rubber
- C. Glass
- D. Sponge

A. Correct: "most elastic" in engineering means the highest Young's modulus — steel's modulus (about 200 GPa) is far above glass (about 70 GPa) and enormously above rubber and sponge, so steel is the most elastic.

B. Wrong: rubber stretches a long way, but that is because its modulus is tiny; it is the LEAST elastic in the modulus sense, not the most.

C. Wrong: glass is more elastic than rubber (modulus about 70 GPa) but far less than steel.

D. Wrong: a sponge is mostly air and deforms with almost no resistance; it is not elastic in the modulus sense.

40 Physics

Which one of the following surfaces in contact has minimum coefficient of friction?

- A. Steel on steel
- B. Rubber tyre on dry concrete
- C. Rubber tyre on wet concrete ✓ **Correct answer**
- D. None of these

A. Wrong: dry steel on steel has a fairly high coefficient of friction (about 0.6–0.8), higher than wet rubber on concrete.

B. Wrong: a rubber tyre on dry concrete grips hardest of all — the coefficient is about 0.7–0.9, the maximum of the three.

C. Correct: water lubricates the contact, so rubber on wet concrete has the lowest coefficient (about 0.4–0.6) — which is why wet roads are slippery.

D. Wrong: rubber tyre on wet concrete is among the options and is correct.

Question 41 Physics

The apparent weight of a man in a lift is less than the real weight when the lift is going down _____?

- A. Under the force of gravity
- B. With some constant velocity
- C. With some acceleration ✓ **Correct answer**
- D. None of these

A. Wrong: "under the force of gravity" (free fall) would make the apparent weight zero, not merely less — and the phrase does not describe the ordinary case the question asks.

B. Wrong: at constant velocity there is no acceleration, so the normal reaction (apparent weight) equals the real weight.

When the lift accelerates downwards, the floor falls away from the man, so the normal reaction is mg − ma — less than the real weight mg.

D. Wrong: with some acceleration is among the options and is correct.

Question 42 Physics

Identify the pair which has same dimensions? Impulse and momentum, Force and power, Energy and work, Momentum and energy

- A. Impulse and momentum
- B. Force and power
- C. Energy and work ✓ **Correct answer**
- D. Momentum and energy

A. Also a same-dimension pair (impulse = change of momentum, both MLT^{-1}), which is why this item is a pick-one rather than a clean verified item.

B. Wrong: force is MLT^{-2} and power is ML^2T^{-3} — different dimensions.

C. Picked: work is the transfer of energy, so both have dimensions ML^2T^{-2}.

D. Wrong: momentum is MLT^{-1} and energy is ML^2T^{-2} — different dimensions.

Question 43 Physics

During flood, water entered an office having wooden tables. Indicate the position of tables, if floating _____?

- A. Legs downward
- B. Legs on side
- C. Legs upwards ✓ **Correct answer**
- D. None of these

A. Wrong: a table does not float in its normal standing position; the broad flat top is the buoyant part and the legs are the heavier, narrower part.

floating table does not settle on its side; it settles in the stable position with the broad top underneath.

C. Correct: the flat table top floats on the water like a raft, with the legs sticking up into the air — the stable floating position, with the centre of buoyancy under the broad top.

D. Wrong: legs upwards is among the options and is correct.

Question 44 Engineering (Fluid Mechanics)

For a floating body, the line of action of a buoyant force acts through _____?

- A. Centre of gravity of submerged part of the body
- B. Centroid of liquid displaced by the body ✓ **Correct answer**
- C. Metacentre of the body
- D. None of these

A. Wrong: the centre of gravity of the submerged part is not the point the buoyant force acts through; the buoyant force acts through the centre of the displaced liquid.

B. Correct: the buoyant force acts vertically upward through the centre of buoyancy, which is the centroid (centre of volume) of the liquid displaced by the body.

C. Wrong: the metacentre is the point about which a floating body rotates when tilted; it is used for stability, but the buoyant force does not act through it.

D. Wrong: centroid of liquid displaced by the body is among the options and is correct.

Question 45 Engineering (Fluid Mechanics)

Measure of the effect of compressibility in fluid flow is the magnitude of a dimensionless parameter known as _____?

- A. Mach number ✓ **Correct answer**
- B. Newton's number
- C. Euler number

A. Correct: the Mach number (flow velocity divided by the speed of sound) measures how important compressibility is — below about Mach 0.3 a flow can be treated as incompressible, above it compressibility matters.

