BunkPoint MOCK TEST

RVUNL JE Mechanical 2026 Mock Test 1

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Engineering Mechanics

Q.1–3 | 3 questions

Q.1 A projectile is launched from level ground at an angle θ to the horizontal and air resistance is neglected. Which statement is correct?

(A) Launch angles θ and $90^\circ - \theta$ give ranges differing by a factor of two

(B) The horizontal component of velocity stays constant throughout the flight

(C) The time of flight depends on the horizontal component of launch velocity

(D) The speed of the projectile is least at the instant of its launch

Q.2 A force $\vec{F} = 10\hat{i} + 20\hat{j}$ N acts at the point $(2, 3)$ m. The moment of the force about the origin is

(A) 80 N m counter-clockwise

(B) 70 N m counter-clockwise

(C) 10 N m counter-clockwise

(D) 10 N m clockwise

Q.3 Which statement about analysing a plane truss is correct?

(A) The method of sections applies only to trusses having no zero-force members

(B) The method of sections needs every cut member to be in compression

(C) The method of joints gives three independent force equations at each joint

(D) A section cut gives one chosen member force without solving every joint

Strength of Materials

Q.4–7 | 4 questions

Q.4 A solid circular shaft of diameter d transmits a torque T. The maximum shear stress in the shaft is

(A) $\frac{16T}{\pi d^3}$ **(B)** $\frac{32T}{\pi d^3}$ **(C)** $\frac{8T}{\pi d^3}$ **(D)** $\frac{16T}{\pi d^4}$

Q.5 A steel bar (E = 200 GPa) and a copper bar (E = 100 GPa) of equal length and equal area are joined between rigid end plates and loaded axially. Which statement is correct?

(A) Copper carries twice the load carried by steel

(B) Steel and copper carry equal stress under load

(C) Steel carries twice the stress carried by copper

(D) The strain in steel is twice the strain in copper

Q.6 Which statement about strain energy in a bar under axial load is correct?

(A) Strain energy per unit volume under axial stress σ equals $\sigma^2 E/2$

(B) A suddenly applied load produces twice the stress of the same load applied gradually

(C) Modulus of resilience equals the whole area under the stress-strain curve up to fracture

(D) The stress due to a sudden load equals that due to the same gradual load

Q.7 At a point, $\sigma_x = 80$ MPa, $\sigma_y = 20$ MPa and $\tau_{xy} = 40$ MPa. The maximum principal stress is

(A) 122 MPa **(B)** 140 MPa **(C)** 110 MPa **(D)** 100 MPa

Theory of Machines

Q.8–15 | 8 questions

Q.8 In a simple gear train made of a driver, an idler and a driven gear, the idler

(A) reverses the rotation but keeps the whole speed ratio

(B) reduces the speed of the driven gear in proportion to its diameter

(C) doubles the speed ratio between the driver and the driven gears

(D) multiplies the torque on the driven gear by its own tooth number

Q.9 For a Grashof four-bar chain, which statement about its inversions is correct?

(A) Fixing the shortest link gives a double-crank or drag link mechanism

(B) The shortest and longest links together must exceed the other two combined

(C) Fixing the link opposite to the shortest link gives a crank-rocker mechanism

(D) Fixing a link adjacent to the shortest link gives a double-rocker mechanism

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Q.10 Which statement about centrifugal governors is correct?

(A) A stable governor has equilibrium radius that decreases as speed rises

(B) Governor power equals the sleeve effort divided by the sleeve lift

(C) A hunting governor is one that fails to respond to small speed changes

(D) An isochronous governor holds equilibrium at one speed

Q.11 Which statement about inversions of the single slider crank chain is correct?

(A) Fixing the slider gives the oscillating cylinder engine mechanism

(B) Fixing the cylinder frame gives the crank and slotted lever mechanism

(C) Fixing the crank gives the Whitworth quick return motion mechanism

(D) Fixing the connecting rod gives the hand pump mechanism

Q.12 A driver pulley of 300 mm diameter runs at 400 rpm and drives a 600 mm pulley. If the total slip is 4 percent, the speed of the driven pulley is

(A) 208 rpm **(B)** 192 rpm **(C)** 200 rpm **(D)** 384 rpm

Q.13 The coefficient of fluctuation of speed of a flywheel is defined as

(A) $\frac{\omega_{max} + \omega_{min}}{\omega_{mean}}$ **(B)** $\frac{\omega_{mean}}{\omega_{max} - \omega_{min}}$

(C) $\frac{\omega_{max} - \omega_{min}}{\omega_{mean}}$ **(D)** $\frac{\omega_{max} - \omega_{min}}{\omega_{max}}$

Q.14 The minimum number of teeth on a pinion of a 20° full-depth involute system, meshing with a rack, to avoid interference is

(A) 17 **(B)** 18 **(C)** 32 **(D)** 14

Q.15 Which statement correctly distinguishes static and dynamic balancing of rotating masses?