B. Wrong: the Newton number (power number) relates power to fluid density and impeller speed in mixing; it is not the compressibility measure.

C. Wrong: the Euler number relates pressure forces to inertial forces; it is not the compressibility measure.

D. Wrong: Mach number is among the options and is correct.

Question 46 Engineering (Manufacturing)

Which of the following metals have excellent machinability?

- A. Cast iron ✓ **Correct answer**
- B. Low carbon steel
- C. Bronze
- D. None of these

A. Correct: grey cast iron machines excellently — its graphite flakes break the chip into short pieces and lubricate the cut, giving a good finish with low tool wear.

B. Wrong: low-carbon steel is soft and gummy; it forms long stringy chips and machines poorly compared with cast iron.

C. Wrong: bronze machines well (especially leaded bronze), but the textbook answer for excellent machinability among these metals is cast iron.

D. Wrong: cast iron is among the options and is correct.

47 Engineering (Manufacturing)

The process of pouring molten metal in the cavity of a metallic mould by gravity is known as _____?

- A. Die casting
- B. Permanent mould casting ✓ **Correct answer**
- C. Pressed casting
- D. None of these

A. Wrong: die casting forces molten metal into the mould under high pressure; it is not poured in by gravity.

B. Correct: pouring molten metal by gravity into a reusable metallic mould is permanent mould (gravity die) casting — the mould is permanent, unlike a sand mould.

C. Wrong: pressed casting is not the name for gravity pouring into a metallic mould.

D. Wrong: permanent mould casting is among the options and is correct.

Question 48 Engineering (Manufacturing)

The forging of steel specimen is normally done at a temperature of _____?

- A. 1500 degree Centigrade
- B. 400 degree Centigrade
- C. 1100 degree Centigrade ✓ **Correct answer**
- D. None of these

A. Wrong: 1500 °C is close to the melting point of steel (about 1370–1530 °C); forging that hot would melt or burn the steel.

B. Wrong: 400 °C is far below the recrystallisation temperature; forging there would be cold working, not hot forging.

C. Correct: steel is normally hot-forged at about 1100–1200 °C — hot enough to be plastic

stallise, but safely below melting.

D. Wrong: 1100 degree Centigrade is among the options and is correct.

Question 49 Engineering (Manufacturing)

In sheet metal work, the cutting force on the tool can be reduced by _____?

- A. Grinding the cutting edges sharp
- B. Increasing the hardness of tool
- C. Providing shear angle on the tool ✓ **Correct answer**
- D. None of these

A. Wrong: a sharp edge helps cutting generally, but the standard way to reduce the cutting FORCE in sheet-metal shearing is to give the blade a shear (rake) angle so the cut progresses gradually.

B. Wrong: a harder tool resists wear, but hardness does not reduce the force needed to cut the sheet.

C. Correct: a shear angle on the punch or die makes the blade meet the sheet progressively instead of all at once, so the peak cutting force drops sharply.

D. Wrong: providing shear angle on the tool is among the options and is correct.

Question 50 Engineering (Materials)

Hot working of metals is carried out _____?

- A. Adversely affects the mechanical properties of metals
- B. Below the recrystallisation temperature
- C. Above the recrystallisation temperature ✓ **Correct answer**
- D. None of these

A. Wrong: hot working generally improves the metal (refines the grain, closes porosity); it does not adversely affect its properties.

working below the recrystallisation temperature is COLD working, not hot working.

C. Correct: hot working is defined as deformation carried out above the recrystallisation temperature, so the metal recrystallises as it is worked and does not harden.

D. Wrong: above the recrystallisation temperature is among the options and is correct.

Question 51 Engineering (Materials)

Identify the refractory material that has high resistance to both acid and basic slags?

- A. Fire clay bricks
- B. Magnesia
- C. Chromite bricks ✓ **Correct answer**
- D. None of these

A. Wrong: fireclay bricks are ACID refractories; they resist acid slags but are attacked by basic slags.

B. Wrong: magnesia is a BASIC refractory; it resists basic slags but is attacked by acid slags.

C. Correct: chromite (chrome ore) bricks are NEUTRAL refractories — they resist both acid and basic slags, which is why they are used where the slag changes character.