(A) Static balance needs both resultant force and resultant couple zero, dynamic needs couple only

(B) Static balance of masses in different planes always ensures their dynamic balance

(C) A system can be dynamically balanced while its resultant centrifugal force is non-zero

(D) Dynamic balance needs both resultant force and resultant couple zero, static needs force only

Machine Design

Q.16–19 | 4 questions

Q.16 A shaft carries a bending moment of 300 N m and a twisting moment of 400 N m. The equivalent twisting moment (maximum shear stress theory) and equivalent bending moment (maximum principal stress theory) are

(A) $T_e = 500$ N m and $M_e = 400$ N m

(B) $T_e = 500$ N m and $M_e = 800$ N m

(C) $T_e = 700$ N m and $M_e = 500$ N m

(D) $T_e = 700$ N m and $M_e = 400$ N m

Q.17 Which statement about a self-energising brake is correct?

(A) Friction produces a moment that helps to apply the brake

(B) It needs a larger actuating force than a non-self-energising brake

(C) The braking torque is independent of the friction coefficient

(D) Friction force produces a moment that opposes brake application

Q.18 The maximum possible efficiency of a self-locking power screw is

(A) 100 percent **(B)** 50 percent **(C)** 75 percent **(D)** 60 percent

Q.19 A single parallel fillet weld has a size of 10 mm and a length of 100 mm. The allowable shear stress is 80 MPa. Taking throat thickness = 0.707 times the size, the load it can carry is

(A) 80.0 kN **(B)** 113.1 kN **(C)** 28.3 kN **(D)** 56.6 kN

Fluid Mechanics

Q.20–27 | 8 questions

Q.20 Water ($\nu = 10^{-6}$ m^2/s) flows at 0.2 m/s past a flat plate. Using the laminar result $\delta = 5x/\sqrt{Re_x}$, the boundary layer thickness at $x = 0.5$ m is

(A) 0.79 mm **(B)** 15.8 mm **(C)** 7.9 mm **(D)** 4.0 mm

Q.21 A vertical rectangular gate 2 m wide and 3 m high has its top edge at the free surface of water. The hydrostatic force on the gate is nearly

(A) 88.3 kN **(B)** 44.1 kN **(C)** 176.6 kN **(D)** 29.4 kN

Q.22 For fully developed laminar flow in a circular pipe, the ratio of maximum velocity to average velocity is

(A) 1.2 **(B)** 1.5 **(C)** 0.5 **(D)** 2.0

Q.23 A clean glass tube is dipped in water. If the bore radius of the tube is halved, the capillary rise becomes

(A) unchanged **(B)** doubled **(C)** halved **(D)** four times

Q.24 Gas flow is usually treated as incompressible only when the Mach number is below about

(A) 0.8 **(B)** 1.0 **(C)** 0.3 **(D)** 1.5

Q.25 Water flows steadily through a horizontal pipe that narrows from 100 mm to 50 mm diameter. If the velocity in the wide section is 2 m/s, the velocity in the narrow section is

(A) 4 m/s **(B)** 8 m/s **(C)** 2 m/s **(D)** 16 m/s

Q.26 Which statement about Buckingham's π theorem is correct?

(A) A problem with n variables and m dimensions has $n - m$ independent dimensionless groups

(B) A problem with n variables and m fundamental dimensions has $n + m$ independent dimensionless groups

(C) The repeating variables chosen must include the dependent variable of the problem

(D) The repeating variables must together form a dimensionless group of their own

Q.27 Oil of density 900 kg/m^3 and viscosity 0.09 Pa s flows at 0.5 m/s through a 50 mm diameter pipe. The Reynolds number and flow regime are

(A) Re = 25000, turbulent flow **(B)** Re = 25, laminar flow

(C) Re = 250, laminar flow **(D)** Re = 2500, turbulent flow

Hydraulic Machines

Q.28–29 | 2 questions

Q.28 A Francis turbine is classified as

(A) an outward-flow impulse turbine with fixed vanes

(B) a tangential-flow impulse turbine with buckets

(C) an axial-flow reaction turbine with adjustable blades

(D) an inward-flow reaction turbine with guide vanes

Q.29 In a reaction turbine fitted with a draft tube, the pressure at the runner exit is

(A) equal to atmospheric

(B) equal to the vapour pressure

(C) less than atmospheric

(D) greater than atmospheric

Thermodynamics

Q.30–35 | 6 questions

Q.30 According to Dalton's law, the total pressure of a mixture of ideal gases equals

(A) the sum of the partial pressures of all the component gases

(B) the partial pressure of the gas with the highest mole fraction

(C) the mean of the partial pressures of the component gases

(D) the product of the partial pressures of the component gases

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Q.31 For an ideal gas, $c_p = 1.005$ kJ/kg K and $c_v = 0.718$ kJ/kg K. The gas constant and the ratio of specific heats are

(A) $R = 1.723$ kJ/kg K and $\gamma = 1.40$

(B) $R = 1.723$ kJ/kg K and $\gamma = 0.71$

(C) $R = 0.287$ kJ/kg K and $\gamma = 0.71$

(D) $R = 0.287$ kJ/kg K and $\gamma = 1.40$

Q.32 A closed system receives 100 kJ of heat while doing 40 kJ of work on its surroundings. The change in internal energy of the system is

(A) +140 kJ **(B)** +60 kJ **(C)** -140 kJ **(D)** -60 kJ

Q.33 Gas expands adiabatically through a nozzle with negligible inlet velocity, no work and negligible potential energy change. With specific enthalpies h_1 and h_2 in J/kg, the exit velocity is

(A) $2(h_1 - h_2)$ **(B)** $\sqrt{2(h_1 + h_2)}$ **(C)** $\sqrt{2(h_1 - h_2)}$ **(D)** $\sqrt{h_1 - h_2}$

Q.34 For the same compression ratio and the same heat input, the air-standard efficiencies compare as follows:

(A) Dual cycle efficiency is lower than both Otto and Diesel

(B) Otto cycle efficiency exceeds Diesel cycle efficiency

(C) Otto and Diesel cycles have equal efficiency

(D) Diesel cycle efficiency exceeds Otto cycle efficiency

Q.35 Which statement about the ideal air-standard Brayton cycle is correct?

(A) Efficiency falls as the pressure ratio rises for a fixed inlet temperature

(B) Efficiency depends on the maximum cycle temperature at a fixed pressure ratio

(C) Net work output is greatest at the highest pressure ratio that can be achieved in practice

(D) Efficiency rises with pressure ratio and is independent of maximum temperature

Heat Transfer

Q.36–40 | 5 questions

Q.36 A small hot metal sphere cools in air. A lumped heat capacity analysis of its cooling is acceptable when the Biot number hL_c/k is

(A) less than about 0.1 **(B)** exactly equal to unity

(C) about 10 or more **(D)** greater than about 1.0

Q.37 In the pool boiling curve of water, the point of maximum heat flux is called

(A) the onset of nucleate boiling **(B)** the film boiling regime

(C) the Leidenfrost point **(D)** the critical heat flux point

Q.38 A wire is insulated with a material of conductivity 0.2 W/m K, and the outside convection coefficient is 10 W/m^2 K. The critical radius of insulation is

(A) 20 mm **(B)** 40 mm **(C)** 5 mm **(D)** 10 mm

Q.39 Which statement about extended surfaces (fins) is correct?

(A) Fin effectiveness is the ratio of the fin tip temperature to the base temperature

(B) Fin effectiveness is heat flow with the fin divided by that without it

(C) Fin efficiency can exceed unity if the fin is made of a very high-conductivity metal

(D) Fin effectiveness improves when the conductivity of the fin material decreases

Q.40 The Prandtl number represents the ratio of

(A) thermal diffusivity to momentum diffusivity of the flowing fluid

(B) convective to conductive heat transfer at a surface

(C) momentum diffusivity to thermal diffusivity of the fluid

(D) buoyancy force to viscous force within the flowing fluid

Manufacturing Processes

Q.41–45 | 5 questions

Q.41 Which statement about sintering in powder metallurgy is correct?

(A) Sintering is done above the melting point of the principal metal constituent

(B) Sintering is performed at room temperature under very high pressure

(C) Sintering is carried out before compaction to remove the binder

(D) Sintering is done below the melting point of the principal constituent

Q.42 Which statement about deep drawing of sheet metal is correct?

(A) Blank holder pressure helps to prevent wrinkling of the flange region

(B) Excess blank holder force is the main cause of flange wrinkling

(C) Limiting drawing ratio is the ratio of punch diameter to blank diameter

(D) Die clearance in drawing is kept less than the sheet thickness

Q.43 Intricate small parts of high-melting alloys needing excellent surface finish and accuracy are best made by

(A) loam mould casting of large parts

(B) investment (lost wax) casting

(C) green sand mould casting

(D) centrifugal casting of cylinders

Q.44 Two cubes of the same metal, of side 20 mm and 40 mm, are cast under identical conditions. By Chvorinov's rule, the ratio of solidification time of the larger to the smaller cube is