D. Wrong: chromite bricks is among the options and is correct.

Question 52 Engineering (Manufacturing)

Slip gauges are generally made of _____?

- A. Cast iron
- B. Wrought iron
- C. Alloy steel ✓ **Correct answer**
- D. None of these

st iron is too soft and too coarse-grained to hold the precision finish a slip gauge needs.

B. Wrong: wrought iron is too soft and not stable enough for precision gauge blocks.

C. Correct: slip gauges (gauge blocks) are made of hardened, stabilised alloy steel (sometimes tungsten carbide or ceramic), ground and lapped to millionths of an inch, so they keep their size and resist wear.

D. Wrong: alloy steel is among the options and is correct.

Question 53 Engineering (Materials)

Tempering temperature for most of the materials is of the order of _____?

- A. 400 to 500 °C ✓ **Correct answer**
- B. 100 – 150 °C
- C. 350 to 400 °C
- D. None of these

A. Picked: the standard textbook figure quoted for the tempering temperature of most steels.

B. Wrong: 100–150 °C is below the usual tempering range (tempering starts around 150 °C) and is too low to temper most steels.

C. Also inside the real tempering range (medium-temperature tempering), which is why this item is a pick-one rather than a clean verified item; it is not the textbook figure picked here.

D. Wrong: 400 to 500 °C is among the options and is correct.

Question 54 Engineering (Materials)

Identify the hardest metal? Diamond, Iron, Platinum, Tungsten

- B. Iron
- C. Platinum
- D. Tungsten ✓ **Correct answer**

A. Wrong: diamond is the hardest MATERIAL known, but it is not a metal — it is crystalline carbon — so it cannot be the hardest metal.

B. Wrong: iron is a relatively soft metal (Mohs about 4–5), far softer than tungsten.

C. Wrong: platinum is a soft precious metal (Mohs about 4–4.5), far softer than tungsten.

D. Correct: among the metals offered, tungsten is the hardest (Mohs about 7.5, and the highest tensile strength of the pure metals); it is the intended answer — chromium, the hardest metal by Mohs hardness, is not an option (see verification summary).

Question 55 Engineering (Materials)

Lack of toughness in a material implies _____?

- A. Creep strength
- B. Brittleness ✓ **Correct answer**
- C. Plasticity
- D. None of these

A. Wrong: creep strength is resistance to slow deformation under load at high temperature; it has nothing to do with lack of toughness.

B. Correct: a material that lacks toughness absorbs almost no energy before breaking — it fractures without deformation — and that is exactly brittleness.

C. Wrong: plasticity is the ability to deform permanently without breaking, which a tough material has and a brittle one lacks; lack of toughness implies the opposite of plasticity.

D. Wrong: brittleness is among the options and is correct.

56 Physics

According to equilibrium law, two forces can be equilibrium only if they are _____?

- A. Collinear in action
- B. Equal in magnitude
- C. Opposite in direction
- D. All of the above ✓ **Correct answer**

A. True but partial: two forces in equilibrium must act along the same line (collinear), but that alone is not enough.

B. True but partial: they must be equal in size, but that alone is not enough.

C. True but partial: they must point opposite ways, but that alone is not enough.

D. Correct: two forces balance only when they are all three at once — equal in magnitude, opposite in direction, and collinear in action.

Question 57 General Science

Environmental protection agencies advise against the use of chloro-fluoro carbon refrigerants since these react with _____?

- A. Ozone layer ✓ **Correct answer**
- B. Water vapour and cause acid rain
- C. Plastic and cause green
- D. None of these

A. Correct: chlorofluorocarbons (CFCs) rise to the stratosphere, where ultraviolet light releases chlorine atoms that destroy ozone molecules — the cause of the ozone hole, which is why CFCs were banned under the Montreal Protocol.

B. Wrong: CFCs do not react with water vapour to cause acid rain (that is sulphur and nitrogen oxides).

is option is garbled, CFCs are not banned for reacting with plastic.

D. Wrong: ozone layer is among the options and is correct.

Question 58 Engineering (Thermodynamics)

A capillary tube is used in a small refrigerator to serve the purpose of _____?

- A. Evaporator
- B. Thermostat
- C. Expansion valve ✓ **Correct answer**
- D. None of these

A. Wrong: the evaporator is the coil where the refrigerant boils and absorbs heat; the capillary tube is not the evaporator.

B. Wrong: the thermostat is the control that switches the compressor on and off; the capillary tube is a tube, not a control.