(A) 2 **(B)** 8 **(C)** 4 **(D)** 1

Q.45 The shrinkage allowance on a casting pattern is provided to compensate for

(A) the extra metal removed during finish machining

(B) the taper needed for easy withdrawal of the pattern

(C) the enlargement caused by rapping the pattern in sand

(D) metal contraction while cooling down to room temperature

Production Engineering

Q.46–47 | 2 questions

Q.46 In the 3-2-1 location principle for a rectangular workpiece, the total number of locating points is

(A) 6 **(B)** 5 **(C)** 4 **(D)** 9

Q.47 In orthogonal cutting with a 0° rake angle, the cutting force is 800 N and the thrust force is 400 N. The coefficient of friction on the tool face is

(A) 2.00 **(B)** 0.33 **(C)** 0.50 **(D)** 0.67

Industrial Engineering

Q.48–53 | 6 questions

Q.48 In exponential smoothing forecasting, a higher value of the smoothing constant α gives

(A) zero weight to the previous forecast

(B) greater weight to the most recent observation

(C) equal weight to all past observations

(D) greater weight to the oldest observations

Q.49 Work sampling is a technique based on

(A) random observations analysed with probability theory methods

(B) tables of predetermined motion times for each motion

(C) continuous stopwatch timing of every work element

(D) micromotion study using a camera at a fixed film speed

Q.50 A c-chart is used to monitor

(A) the fraction defective in a sample

(B) the number of defects per inspection unit

(C) the range of values within a sample

(D) the average of sample measurements

Q.51 Assuming no shortages, annual demand is 2400 units, ordering cost is Rs 200 per order and holding cost is Rs 12 per unit per year. The economic order quantity is nearly

(A) 200 units **(B)** 566 units **(C)** 400 units **(D)** 283 units

Q.52 Which statement about inventory classification is correct?

(A) ABC analysis classifies items by criticality of shortage instead of by value

(B) VED analysis classifies items by annual consumption value of each item

(C) Class A items are a small share of items but most of the annual usage value

(D) Class C items are a small share of items but most of the annual usage value

Q.53 The X-bar chart and the R chart are used together to monitor

(A) the fraction defective and the variation in sample size

(B) the number of defectives and the defects per unit

(C) the mean and the spread of a measured characteristic

(D) the specification limits and the natural tolerance only

Power Plant Engineering

Q.54–57 | 4 questions

Q.54 A power plant of 100 MW installed capacity has a maximum demand of 80 MW and generates 350 GWh in a year of 8760 hours. Its load factor is nearly

(A) 49.9 percent **(B)** 80.0 percent **(C)** 40.0 percent **(D)** 62.5 percent

Q.55 Which statement about the Parsons reaction steam turbine is correct?

(A) Steam expands only in the fixed blades of each stage

(B) The degree of reaction is zero for the moving blade rows

(C) The steam pressure stays constant across the moving blade rows

(D) The degree of reaction is 50 percent with identical blades

Q.56 In a nuclear reactor, the function of the moderator is to

(A) carry heat from the core to the heat exchanger loop

(B) slow down fast fission neutrons to low thermal energies

(C) shield the surroundings from harmful radiation

(D) absorb neutrons to regulate the chain reaction

Q.57 Equivalent evaporation is the steam produced per hour from and at 100°C, meaning conversion of

(A) water at 100°C into wet steam of dryness 0.9 at atmospheric pressure

(B) water at 100°C into dry saturated steam at 100°C at atmospheric pressure

(C) water at 0°C into dry saturated steam at 100°C at standard atmospheric pressure

(D) feed water at its actual temperature into steam at the actual boiler pressure

Refrigeration and Air Conditioning

Q.58–59 | 2 questions

Q.58 For unsaturated moist air, the correct order of the three temperatures is

(A) dry bulb > wet bulb > dew point temperature, in that order

(B) wet bulb > dry bulb > dew point temperature, in descending order

(C) dry bulb > dew point > wet bulb temperature, respectively

(D) dew point > wet bulb > dry bulb temperature, from high to low

Q.59 Which refrigerant designation and chemical name pair is correct?

(A) R-717 is CO_2, chemically carbon dioxide

(B) R-134a is $CHClF_2$, chemically chlorodifluoromethane

(C) R-22 is CCl_2F_2, chemically dichlorodifluoromethane

(D) R-12 is CCl_2F_2, chemically dichlorodifluoromethane

Engineering Materials

Q.60 | 1 question

Q.60 Which hardness test uses a square-based diamond pyramid indenter?

(A) Brinell test

(B) Rockwell B test

(C) Vickers test

(D) Shore scleroscope test

Get the Answers with Explanations

RVUNL JE Mechanical 2026 Mock Test 1

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