C. Correct: in a small refrigerator the long, narrow capillary tube acts as the expansion device — the high-pressure liquid refrigerant drops in pressure as it flows through it, then enters the evaporator.

D. Wrong: expansion valve is among the options and is correct.

Question 59 Physics

When the spring of a watch is wound, it will possess _____?

- A. Electrical energy
- B. Strain energy ✓ **Correct answer**
- C. Kinetic energy
- D. None of these

A. Wrong: a wound watch spring stores mechanical energy, not electrical energy.

winding the spring deforms it elastically, and the work done is stored as elastic potential (strain) energy, which is released as the spring unwinds to drive the watch.

C. Wrong: kinetic energy is the energy of motion; a wound spring at rest has no kinetic energy — it has stored strain energy.

D. Wrong: strain energy is among the options and is correct.

Question 60 Engineering (Fluid Mechanics)

Flow rate of a river can be determined by _____?

- A. Weir ✓ **Correct answer**
- B. Kennison nozzle
- C. Kundt's tube
- D. None of these

A. Correct: a weir (a low dam with a notched crest) is the standard device for measuring the flow rate of a river or open channel — the discharge is calculated from the head of water over the crest.

B. Wrong: a Kennison nozzle is a device for measuring flow in pipes, not for a river.

C. Wrong: Kundt's tube is a laboratory apparatus for measuring the speed of sound in a gas, not river flow.

D. Wrong: weir is among the options and is correct.

Question 61 Physics

"All bodies above absolute zero temperature emit radiation." Above statement is based on _____?

- A. Wien's law
- B. Provost theory ✓ **Correct answer**
- C. Plank's law

A. Wrong: Wien's displacement law tells how the peak wavelength of the emitted radiation shifts with temperature; it is not the statement that all bodies emit radiation.

B. Correct: Prevost's theory of heat exchanges (1791) states that every body above absolute zero both emits and absorbs radiant heat — the body that appears cold is still radiating, it is just absorbing more than it emits.

C. Wrong: Planck's law gives the spectrum (the amount of radiation at each wavelength) emitted by a black body; it assumes, rather than states, that bodies emit radiation.

D. Wrong: Provost theory is among the options and is correct.

Question 62 General Science

Formation of fog is due to _____?

- A. Temperature falls of atmosphere ✓ **Correct answer**
- B. High pressure
- C. Humidity
- D. None of these

A. Correct: fog forms when the air cools to its dew point, so the water vapour in it condenses into tiny droplets suspended in the air — typically on a calm, clear night when the temperature falls.

B. Wrong: high pressure alone does not make fog; fog needs cooling to the dew point (high pressure often brings the clear skies that allow the cooling, but it is not the cause).

C. Wrong: humidity is necessary for fog (there must be water vapour to condense), but the formation itself is caused by the fall in temperature; humid air without cooling stays clear.

D. Wrong: temperature falls of atmosphere is among the options and is correct.

63 Engineering (Thermodynamics)

Heat is transferred from an insulated pipe to the surrounding still air mainly by _____?

- A. Radiation
- B. Conduction
- C. Free convection ✓ **Correct answer**
- D. None of these

A. Wrong: an insulated pipe has a low outer surface temperature, so its radiation loss is small compared with convection.

B. Wrong: conduction carries heat through the insulation to the outer surface, but the transfer FROM the surface to the still air is not conduction through a solid.

C. Correct: the warm outer surface heats the air touching it, the air rises and is replaced by cooler air — natural (free) convection is the main way heat leaves an insulated pipe into still air.

D. Wrong: free convection is among the options and is correct.

Question 64 Engineering (Thermodynamics)

The highest value of thermal conductivity is expected for _____?

- A. Boiling water
- B. Solid ice ✓ **Correct answer**
- C. Melting ice
- D. None of these

A. Wrong: water's thermal conductivity is about 0.6 W/m·K, and boiling does not raise it — the value for water is the lowest of the three.

B. Correct: solid ice has a thermal conductivity of about 2.2 W/m·K — roughly four times that of liquid water — because heat travels through the ordered crystal lattice far better than through a liquid.

elting ice is a mixture of ice and water at 0 °C, and its effective conductivity is below that of solid ice.

D. Wrong: solid ice is among the options and is correct.

Question 65 Engineering (Manufacturing)

A surface gauge is used to _____?

- A. Check the surface finish
- B. Layout the work accurately ✓ **Correct answer**
- C. Level the surface plate
- D. None of these

A. Wrong: surface finish is checked with a profilometer or by comparison specimens, not with a surface gauge.

B. Correct: a surface gauge (scribing block) holds a scriber at a set height above a surface plate so the workman can scribe accurate layout lines on the workpiece.

C. Wrong: a surface plate is levelled with a spirit level, not with a surface gauge.

D. Wrong: layout the work accurately is among the options and is correct.

Question 66 Physics

Gases have poor _____?

- A. Absorptivity as well as transmissivity
- B. Absorptivity ✓ **Correct answer**
- C. Reflectivity
- D. None of these

A. Wrong: gases are poor absorbers but they are GOOD transmitters of radiation (most gases let thermal radiation pass straight through) — so they are not poor in transmissivity.

gases (especially the simple diatomic gases like nitrogen and oxygen) absorb very little thermal radiation — they have poor absorptivity and are nearly transparent to it.

C. Wrong: gases reflect almost no radiation; their reflectivity is low, but the property the question asks about is absorptivity.

D. Wrong: absorptivity is among the options and is correct.

Question 67 Engineering (Thermodynamics)

Steam at the exit from the nozzle has _____?

- A. Low pressure and high velocity ✓ **Correct answer**
- B. High pressure and low velocity
- C. Low pressure and low velocity
- D. None of these

A. Correct: a nozzle converts the steam's pressure (enthalpy) into kinetic energy — so at the exit the steam is at low pressure and high velocity, ready to strike the turbine blades.

B. Wrong: that describes the steam at the nozzle INLET, not the exit.

C. Wrong: the pressure does fall, but the velocity RISES — the whole point of a nozzle is to raise the velocity.

D. Wrong: low pressure and high velocity is among the options and is correct.

Question 68 Physics

The triple point of water is _____?

- A. 373.16k
- B. 273.16k ✓ **Correct answer**
- C. 285.16k
- D. 300.16k

373.16 K is 100 °C, the normal boiling point of water, not the triple point.

B. Correct: the triple point of water — where ice, liquid water and vapour coexist — is 273.16 K (0.01 °C) at 611.7 Pa; it is the defining fixed point of the kelvin scale.

C. Wrong: 285.16 K is not a special point for water.

D. Wrong: 300.16 K is about 27 °C, an ordinary room temperature, not the triple point.

Question 69 Engineering (Manufacturing)

A brazed joint can be satisfactorily made on an article made of _____?

- A. Galvanized sheet
- B. Aluminum
- C. Copper ✓ **Correct answer**
- D. None of these

A. Wrong: galvanized (zinc-coated) sheet brazes badly — the zinc coating vaporises at brazing temperature, giving porous, weak joints and toxic fumes.

B. Wrong: aluminium is difficult to braze — its tenacious oxide layer needs special fluxes and filler metals, so it is not the straightforward brazing material.

C. Correct: copper brazes readily and satisfactorily with standard silver or copper-phosphorus filler metals — copper pipe joints are the classic brazed joint.

D. Wrong: copper is among the options and is correct.

Question 70 Engineering (Manufacturing)

The binder in case of synthetic sand is _____?

- A. Rounded
- B. Water
- C. Clay ✓ **Correct answer**

A. Wrong: "rounded" describes the shape of sand grains, not a binder.

B. Also defensible in substance, since the textbook phrase names water together with bentonite as the binder — which is why this item is a pick-one rather than a clean verified item — but water is classified separately as moisture, not as the binder itself.

C. Picked: bentonite clay is the binder in synthetic moulding sand; it is the clay that holds the sand grains together.

D. Wrong: clay is among the options and is correct. Printed-key correction: testpointpk keys B 'Water'; corrected to C 'Clay' (see verification summary).

This paper remains the paper of the Balochistan Public Service Commission. Ranjha Solutions branding is on this solved presentation only — the paper is not owned by Ranjha Solutions. BPSC publishes no past papers officially.

Past papers are **free** — no charge is taken from any student for papers. General Knowledge answers are as of the 2025 sitting.

Source: https://testpointpk.com/paper-mcqs/6446/bpsc-assistant-engineer-past-paper-14-04-2025 (accessed 8 Nov 2026). See the source note on this page about the fold-in corrections.